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Title

REWARDS AND RISKS IN STOCK MARKETS: A CASE OF EMERGING ECONOMIES

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Abstract:

This paper analyzesthe study of the risk-return patterns of the 10 emerging stock markets economies-Taiwan, Brazil, South Korea, China, India, Malaysia, Mexico, Philippines, Indonesia, Russia and 2 developed economies- Japan and USA. The daily closing levels of the fourteen representative indices for a period beginning 1st January 1997 through 17th June 2011 is considered as the reference period. The Mean percent return (per year and over the entire reference period), Average annual return, maximum and minimum return, Standard deviation, Skewness, Kurtosis and Jarque Bera statistic for the fourteen series are presented in the paper. Findings of the study states emerging economies provides high return at higher risk comparative to the developed economies, further it added 9 out of 12 economies exhibits negative Skew nessand excesskurtosis coefficient (greater than 3) and nonnormal return distributions pattern.

Introduction:

Financial liberalization has been widely implemented in several emerging countries through on-going structural adjustment programs and these markets have known a considerable expansion. As a prerequisite to the financial liberalization processes, stabilization policies have been designed to ensure macroeconomic stability, low inflation and reduced budget deficits. As a result, emerging market capitalization has grown from 4% of world market capitalization in 1987 to 13% in 1996 and was around 20% in 2000. Overall, economic stability and good perspectives have been key assets for the development of emerging markets. Substantial empirical work supports risk return analysis in developed stock markets. The area has great potential for research in emerging stock markets like India as well(Rakesh and Dhankar, 2009). Since the 1980s, emerging stock markets have been widely seen as the most exciting and promising area for investment, especially because they are expected to generate high returns and to offer good portfolio diversification opportunities.

Investors value the stocks taking into account the risk and return prospects [Sharpe (1964); Mossin(1966)].Risk in financial assets has been classified into two categories, vis-à-vis, systematic risk and unsystematic risk. In a large portfolio, unsystematic risk is essentially

eliminated by diversification. But in practice, total risk cannot be completely eliminated by increasing the number of stock in a portfolio. Thus, the only relevant risk for investors who hold a well-diversified portfolio or indices is systematic risk or we can say non-diversifiable, not total risk. Investors get rewarded only for non-diversifiable risk. Obviously, they would not require a risk premium for a "bad" that they can themselves eliminate through diversification.

In finance, the risk premium refers to the amount by which an asset's expected rate of return exceeds the risk-free interest rate. When measuring risk, a common approach is to compare the risk-free return on T-bills and the risky return on other investments (using the ex post return as a proxy for the exante expected return). The difference between these two returns can be interpreted as a measure of the excess expected return on the risky asset. This excess expected return is known as the risk premium. Risk and return have been observed to have a positive correlation with each other [Fama and MacBeth (1973); Ball et al. (1976); Pettengill, Sundaram and Mathur (1995); Fletcher (1997); WilliamN. and Philippe (1999); Debasish Sur(2007)]. Thus, it would make sense higher the risk taken; the higher will be the expected return. However,there have been evidence that stock returns are weakly related to the risk that contradict the intuition that risk and return are positively related [Haugen and Baker (1991); F. Robert(2000); Theriou (2005)].

If investors are risk averse, they predict a positive relationship between stock return and risk. If there is a high risk in a stock market, the investors should be compensated in form of higher risk premium (Leon, 2007). The daily rate of return for stock is an important figure, not only for practical people, who want to see how their portfolio performs, but also in many theories on market risk. A model of the distribution of daily stock returns is a prerequisite for many theories. For example the Black and Scholes' formula for options (Black /Scholes, 1973) relies on the assumption that daily returns are log normal distributed. Markowitz portfolio theory is built on the assumption that returns follow a Gaussian normal distribution (Markowitz, 1952). It is known, however, that actual returns measured in the market do not follow these model distributions (Aas 2004; Nawroth/Peinke 2007).Measuring the rate of return is an important issue for theory and practice of investments in the stock market. Return may be calculated using different formulas. The most common used are arithmetic return ratio and Log Ratio. Both

measures have the disadvantage of an unsymmetrical and unbound range(**Databionics Research Group**). In this paper, we used log ratio formula to calculate daily return.

