The Effect of Financial Leverage & Systematic Risk on Stock Returns in the Amman Stock Exchange (Analytical Study – Industrial Sector)

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Abstract
This study aims at evaluating the relationship between stock returns in industrial companies listed on Amman Stock Exchange (ASE) and each of the systematic risk and financial leverage. Stock returns (R_{it}) are measured through the equation of returns divided by acquisition period. Whereas, systematic risk is measured by beta coefficient (β) using the market model, while the financial leverage (Lev) is expressed by debt ratio. Data concerning the variables of the study were collected comprising 48 industrial companies listed in Amman Stock Exchange for the period between January 2000 and December 2009. This task was accomplished in order to determine the relationship between stock returns as a dependent variable, and each of the systematic risk & financial leverage as independent variables. It should be noted that the study shows a statistically significant relationship between dependent variable and independent variables, it also found that these independent variables explain the 4.4% percentage of variation in stock returns in the industrial companies listed in Amman Stock Exchange.
The results revealed by the study model were contradictory, and do not match very well with the previous studies that have been conducted on more developed stock markets. Moreover, the direction of some independent variables and it relationship with the dependent variable were different from the hypothetical relationship, given the example of the relationship between systematic risk represented by beta coefficient and stock returns. However, these results correspond very well with studies conducted on developing markets.
Keywords: Returns, Systematic Risk, Financial Leverage, Amman Stock Exchange, Industrial Sector.

1. Introduction

During the last years, Jordan witnessed a great development in various economic fields, and the development of industrial sector is considered to be one of the main important aspects of economic progress in Jordan. It should be mentioned that Amman Stock Exchange has been established in 1976 and started working in the beginning of 1978. During the past decade, the market witnessed a number of changes and developments: the number of companies listed in financial market increased from 163 companies in 2000 to become 277 in 2010, all of them working in different economic sectors (Amman Stock Exchange, 2011). Within the scope of modernization of capital market in Jordan, the Jordanian government validated a number of laws in 1997 which aim at developing the capital, including securities law where securities commission, Amman Stock Exchange, and securities depository center were established according it.

Investment is defined as current sacrifice of certain financial values in order to obtain future uncertain values whereas the investor sacrifices a part or all of his wealth by freezing his funds and using them in investments with the hope of increasing these funds. Therefore, investment has two features; first the investment must usually generate returns; second these returns are uncertain and subject to fluctuations and volatility. Subsequently, the return on investment is the expected amount added to the wealth or returns during a future period of time. As long as this return is related to the future, it is uncertain, in other words it carries a number of risks that are usually measured quantitatively through contrast or standard deviation of potential returns.

2. The Problem of Study

The investor in stock market faces a difficulty in determining financial indicators and ratios which define the returns level that can be achieved through stocks of companies listed in stock exchange. Nationwide, investor in Amman Stock Exchange cannot determine financial ratios and indicators related to the desired return level and the degree of systematic risk and aggregate risks concerning stock prices of companies listed in stock exchange. For this reason the study will try to answer the following question:
What is the impact of systematic risk (β) and financial leverage (Lev) on stock returns of industrial companies listed in Amman Stock Exchange? The following sub-questions derive from the main question:
- Is there any impact for the financial leverage on stock returns of companies listed in Amman Stock

Exchange?
- Is there any impact for the systematic risk on stock returns of companies listed in Amman Stock Exchange?
- Is there's a common impact for both indicators (β, Lev) on stock returns of companies listed in Amman Stock Exchange?

3. The study Importance

Importance of the study is emphasized through the following elements:

3.1. Attempting to examine the effect between each of the systematic risk (β) and financial leverage (Lev) only for industrial companies listed in Amman Stock Exchange, and stock returns of these companies.

3.2. Identifying stock returns of industrial companies listed in Amman Stock Exchange in addition to the impact of the fluctuations of financial indicators and ratios on the companies because of its importance for both the investors and the owners.

4. Study objectives

The study aims to:

4.1. Measuring stock returns of industrial companies listed in Amman Stock Exchange during the period between 2000 and 2009.

4.2. Measuring systematic risk (β) of stocks for the industrial companies listed in Amman Stock Exchange, and defining its impact on stock returns of these companies subject of the research

4.3. Identifying the impact of financial leverage (Lev) of stocks of industrial companies listed in Amman Stock Exchange on the stock returns of these companies

4.4. Identifying the impact of both the financial leverage and systematic risk (Lev, β) on stock returns of the companies listed in Amman Stock Exchange.

