Predicting and explaining returns of Initial Public Offerings is extremely difficult, if not impossible. By using regression analysis, one can attempt to pinpoint a variable (or variables) that has an acceptable correlation with the returns of IPO stocks. The following paragraphs discuss the advantages and disadvantages of each independent variable and provide conclusions that have been made from various statistical measures.

DATA & STATISTICAL RESULTS:

The data used in the analysis consisted of daily closing stock quotes for the following stocks offering IPOs. These stocks included:

Company Name	Ticker Symbol	Industry
Northwestern Steel and Wire	NWSW	Manufacturing
First Shift	FSFT	Computer software
Donnkenny	DNKY	Clothing manufacturer/Retailer
Pacific Sun	PSUN	Clothing manufacturer/Retailer
All State Company	ALL	Insurance
Omni Insurance Group	OMGR	Insurance
Davidson and Associates	DAVD	Computer software
ECCS Incorporated	ECCS	Computer peripheral equipment
Clayton Williams Inc.	CWEI	Gas and oil exploration
United Meridian Corporation	UMC	Gas and oil exploration

The data was retrieved from the Dow Jones Retrieval service located in the Homer Babbidge Library. The data included the closing prices for the first five days of results. In addition, we have used the stock's closing price for each Friday for 26 weeks. The S&P 500 values were used as a method to benchmark IPO performance. These figures were found in The Statistical Survey produced by Standards & Poors. [1]

[1]Standard & Poor's, Statistical Survey, see mike for month and page.

We used regression on with following independent variables using the first day abnormal returns as the dependent variable. The following list outline the the attributes we used as the independent variables.

1. Standard Deviation
2. S&P 500
3. Underwriter
4. Percent of stocks owned by insiders (insider)
5. Capital Structure (debt/equity ratio)
6. Age of the firm expressed as the natural logarithm (Age)
7. Offer size measured as a percent of gross proceeds from offering in thousands. (Size)
8. Month the offer was made (Month)

The regression results are presented within the document with the qualitative discussion of each independent variable discussed above.

First Day Returns

First day returns is defined as the profit/loss after the first day close divided by the price paid for the stock. Underwriters value the stock and offer it to the public at an established price. Investors review the prospectus and determine whether the stock is over or under-valued.

The drawbacks of using this independent variable are numerous. It is a superficial measure in that it ignores the long-term potential of the stock. High first day returns could be attributable to a low offer price coupled with the offering firm's desire to make the stock an instant success. Another drawback to this independent variable is that small investors are neglected in the offering and that the offering does not get full exposure to the market.

Here are the regression results:

Regression Output:	S & P 500
Constant	0.01799
Std Err of Y est.	0.08068
R squared	0.03713
No. of observations	10
Degrees of Freedom	8
X Coefficient(s)	0.51134
Std Err of Coef.	0.92056

First day returns cannot explain an acceptable amount of the variability in the selected IPO's (3.7%). Like most independent variables, it is not useful for prediction purposes. The X coefficient (or beta) shows that there is a positive correlation with the first day returns and that is comforting. One can say, with hesitation, that if the IPO experiences an increase in value after the first day, then the stock will have positive returns. The standard error of the coefficient is .92056; this demonstrates that there is an unacceptable "closeness of fit" to the regression line. The T-statistic is .5555, which is below 2.0, therefore, little to no correlation exists.

Standard & Poor's Returns v. Selected IPO Returns

The S& P 500 index is considered a leading economic indicator for economists and is used as a benchmark for investors around the world. Because of its importance for various disciplines, an attempt has been made to use it as an independent variable to determine the causal relationship for the returns of IPO's.

A large number of stocks listed with the S & P 500 are established stocks, some that have been traded for nearly a century. Therefore, to compare the returns of IPO's on a six month basis to this index is an unfair comparison. Since there are few alternatives, one must settle for this index.

A more correspondent index to use as an independent variable would be an IPO index, which is not available to investors. This proposed index would contain returns of new stocks, or

IPO's that have been offered within a calendar year. This index would provide IPO investors with a reliable measure. Here are the regression results:

Regression Output:	S & P 500
Constant	-0.0889
Std Err of Y est.	0.06565
R squared	0.36239
No. of observations	10
Degrees of Freedom	8
X Coefficient(s)	88.1788
Std Err of Coef.	41.3526

Upon an initial review of the statistical output, it appears that the S & P 500 can explain a substantial amount of the variability in the selected IPO's (36%). Taking into consideration the difficulty of predicting the returns of stocks, this is a highly dependable independent variable. The X coefficient (or beta) shows that there is a positive correlation between the S & P 500 performance and the IPO's returns. As the S & P 500 goes up, the returns of IPO's also increases.

The standard error of the coefficient shows a value of 41.4. A first look at this measure would alarm investors but, in fact, the units of the S & P 500 are in the hundreds. A more appropriate statistical technique is to look at the t-statistic which adjusts the measures due to a smaller sample size. The T-statistic, which is defined as the X coefficient divided by the standard error of the coefficient, is 2.1. Normally, for a sample size of at least 30, this t-statistic would acceptable because it is greater than 2.0. However, the sample size is only 10 and no conclusion can be made.