LR=In (P (today)/ P (Yesterday))

Where LR is the Log Ratio and P (d) is the closing price of a stock at day d.

This study uses market indices as the proxy for stock markets. The data set used in the study consists of daily closing prices of ten emerging markets, for ease of comparison with developed stock market, two stock indicesfrom Japan and United States of America is also used. The study use Exchanges namely(BOVESPA SAO PAULO Stock Exchange , RTS exchange , National Stock Exchange , Bolsa Mexican Valores,(BMV), Shanghai Stock Exchange, Jakarta Stock Exchange, Taiwan stock Exchange , Philippines Stock Exchange,Kuala Lumpur Stock Exchange, Korea Stock Exchange and to represent the global markets New York Stock Exchange, Tokyo Stock Exchange.

Review of literature:

While empirical tests of return-risk behaviour are plentiful for developed stock markets, the focus on developing and emerging stock markets has begun in recent years. The interest in these emergingmarkets has arisen from the increased globalization and integration of the world economies in general andthat of the financial markets in particular. The globalization and integration of these markets have createdenormous opportunities for domestic and international investors to diversify their portfolios across theglobe. As a result, rigorous empirical studies examining the characteristics of thesemarkets would be of great benefit to investors and policy makers at home and abroad.

A number of papers **(Haque and Hassan, 2000; Harvey, Bekaert, 1995; Bekaert,1995; Bekaert and Harvey, 1997; Kim and Singal, 1999; Choudhury, 1996; Lee and Ohk, 1991;Claessens, Dasgupta and Glen, 1995)** examined the return-risk behavior of a number of emergingmarket economies. From the perspective of international investors, these rapidly growing markets offer potentially high rates of return and an important means of diversifying portfolio risk (**Divecha, Drach, and Stefak 1992; Harvey 1993, 1995; Wilcox 1992). Fama**

(1965) has found that large (small) changes in stock prices follow by large(small) changes in either signs or stock prices exhibit fatter tails than a normal distribution.There is other evidence that many of the emerging-market returns depart from normality. **Harvey (1994)** presents a test of normality based on **Hansen's (1982)** generalized method of moments and rejects normality in fourteen of twenty emerging markets.

The risk-return trade-off should, however, be investigated from the point of view of an internationally well-diversified investor who is considering investing in emerging markets. Because correlations between equity returns from different countries are lower than those between equity returns in the same country, the benefits of diversification-a lower risk for equivalent return or a higher return for equivalent risk-are stronger across international financial markets than within domestic markets. Harvey **(1993) and Divecha, Drach, and Stefak (1992)**stated that the above is especially true for investments in developing countries, because their stock returns tend to have (even) lower correlations with those of industrial countries. Participation in developing countries is thus likely to lower overall unconditional portfolio risk.

(Gooptu 1993). Compare emerging markets with that of the more thoroughly studied markets in industrial economies. He provides descriptive statistics on emerging stock markets and investigates the presence of some of the return anomalies that have been documented in other markets. In this study several motivations specific to developing economies for research of stock market behaviour are stated. First, stock markets are believed to be very efficient at allocating capital to its highest-value users. Improved capital allocation increases overall economic efficiency. Second, stock markets play an important role in encouraging savings and investment, which are essential in economic development. Third, by allowing diversification across a variety of assets, stock markets reduce the risk that investors must bear, thus reducing the risk premium demanded by suppliers of capital and, through the risk premium, the cost of capital. The result should be increased investment levels and enhanced development.