5. The Study hypothesis

5.1. The main hypothesis: There's no statistically significant impact for each of the systematic risk (β) and the financial leverage (Lev) of the stocks of industrial companies listed in Amman Stock Exchange on stock returns of these companies.

5.2. The following sub-hypothesizes derived from the abovementioned main hypothesis:

   - There's no statistically significant impact for the financial leverage (Lev) of industrial companies listed in Amman Stock Exchange on annual returns of its stocks.

   - There's no statistically significant impact for the systematic risk (β) of industrial companies listed in Amman Stock Exchange on annual returns of its stocks.

6. Literature Review

6.1. Chen study (2004) entitled: "The Relationship between Operational Leverage & Financial Leverage":
This study has been carried out in the Republic of China, and according to this study, if the chief financial officer is aware of the possibility of a high development, he will choose a high operational leverage as a tool to help him realizing a low capital cost. On the other hand, if the chief financial officer knows that the company is in a bad financial position, he will choose a low operational leverage, and the company will assume a higher capital cost, leading by its turn to a higher risk. Furthermore, the study concluded the existence of a positive relationship between operational leverage and financial leverage, which means that what is applicable on the operational leverage, will be applied on the financial leverage too.

6.2. Smith and his colleagues study (conducted in 1990) entitled: "the Impact of Financial Leverage on Return on Investment" :
This study has been conducted on a group of 59 companies among the American industrial companies, and it shows the existence of a relationship between financing cost and financial leverage which influences on the return on investment. Moreover, the study recommended that the cost of borrowed and possessed financing must be used to eliminate the impacts of financial inflation that is shown in the financial statements, in order to determine the true and net value of returns and achieve the budget between financing cost and the financial leverage.

6.3. Al Khalayla (1998) study, entitled: Correlation degree between measures of financing risk and its Relationship with market beta and aggregate risk":

The study has found a strong and statistically significant correlation with 1% importance level between measures of financial risk. This fact supports the use of some of these measures in general as powerful alternatives. The results of market beta regression analyze on different measures of financing risk, were consistent with those of the previous studies, where the results indicate the existence of a positive relationship between market beta and the four measures of financing risk: (total debt to assets, total debt to book value property rights, long term liabilities to property rights, total debt to market value property rights) this is a statistically significant relationship to all financing risk measures, with the exception of the ratio of total debt to market value property rights. The study didn't found any results supporting the existence of a statistically significant relationship between financing risk measures and standard deviation of stock returns

7. The Study Model
7.1. Virtual model:
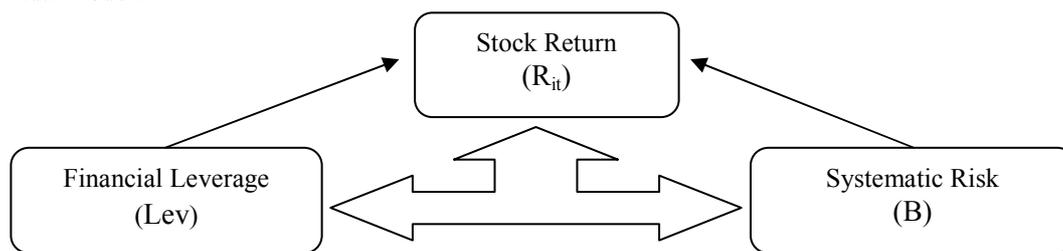
7.2. Mathematical model:
The study is trying to examine the impact of risk on return that is expressed by systematic risk and financial leverage. To achieve this step, and in order to examine the hypothesis, the study adopted the models that were used in many previous studies conducted for examining the Relationship between return and each of systematic risk and some financial ratios such as financial leverage, operational leverage and time interest earned. The studies included those conducted by "Fama & French, 1992", "Smith.et.al, 1990", "Abdel Rahman, 1987", "Chen 2004", "Glenn W. Boyle, Leslie Young, 2002", "Andrew A. Christie, 2002", in addition to the Mahmoud Al Rifai study conducted in 2008.