Underwriter

It is important to see if there is a relationship between the top underwriters (i.e., Merrill Lynch and Goldman Sachs) and the initial success of the IPO in the first days. The well-known, big firms could be better at pricing and/or gauging interest. Here, the higher returns and the statistical significance could be the proof.

Large and experienced firms may accurately price the IPO for a successful initial offering. One of the very important reasons for this hypothesis is that these firms have greater access to information. Smaller firms, on the other hand, may underprice to ensure the sale of the stock. This, naturally, will create arbitrage opportunities.

As an example, a Business Week article reports that Merrill Lynch underwrote three times as many IPOs as their nearest competitor. This could help investors feel comfortable about the reliability of the asset price.

Regression Output: UNDERWRITER		
Constant	0.04134	
Std. Error of Y Est.	0.08220	
R Squared	0.00054	
No. of Observations	10	
Degrees of Freedom	8	
X Coefficient(s)	0.00059	
Std. Error of Coef.	0.00896	

The very small number of R Squared is basically because of the small sample size. More than 99% of the relationship between independent and dependent variables can be explained by the other factors. One unit increase in independent variable X can only increase dependent variable Y by 0.00059. This, in terms of statistical analysis, is a very small number for slope. Standard error of coefficient is also small which shows that there are no

T-test = X coefficient / Std. error = 0.00059 / 0.00896 = 0.0658.

If the confidence level is assumed to be 95%, in a two tailed analysis, t-test is insignificant. This is mainly because of our small sample size.

Percent Held By Insiders

All managers of companies that are offering IPO's know the value of the stock. Therefore, a high percentage of insiders holding the stock means that the stock may be worth more than the offering price. Depending on the performance of the company, a high insiders percentage could indicate a closely held company that needs to raise capital for expansion or reduction of debt levels.

There are, however, drawbacks to holding a high percentage of stock. This could mean that the company will take on high levels of debt in the future to finance capital expenditures sometime in the near future.

Here are the regression results:

Regression Output:	S & P 500
Constant	0.08405
Std Err of Y est.	0.07505
R squared	0.16674
No. of observations	10
Degrees of Freedom	8
X Coefficient(s)	-0.0389
Std Err of Coef.	0.02697

First day returns cannot explain an acceptable amount of the variability in the selected IPO's (16.7%). It is not useful for prediction purposes. The X coefficient (or beta) shows that there is a negative correlation with the percentage of insider holding. One can say, that if the IPO has a high amount of insider holding, then it is likely that the return on the IPO will be negative. The standard error of the coefficient shows a value of .05409 which shows that there is an acceptable "closeness of fit" to the regression line. The T-statistic has a value of -1.265 demonstrating that the correlation is not very impressive.

Debt/Equity Ratio

Debt/Equity ratio is one of the most important attributes in our analysis. It can be observed in two different ways. The first one is that highly leveraged company could be a significant fluctuations from the X coefficient line. riskier investment. Especially, in the long-run, this can be very effective on the stock prices. Actually, one of the first things underwriters consider is the balance sheets of the companies. And, firms which have to pay high amount of debt could have liquidity problems which in turn, takes down their stock's price.

However, a second point of view can tell us substantially different things. Firms which are eager to succeed growth in their sales or market share have to increase their debts. The main reason is that, virtually for all of the companies, cost of debt is lower than the cost of equity.

So, Debt/Equity ratio does not tell us much about the price or the performance of the stock. However, it would not be wrong to say that long-term debt may make difference in returns over time and the standard deviations of returns.

Regression Output: DEBT/EQUITY RATIO	
Constant	0.08405
Std. Error of Y Est.	0.07505
R Squared	0.16674
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s) -0.06840	
Std. Error of Coef.	0.05409

Here, we have a decent value for R Squared, 16.674%. This can be accepted as a normal value especially when the sample size is not big. X coefficient is negative; so, one unit increase in the independent variable causes a decrease in the dependent variable. In other words, they are negatively correlated. Standard error of X coefficient is also not high.

T-test = X coefficient / Std. error = -0.06840 / 0.05409 = -1.2646.

Again, in a confidence level of 95%, this number is insignificant. Like the previous analysis of underwriters, we came up with an insignificant result since our sample size is very small.

Age of the Company

Age of the firm since the founding is also an important factor in the determination of IPO price and the performance of the security. Obviously, older firms will have different performance and interest than newer firms.

Older firms will tend not to be high tech offerings, as a result they may not be perceived as hot commodity in the '90s.

Another reason why we included the age of the firms in our analysis is that it could be interesting to see how the old firms do against the new high tech IPOs selected. This may also help investors in their decisions. A successful new high tech company might even change the beliefs of the investors on old corporations and vice versa.