Claessens S ., Dasgupta S. and Glen Jack(1995) investigates the behaviour of stock returns in the twenty stock markets represented in the International Finance Corporation's Emerging Markets Data Base. The mean rates of return for emerging marketsare in general high but so, too, are the standard deviations. The highest mean rate of return is for Argentina, almost 6 percent on

a monthly basis (68 percent on an annual basis). However, Argentina also has the highest standard deviation, almost 30 percent (103 percent on an annual basis), and the highest return range, 243 percent. Indonesia has the lowest mean return (-1.019 percent), and Jordan has the lowest standard deviation (5.165 percent). In general, the returns and their standard deviations for the individual emerging markets, as well as the regional and composite EMDB indexes, are higher than those for the industrial economies. This study shows there are several Emerging markets have seen a sharp increase in equity inflows in study periods.**Linda L. Tesar and Ingrid M. Werner (1995)**also finds in study if U.S. investors were to hold the market portfolio, 6 to 7 percent of their portfolio would be allocated to the emerging markets and the smaller European markets. They examined U.S. equityflows to emerging stock markets from 1978 to 1991and draws three main conclusions. First, despite the recent increase in U.S. equity investment in emerging stock markets, the U.S. portfolio remains strongly biased toward domestic equities. Second, of the fraction of the U.S. portfolio that is allocated to foreign equity investment, the share invested in emerging stock markets is roughly proportional to the share of the emerging stock markets in the global market capitalization value. Last finding of the paper is volatility of U.S. transactions in emerging-market equities is higher than in other foreign equities.

Derrabi and Leseure (2005) investigate the return on Emerging Stock Markets from Argentina, Brazil, Israil, Columbia, Philippines, Taiwan, South Africa, Thailand, Turkey, Korea, Malysia, Mexico, Hungary, Indonesia, Morocco, Czech Republic, Italy, Germany, Hong Kong, Australia, Netherlands, Singapore, Spain, UK, USA, Japan, France, Belgium, Canada and Denmark from January 1997 to November 2001 and study the weekly returns during this period. The study finds that emerging markets have higher mean weekly return as well as too much dispersion compared to developed economies. **Harvey,1995;Leon, 2007;Rao Ananth, 2008;Bodla B.S., Yadav Pooja and Kumar Rajesh, 2010;Mollah and Mobarek(2009)** also supports**Derrabi and Leseure** findings. **Harvey**investigates the return pattern of the 20 emerging markets including US, UK, Argentina, Germany, and France. The studyobserves that annualized mean US dollar returns range from 71.8% for Argentina to -11.4% for Indonesia. Both Argentina and Turkey have annualized standard deviation over 75%. Taiwan whose average return is 40.9%, has a standard deviation of 53.9%.**(Leon, 2007)** predicts a positive relationship between stock return

and risk and suggest If there is a high risk in a stock market, the investors should be compensated in form of higher risk premium.**Rao Ananth(2008)** explored the daily mean return index of the world developed markets was in general lower (0.1047%) than the mean return in Arbian Gulf cooperation council (AGCC) emerging markets ranged between 0.7911%(Bahrain) and 1.9277%(South Arabia) is relatively higher compared to developed markets(0.7622%) The same is also described by **Erbet et al (1996)** and **Michelfelder (2005)**. Distributional properties of the return series in this study are non-normal. The finding of the study shows both developed and emerging markets have excess kurtosis i.e. exceeding three and the same is supported by a number of other studies including **Bekart and Harvey, 1997**;**Mollah and Mobarek, 2009.Mollah and Mobarek(2009)**finds mean US dollar returns in emerging markets from 1.74% (Russia) to -0.68%(China) is higher than the developed markets ranging from 1.29%(Finland) to 0.38%(Italy) and the standard deviation of the emerging markets is also higher (18.69% to 5.07%) compared to developed markets. In this study also the non-normality of the emerging market return series data revealed by the coefficients of skewness and kurtosis by using non-linear models. The paper reported high risk – return and predictable nature of emerging markets compared to developed markets.