In the study model, the impact of each of the systematic risk and financial leverage, are expressed by independent variables, while annual returns is represented by the dependent variable in the following mathematical model:

$R_{it} = \alpha_0 + B_1 * \beta_{it} + B_2 * Lev_{it} + e_{it}$ .... (1)

Whereas:

R_{it} : Return of stock, it is considered as the dependent variable in the study

β_{it} : Systematic Risk

Lev_{it} : Financial Leverage, it is expressed by debt ratio

8. Calculation Variables
8.1. The dependent variable:
Stock return (R_{it}) has been measured during each financial period by using the equation of the return divided by the acquisition period. Annual stock return is considered to be the only dependent variable in this study:
- Monthly return has been calculated for each company during the period of the study as follows:

$HPR = \frac{(p1 - p0) + Div}{p0}$ ....(2)

Whereas:

HPR: return on acquisition period representing return on stock

p1: stock price at the end of the month

p0: stock price at the end of the previous month

Div: cash dividend during that month

This method of return calculation is characterized by eliminating cash dividend. In case cash dividend was introduced within the return calculation, it will be necessary to assume the rate at which the dividend will be reinvested in the establishment. Subsequently, this will oblige the researcher to modify the equations calculated for the bias resulting from the method of return calculation.

8.2. The Independent variables:
Independent variables are calculated as follows:

8.2.1.   Systematic Risk (βeta): expressed by (βeta) which measures systematic risk that the company is exposed to, and that cannot be avoided through the distribution of portfolio. It is considered as an indicator of the stock responsiveness towards the risks that it faces in market:

Systematic risk (βeta) for each company mentioned in the sample study was calculated by using monthly data for the period between December 2000 and January 2009 (120 months), and also by adopting the market model to evaluate the beta coefficient for each company as follows:

$$R_{it} = \alpha + \beta * R_{mt} + e_t \dots\dots\dots(3)$$

Whereas:

-        R_{it}: Return of stocks for the company "i" during month "t", which is calculated by referring to the equation of the returns divided by the acquisition period

-        R_{mt}: return of market index during month "t" which is calculated by referring to the equation of the returns divided by the acquisition period

-        α: constant element

-        β: (beta) systematic risk for company's stock

-        t: month (t) during the year (year = 12 month)

-        i: company among the 48 companies

-        e_t: random error distributed normally with an average of ($\bar{x}$) zero and fixed variance (σ^2)

In order to evaluate beta coefficient by adopting Ordinary Least Square through simple regression model, we need to carry out more than 60 observations (5 years) on the average of monthly return per share (foster, 1996). The period of study is adequate for evaluating beta coefficient since it comprises 10 years of observations.

8.2.2.   Financial leverage: expressed by debt ratio, and it is calculated for each company by using the following equation:

$$Lev_{it} = (L/A) * 100 \quad i: 1, 2,\dots, 48 \dots\dots\dots(4)$$
$$t: 1,2,\dots10$$

Whereas:

Lev it: debt ratio for each company for each year of the study

L: Total Liabilities

A: Total Assets

9. **Study Sample**

There are three main sections in Jordanian industry according to the Industrial Policies Department /Industrial Development Directorate: extractive industries, manufacturing industries, in addition to electricity and water. These three categories compose the industrial sector in Amman Stock Exchange. In 2010, 78 industrial companies were registered in (ASE).

A random sample among the companies composing the industrial sector has been chosen for conducting this study after omitting all companies who don't meet the following criteria:

1. To be among the registered companies and traded in industrial sector
2. Trading in the company stocks wasn't suspended according to a decision made by the board of directors of the market during the period from 2/1/2000 till 31/12/2009
3. Trading in the company stocks wasn't interrupted, and its type of ownership wasn't transformed or merged during the period from 2/1/2000 till 31/12/2009
4. Availability of sufficient data such as income statement, balance sheet in order to calculate financial indicators and ratios that were used in the study
5. Availability of all monthly closing prices for the companies stocks during the whole period in which the study was conducted.

According to the abovementioned criteria, a random sample has been chosen for this study comprising 48 industrial companies listed in the Amman Stock Exchange. They are all following the Gregorian calendar and their financial year ends up in the 31st of December of each year.

10. **Data Collection Methods:**

In order to collect the data, the study was based on the following official resources:

-    Companies Guide issued by Amman Stock Exchange (several versions) covering the period of the study.

-    Monthly statistical bulletin issued by Amman Stock Exchange (several versions) covering the period of the study.

-    Annual reports and financial statements for the companies included in the study sample

- Website of the Ministry of Industry and Trade / industrial statistics reports.