Regression Output: AGE	
Constant	0.17435
Std. Error of Y Est.	0.07323
R Squared	0.20669
No. of Observations	10
Degrees of Freedom	8

X Coefficient(s)	-0.03890
Std. Error of Coef.	0.02697

R Squared is around 20% which can be accepted as a normal value again. Despite our small sample size, we can explain 20% of the relationship between the dependent and independent variables. Coefficient of X is negative like in Debt/Equity ratio which again means that any increase in independent variable will cause a decrease in the dependent variable. We also have a small value for standard error of coefficient.

T-test = X coefficient / Std. error = -0.03890 / 0.02697 = -1.4423.

A T-test value of -1.4423 falls outside of our confidence level of 95%. Therefore, we can come up with the conclusion that again, there is no significance in the regression analysis of the age of the company. Our small sample probably had an effect on this as well.

Offer Size

We analyzed the offer size as it related to the returns to see if there was a significant relationship. The size of an IPO's offer may impact the abnormal returns on the offering. The larger the offer size, the more difficult the IPO can be to bring to market. For example, an investment banking firm may have difficulty placing a relatively large offer size. In our study, Allstate had the largest offer size at 78.5 million shares. Coincidentally, Allstate also had the highest offer price at $27 per share. Although Allstate's prospectus does not discuss any difficulty experienced with this offer size, we postulate that the offer size and the returns can be negatively related. The larger the offer size, the more difficult it is to bring to market and the lower the first day abnormal returns.

Another issue to examine with respect to IPO's offer size is the buyers. The Business Week ("Beware of the IPO Market", April 4, 1994) states that institutional investors are the major purchasers of IPOs. IPO offer size can be examined through a simple supply and demand analysis. The demand for IPOs can be assumed stable, as the number of institutional buyers is relatively fixed in the short run. If the supply of IPOs in the market grew due to a very large offer size, the supply curve of the IPO would shift out and to the right thus decreasing the average price per IPO and overall returns. The relationship between IPO offer size and returns is negative.

Day 1 Abnormal Returns = 0.05436 + - 0.000001 Offer Size + 0.00003

The results of regressing Day 1 Abnormal Returns against offer size produced by the LOTUS 1-2-3 regression function were:

Constant	0.05436
Std. Err of Y Est	0.08097
R Squared	0.03031
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	-0.000001
Std. Err of Coef.	0.00003
T- statistic	-0.0000

From a statistical analysis these results are slightly significant given the small sample size.

The R squared yields a result of 0.03031. This indicates that 3.031% of the variability in the dependent variable, Day 1 Abnormal Returns, can be explained by changes in the independent variable, offer size. From a statistical perspective the result is not significant.

The X Coefficient, or the beta, was found at -0.00000. We have virtually a vertical line. The slope does have a negative sign which means that as the offer size increased, Day 1 Abnormal Returns decreased. We postulate that the larger the offer size, the more difficult it may be to bring to market since a major firm like Goldman, Sachs & Co. had to obtain the support of other major player to bring the 78.5 million share offering to market.

We cannot examine the T-statistic because the output only produced a negative sign and a string of zeros. Although the t-test fails, the negative sign of the result lends more support to our qualitative analysis between offer size and IPO returns.

Month of the Offer

The month that an IPO's is offered in may impact the abnormal returns. For example, there are significantly more IPOs offered during the month of June (See graph from *Wall Street Journal)*. One reason for this may be that June is the month many firms choose as their fiscal year end. An IPO's returns can significantly boost company results during the final end of the year quarter; hence, artificially improve financial stability through the inflow of equity funds. ALl the IPOs we chose most were offered in February, so based on our data there is no correlation with this attribute. It is interesting to note the differences in the volume of offerings by month.

Another explanation could be that an increase in volume of IPO activity in any given month can have a positive impact on the investor's activity in the IPO market; hence, increase initial returns. Thus, the assumption is that an increase in activity during any month will be positively related to Day 1 Abnormal Returns.

Day 1 Abnormal Returns = -0.0160 + 0.01214 Month + 0.00718

The results of regressing Day 1 Abnormal Returns against month offered are as follows. We assigned a numerical representation for each month, e.g., January equals one, fFebruary equals two and so on.

Constant	-0.0160
Std. Err of Y Est	0.07059
R Squared	0.26296
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	0.01214
Std. Err of Coef.	0.00718
T- statistic	1.6908

The R squared, yields a result of 0.26296. This result tells us that 26.296% of the variability in the dependent variable, Day 1 Abnormal Returns, can be explained by changes in

the independent variable, month. From a statistical perspective the result is not significant, but it is one of our highest betas.

The X Coefficient, or the beta of the regression equation, was found at 0.01214. The slope has a positive sign which means that as the volume of IPOs offered during a month increases, Day 1 Abnormal Returns increase. This is consistent with the qualitative analysis that increased IPO activity during a given month will rally investors to increase IPO's returns.

Lastly we examined the T-statistic which was 1.6908. We established a two tailed test at 95% confidence level with an alpha level equal to 0.025. The t-test fail, the positive sign of the result lensd more support to our qualitative analysis between month offered and IPO returns. We can therefore conclude that the month offerd has a positive impact on IPO performance, thus the more IPO stock available in a month, the greater the IPO returns.