Debasish Sur (2007) evaluated the business and financial risks associated with NTPC Limitedfor the period 1982-83 and 1994-95 to 2005-06 have been used as the pre-liberalization and post-liberalization periods respectively. For analyzing the data the technique of ratio analysis, statistical tools and techniques such as Pearson's simple correlation Spearman's rank correlation analysis have been applied. The study also found a significant positive association between risk and return, but the results showed that high risk was not at all compensated by high risk premium, that was, high return during the study period.

Kumar Rakesh and Dhankar (2009) examined the cross-correlation in stock returns of South Asian stock markets, their regional integration, and interdependence on global stock market. Their study examined the important aspects of investment strategy when investment decisions are made under risk and uncertainty. The study uses Bombay stock exchange listed index BSE 100 for India, Colombo stock exchange listed Milanka Price Index for Sri Lanka, Karachi stock exchange listed KSE 100 for Pakistan, Dhaka stock exchange listed DSE-General Index for Bangladesh, and S & P Global 1200 to represent the global market. The positive average return

and risk relationship, negative skewness, normal distribution supported with help of Jarque- Bera test of selected markets.

Stock markets tend to be very efficient in the allocation of capital to its highest-value users. These markets also help in increase savings and investment, which are essential for economic development. An equity market, by allowing diversification across a variety of assets, helps reduce the risk the investors must bear, thus reducing the cost of capital, which in turn spurs investment and economic growth. However, volatility is important features which will ultimately determine the effectiveness of the stock market in economic development. For example, in a stock market which is highly uncertain, investors face difficulty in choosing the optimal investment as information on corporate performance is slow or less available. The resulting uncertainty may induce investors either to withdraw from the market until this uncertainty is resolved or discourage them to invest funds for long term. Moreover, if investors are not rewarded for taking on higher risk by investing in the stock market, or if excess volatility weakens investor's confidence, they will not invest their savings in the stock market, and hence deter economic growth. The emerging stock markets offer an opportunity to examine the evolution of stock return distributions and stochastic processes in response to economic and political changes in these emerging economies. Such changes are occurring in a magnitude and direction in these countries which are not typically observed in the developed stock markets.

Research Methodology:

The data employed in this study consists of closing stock market prices indices for the ten emerging economies and U.S. and Japan usedas the proxy for developed stock markets listed in the table below. We use one stock exchange from each of the selected countries as a representative of the respective country. The daily closing levels of the twelve representative indices for a period from January 1997 to 17th June 2011 is considered the reference period. Out of the time for which data is taken, we find that on few days, one or two of the exchanges were open while other(s) was (were) closed. We took the data for all the days on which either of the all stock exchanges were open. As a result, there were missing values in the data of some of the

stock exchanges for some days. We filled the missing values by taking the average of the two nearest cases.

Data have been analyzed using various tools of statistics. First of all, we present the descriptive statistics of the daily close levels of the stock exchanges under study for the reference period. On the basis of these statistics, we attempt to infer the movement patterns of the stock exchanges under study. After this, we proceed to compute the returnby taking the log of the series at the stock exchanges under study for the reference period under study. We present the descriptive statistics including Mean percent return (per year and over the entire reference period), Average annual return, maximum and minimum return, Standard deviation, Skewness, Kurtosis and Jarque Bera statistic for the twelve series.