11. Data analysis methods:

11.1.   Adopting the statistical analysis method SPSS (Statistical Package for Social Sciences)

11.2.   Examining coefficient of determination (R^2) in addition to the adjusted coefficient of   determination (Adjusted R^2). The coefficient of determination (R^2) measures to which degree the dependent variable is affected by independent variables. If all the changes occurring in the dependent variable are derived from the changes that occur in the independent variables, the coefficient of determination will be equal to one. The more the coefficient is close to number one, this will give us an impression that independent variables have a huge impact on the dependent variable. We can also refer to (Adjusted R^2) in order to explain the results with more accuracy.

11.3.   Examining the total statistical significance of the model by using the (F) distribution.

In case the calculated F value exceeded the tabular F value at 5% and multiple degrees of freedom, then the alternative hypothesis is accepted, stating that the model evaluation characteristics are not all equal to zero (Gujarati, 1995). We can also use the (F-sig.) that is shown in the statistical program and that displays its statistical significance.

12. Analyzing Data:

In order to examine the effect of independent variables (systematic risk and financial leverage) on the returns – as a dependent variable – for the industrial companies listed in Amman Stock Exchange, we will realize the following steps:

- Calculating the value of independent variables represented by systematic risk and the financial leverage for each company according to the above mentioned .
- Calculating the value of the dependent variable represented by annual returns for the company's stocks for each year included in the study, and according to the abovementioned equation.
- After finding the value of the dependent variable and the independent variables for each year included in the study, the rates of financial leverage and systematic risk will be associated to the annual returns of the company's stocks, and the study model will be evaluated in order to extract the results.

- **Measures of central tendency and dispersion of the study variables:**

Table 1.Measures of central tendency and dispersion

	R_{it}	Lev	Beta
Observations	480	480	480
Mean	0.1213	30.2701	-0.0089
Std. Deviation	0.34646	19.56269	2.65984
Skewness	3.988	0.679	-1.183
Kurtosis	40.944	-0.064	7.900
Minimum	-1.97	0.44	-17.67
Maximum	3.74	93.76	8.32

Table 1. shows the calculation results of the measures of central tendency and dispersion concerning the study variables. These results reveal that the average annual return (Mean) of the sample of industrial companies listed in Amman Stock Exchange reached 12.13%. Concerning the independent variables, the average systematic risk reached -0.89%, which means that systematic risk composes a small part of the risks that the company stock might be exposed to. In case the market returns changed about 100%, this will cause a change in the return of the company's stocks with a percentage of 0.89%.

We should note that the average systematic risk of the sample of industrial companies listed in Amman Stock Exchange has a negative sign, which means that a large proportion of these companies are moving against the changes that occur in the market. This point could be referred to the fact that companies with major indicators exist in a small number, and they are the ones who are operating and moving the market.

The average financial leverage for the sample companies attained 30.27%, representing the average debt ratio of

these companies (liabilities to assets ratio). Each dinar in the companies' assets corresponds to 30.27% of the liabilities. Speaking about skewness, and since we can remark the negative and positive values, this proves the skewed distribution of data (positive and negative), where it should have a value close to zero since the skewness is considered to be moderate.

- **The correlation between the study variables:**

The matrix of correlation shown in Table (2) has been studied in order to make sure there's no strong relationship between each of the independent variables. The results reveal the absence of a strong correlation between these variables. Moreover, this correlation won't have an impact on the convenience of the model as it's shown through the (VIF) values indicated in Table (3).

Table 2. Matrix of the correlation between the study variables

	R_{it}	Lev	Beta
R_{it}	1	-0.192	-0.019
Lev	-0.192	1	0.007
Beta	-0.019	0.007	1

13. Results of Testing Hypothesis

The Table indicates the results of evaluating the model between annual returns and independent variables:

Table 3. Results of evaluating the model

Variables	Beta	T	Sig.	VIF
Lev	-0.173	-3.744	00.000	1.057
Beta	-0.160	-0.3660	00.714	1.001
R-Square	0.044			
Adjusted R-Square	0.036			
Mean Square	0.635			
F	5.487			
Sig.	0.000(a)			

When we analyze the adjusted coefficient of determination R^2 as indicated in Table 3. We conclude that the R^2 value corresponds to 3.66%, which indicates that 3.66% of changes occurring in the dependent variable (the stock annual return) derive from the changes that occur in the abovementioned independent variables.

According to the results of the statistical analysis SPSS which is indicated in the above schedule, the research hypothesis (main hypothesis and sub-hypothesis) related to the study have been examined as follows:

13.1. Examining the main hypothesis:

Hypothesis: there's no statistically significant impact for the financial leverage and systematic risk of the industrial companies listed in the Amman Stock Exchange on the annual return of these companies stock

Result**:**

Table 3. Shows the result of the examination of this hypothesis. The abovementioned results indicate that the P value (corresponding to 0.00) neighboring the F Statistic value (corresponding to 5.487) is less than (-1) with a confidence level of 5%. This means that the nihilistic hypothesis is refused according to the adopted decision support; subsequently, there's a statistically significant impact for the independent variables on the dependent variable. In other words, the alternative hypothesis is accepted.

13.2. Examining the first sub-hypothesis:

Hypothesis: there's no statistically significant impact for the financial leverage of the industrial companies listed in the Amman Stock Exchange on the annual return of these companies stock

Result:

Table 3. Reveals the result of the examination of this hypothesis. The abovementioned results indicate that the P value, corresponding to 0.00, is less than (-1) with a confidence level of 5%. This means that the nihilistic hypothesis, stating the absence of statistically significant impact for this independent variable (financial leverage) on the dependent variable (annual return), is not supported. Subsequently, alternative hypothesis, which consists of the presence of a statistically significant impact between the financial leverage variable and the annual return, must be accepted and taken into consideration.

13.3. Examining the second sub-hypothesis

Hypothesis: there's no statistically significant impact for the systematic risk (B) of the industrial companies

listed in the Amman Stock Exchange on the annual return of these companies stock

Result:

Table 3. reveals the result of the examination of this hypothesis. The abovementioned results indicate that the P value, corresponding to 0.714, is more than (-1) with a confidence level of 5%. This means that the nihilistic hypothesis is supported. In other words, there's no statistically significant relationship between this independent variable (systematic risk) and the dependent variable (annual return). Subsequently, nihilistic hypothesis is accepted.

14. **Results and recommendations**

14.1. Study results

The study underlines the existence of a statistically significant impact for the independent variables (financial leverage and systematic risk) of the industrial companies listed in the Amman Stock Exchange on the annual return of these companies stock. Moreover, this study concluded that the independent financial variables explain the 4.4% percentage of changes occurring in the stocks returns since they are considered as the dependent variable. Furthermore, the results indicate the presence of a statistically significant impact for the financial leverage on the annual stocks returns of the industrial companies listed in the Amman Stock Exchange.

14.2. Comparison of study results with the previous studies results

The "Andrew A. Christie, 2002" study, issued from the "Rochester.USA" university, and published in the "Journal of Financial Economics", demonstrated that the return on the property rights is in a negative correlation with the financial leverage. Furthermore, the study results were consistent with these results.

Comparing this study results with the "Fama & French, 1992" study, we conclude that the Fama & French study proved the existence of a strong relationship between Beta and stock returns, with the presence of some exceptions when it comes to speaking about company size and its growth rates. However, the results were in contradiction with those of the Fama & French study, since the results didn't prove the existence of a relationship between beta, which is expressed by the systematic risk, and the stock return.

Controversy remains concerning the relationship between returns and systematic risk, especially after the publication of an article in the American research website "AllAboutAlpha.com", entitled "Sharpe to Fama & French: Beta's Death Announcement is "Highly- Premature" (2006).

The results of Chen study conducted in 2004 in China financial market, demonstrated the existence of a positive relationship between operational leverage and financial leverage; in other words, what is applicable on the operational leverage will be applied on the financial leverage too.

The results of the statistical analysis that were mentioned in the schedule B, demonstrated the absence of a relationship between financial leverage and systematic risk, contrary to the results that were deduced by "Beaver, Kettler & Scholes, 1979". The difference between the results of this study and those of the previous studies can be interpreted through the historical and current information and data that the international bourses publish about the companies listed and their stocks prices; or because of the existence of other quantitative or non- quantitative reasons that influence in the stocks returns of Amman Stock Exchange.

14.3. Study recommendations

1- When taking investment decisions, investors and financial managers are interested in studying the directions of financial indicators and ratios in industrial companies particularly, and in all companies in general, because of the impact of some financial indicators and ratios on returns stocks.