Data Table:

Country	Stock index	Period	Source
Brazil	**BVSP INDEX** (BOVESPA SAO PAULO Stock Exchange)	01-01-1997 to 17-06-2011	World Federation Exchanges
Russia	**RTSI** (RTS exchange)	01-01-1997 to 17-06-2011	www.allstocks.com
India	**S&P CNX Nifty** (National Stock Exchange)	01-01-1997 to 17-06-2011	www.nseindia.com
Mexico	**IPC** (Bolsa Mexican Valores,(BMV)	08-01-1997 to 17-06-2011	www.allstocks.com
China	**SSE** (Shanghai Stock Exchange)	04-01-2000 to 17-06-2011	www.yahoo.com
Indonesia	**JKSD** (Jakarta Stock Exchange)	01-01-1997 to 17-06-2011	www.allstocks.com

South Korea	**KOSPI** (Korea Stock Exchange)	01-01-1997 to 17-06-2011	World Federation Exchanges
Taiwan	**TWSE** (Taiwan stock Exchange)	02-07-1997 to 17-06-2011	www.yahoo.com
Philippines	**PSEI^PSI** (Philippines Stock Exchange)	02-07-1997 to 17-06-2011	World Federation Exchanges
Malaysia	**Kaula Lumpur Stock Exchange**	01-01-1997 to 17-06-2011	KLSE
U.S.	**S&p 500** (New York Stock Exchange)	01-01-1997 to 14-06-2011	www.allstocks.com
Japan	**NIKKEI- 225** (Tokyo Stock Exchange)	01-01-1997 to 14-06-2011	www.allstocks.com

The **mean** describes the central location of the data. It is the arithmetic average of a set of values, or distribution.

$$\bar{x} = \frac{1}{n} \cdot \sum_{i=1}^{n} x_i$$

However, for skewed distributions, the mean is not necessarily the same as the middle value (median), or the most likely (mode). In probability theory and statistics, a **median** is described as the numerical value separating the higher half of a sample, population, or a probability distribution, from the lower half. The median of a finite list of numbers can be found by arranging all the observations from lowest value to highest value and picking the middle one. If there is an even number of observations, then there is no single middle value; the median is then usually defined to be the mean of the two middle values.

Minimum Value is the value that is found to be the minimum for the current variable in the entire study period. Conversely, **maximum value** is the one that is found to be the maximum for the current variable in the entire study period.

Standard deviation is a widely used measurement of variability or diversity used in statistics. It shows how much variation or "dispersion" there is from the average (mean, or expected value). A low standard deviation indicates that the data points tend to be very close to the mean, whereas high standard deviation indicates that the data are spread out over a large range of values. Technically, the standard deviation of a statistical population, data set, or probability distribution is the square root of its variance. It is algebraically simpler though practically less robust than the average absolute deviation.

$$s = \sqrt{\frac{\sum x_i - \mu^2}{N}}$$

Where

μ s the population mean and N is the population size

The

sample estimate of the population *standard deviation* is computed as:

$$s = \sqrt{\frac{\sum x_i - \bar{x}^2}{(n-1)}}$$

where $\bar{x}$ s the sample mean and n is the sample size

The c**oefficient of variation** measures the dispersion of data points around the mean. The coefficient of variation (CV) is defined as the ratio of the standard deviation σ to the mean μ: The CV is only defined for *non-zero* mean and the absolute value is taken for the mean to ensure it is always *positive*. It is sometimes expressed as percentage, in which case the CV is multiplied by 100%

$$c_v = \frac{\sigma}{|\mu|}$$

In probability theory and statistics,**skewness** is a measure of the asymmetry of the probability distribution of a real-valued random variable. The skewness value can be positive or negative, or even undefined. A zero value indicates that the values are relatively evenly distributed on both

sides of the mean, typically but not necessarily implying a symmetric distribution. The skewness of a random variable X is the third standardized moment, denoted γ_1 and defined as-

$$\gamma_1 = \sum_{i=1}^{m} x_i - \bar{x}^3 / \sigma^3] = \mu^3 / \sigma^3$$

Where

$\iota^3$is equal to: $\sum_{i=1}^{m} x_i - \bar{x}^3$

$\tau 3$is the sample standard deviation raised to the third power

Kurtosisis a measure of whether the data are peaked or flat relative to a normal distribution. That is, data sets with high kurtosis tend to have a distinct peak near the mean, decline rather rapidly, and have heavy tails. Data sets with low kurtosis tend to have a flat top near the mean rather than a sharp peak. A uniform distribution would be the extreme case.