2- Research department in Amman Stock Exchange must adopt a new mechanism for elaborating Public Joint-stock companies guidebook through the calculation of the value of beta coefficient for all companies listed in the Bourse, and distributing it to interested people in order to provide them with useful information about decision making in investment field.

3- The Direction of Amman Stock Exchange must take advantage from the technological development so as to make available, and in a quick, periodical and low cost method, all information related to financial indicators and ratios of companies listed in Amman Stock Exchange, so that interested parties, either they were researchers or decision makers, can benefit from these information.

4- Researchers can take advantage from this study by applying it to another companies, in different sectors in Amman Stock Exchange, in order to discover the relationship between the risks and financial indicators and ratios, in addition to the stock returns of the companies

5- In line with the study results, researchers are advised to choose new financial indicators and ratios that were not taken into consideration previously, in order to acknowledge the relationship between these ratios and the companies' returns.

15. References

15.1.   Arabic References

Haddad, Fayez, the use of financial ratios in order to measure systematic risk of the companies, *studies journal, administrative sciences, University of Jordan*, volume 30, issue 2, 2003, p. 314 – 321.

AL Khatib, Fawzi and Monzer Al Sharaa, "Amman Stock Exchange and it responsiveness towards economic variables: standard study", *Al Yarmouk researches journal*, volume 10, issue 3, 1994, p. 375 -380.

Al Khalayla, Mahmoud, " The Relationship between the cash flows and stock returns in the long term", *Studies Journal, Administrative Sciences, University of Jordan*, volume 25, Issue 1, 1998, p. 124-132.

-----------------------, "The Relationship between the returns rate on the assets and the systematic risk", *studies journal of administrative sciences*, University of Jordan, volume 27, issue 1, 2000.

--------------------, "Correlation between measures of financing risks and its relationship with market beta and aggregate risks", *Al Yarmouk researches journal*, volume 14, issue 1, 1998, p. 149 - 161.

Al Rawach, Amjad, "The stability of beta coefficient: practical study on Amman Stock Exchange", *unpublished master thesis*, University of Jordan, Amman, 2001.

Al Rifai, Mahmoud, "The Relationship between financial performance of Jordanian financial banks, and systematic and aggregate risks of its stock prices in Amman Stock Exchange", *unpublished PhD thesis, University of Banking and Financial Sciences*, Amman, 2008.

Said, Abid, "Evaluation of beta coefficient in capital markets", *Al Afac economic journal*, issue 14, Ain Shams University, Cairo, 1995.

Salama, Rashed, "Predicting the prices of the stocks traded in Amman Stock Exchange", *Al Basaer journal*, University of Jordan, 1997, p. 201 – 220.

-----------------------, "The Relationship between the change in the general level of prices and stock prices change in Jordan", *Al Balkaa journal*, volume 5, issue 1, 1997, p. 39- 59.

15.2.   Foreign References

 Andrew A. Christie, The stochastic behavior of common stock variances: Value, leverage and interest rate effects, *Journal of Financial Economics*, Volume 10, Issue 4, December 1982, p. 407-432.

Atkinson, and Kaplan, Management Accounting, fourth Edition, 2004, New Jersey.

Badrinath, S.G and Kini, O, "The Robustness of Abnormal Returns from the Earning Yield Contrarian Investment Strategy", *Journal of Financial Research*, Fall2001, 24(3), p. (385-401).

Beaver, W.H, P and Scholes, M, "The Association between Market Determine and Accounting Determine Risk Measures", *Accounting Review*, 45, 1970, p. 654-682.

Beighly, H. Prescott, John H.Boyd and Donald P. Jacobs, 'The Risk Perceptions of Bank Holding Company Debt Holders' *Journal of Bank Research*, Summer 1997.

 Bernstein, L., *Financial Statement Analysis-Theory Application and Interpretation*, 5th Ed, IRWIN, USA, 1993.

Bhalla V.K., *Investment Management* (Security Analysis and Portfolio Management), 5th Ed., S.C hand and company LTD, New Delhi, 1997.

Bowman, R.G., 'The Theoretical Relationship between Systematic Risk and Financial (Accounting) Variables ', *Journal of Finance*, 1979, p. 617-630.

Bregham, E., & Houston. *Fundamentals of Financial Management*, 8th Ed., harcount Brace Collage Publishers, USA.1998.

Crewell, J., '*Taking the True Measure of Risk* ', Fortune, VO; 138No.12Dec.1998p.116.

Donald R.Lehmann, '*Linking Marketing to Financial Performance and Firm Value*", 2002.working paper, Marketing Science Institute.

Efterhari, B, er.al '*On the Volatility of Measures of Financial Risk*: An Investigation using Returns from European Markets", European Journal of Finance, 2002, 6, pp.18-38.

Fischer D. and Jordan R., *Security Analysis and Portfolio Management*, 5th edition, Prentice Hall New Jersey, 1991.

16. Appendixes

Appendix.1 Chart (normal distribution) for Dependent Variable

Frequency   **R$_{it}$**

Mean =0.12
Std. Dev =0.346

N =480
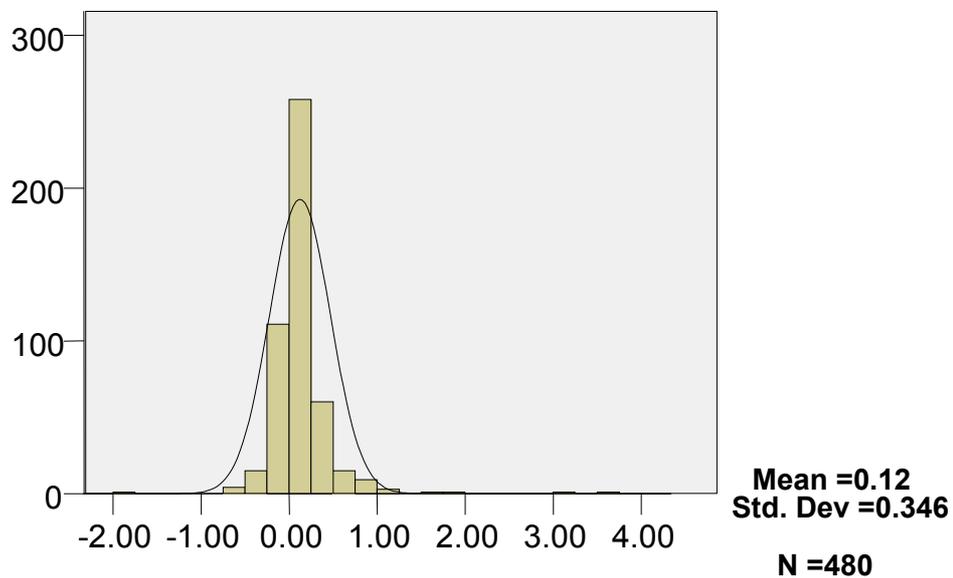
Appendix 2. Chart (normal distribution) for Independent Variable

Frequency   **Lev**

Mean =30.27
Std. Dev. =19.563
N =480
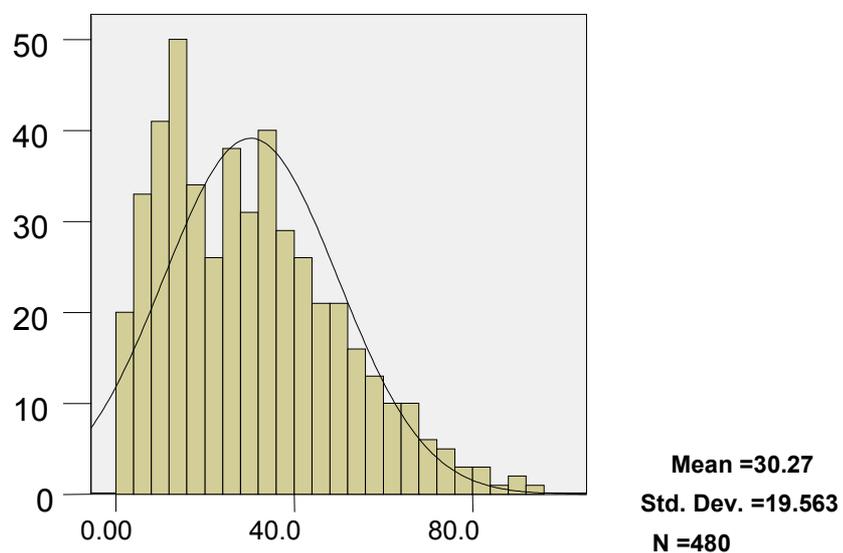
Appendix 3. Chart (normal distribution) for independentVariable

beta

Mean =0.00
Std. Dev. =2.66
N =480