For univariate data Y_1, Y_2, ..., Y_N, the formula for kurtosis is:

$$kurtosis = \frac{\sum_{i=1}^{N}(Y_i - \bar{Y})^4}{(N-1)s^4}$$

Where $\bar{Y}$ is the mean, $s$is the standard deviation, and N is the number of data points.

The kurtosis for a standard normal distribution is three. For this reason, some sources use the following definition of kurtosis (often referred to as "excess kurtosis"):

$$kurtosis = \frac{\sum_{i=1}^{N}(Y_i - \bar{Y})^4}{(N-1)s^4} - 3$$

This definition is used so that the standard normal distribution has a kurtosis of zero. In addition, with the second definition positive kurtosis indicates a "peaked" distribution and negative kurtosis indicates a "flat" distribution.

Which definition of kurtosis is used is a matter of convention (this study uses the original definition)

the **Jarque–Bera test** is a goodness-of-fit measure of departure from normality, based on the sample kurtosis and skewness. The test is named after Carlos Jarque and Anil K. Bera. The test statistic*JB* is defined as

$$JB = \frac{n}{6}\left(S^2 + \frac{1}{4}K^2\right)$$

where *n* is the number of observations (or degrees of freedom in general); *S* is the sample skewness, and *K* is the sample kurtosis:

$$S = \frac{\hat{\mu}_3}{\hat{\sigma}^3} = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^3}{\left(\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2\right)^{3/2}}$$

$$K = \frac{\hat{\mu}_4}{\hat{\sigma}^4} - 3 = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^4}{\left(\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2\right)^2} - 3,$$

where $\hat{\mu}_3$and $\hat{\mu}_4$are the estimates of third and fourth central moments, respectively, $\bar{x}$is the sample mean, and $\hat{\sigma}^2$is the estimate of the second central moment, the variance.

The statistic *JB* has an asymptotic chi-square distribution with two degrees of freedom and can be used to test the null hypothesis that the data are from a normal distribution. The null hypothesis is a joint hypothesis of the skewness being zero and the excess kurtosis being 0, since samples from a normal distribution have an expected skewness of 0 and an expected excess kurtosis of 0 (which is the same as a kurtosis of 3). As the definition of *JB* shows, any deviation from this increases the JB statistic.

First Value is the value of the series on the first date from the period under study while *Last Value* is the value of the series on the last date of the reference period.

Analysis and Interpretation:

We undertake the statistical methods as mentioned in the research methodology of this chapter and present the findings here in this section. We start by computing the basic statistics for the twelve series so as to get an insight into the data. In the table 3.1, we present the descriptive

statistics, Mean of the indices, median of the indices, minimum level of the indices, maximum level of the indices, standard deviation of the indices and the variance of the indices at the selected stock exchanges individually.

First row of the table shows the name of the country. The second row *(Mean)* deals with the average levels of the indices and third row presents the *Median* of the twelve series. Fourth *(Minimum)* and fifth *(Maximum)* rows depict the range of the series – forth row presents the minimum value of the index while row fifth shows the maximum value of the index. The sixth *(Standard deviation)* and seventh *(Variance)* rows show the standard deviation and the co-efficient of variation respectively. The eighth (*Skewness*) and ninth (*Kurtosis*) rows show the values regarding skewness and kurtosis from the series. The tenth (start date) and eleventh (*First value)* shows the level of the indices on the first day of the study period. The twelfth (last date) and thirteenth *(Last value)* show the index level on the last date and value of the study period.

Column 2nd Taiwan in the table of the Taiwan Stock Exchange started the study period from a level of 8996.72. The low of 3446.26 and the high of 10202.2 were recorded on the exchange before closing the period at 8747.51. The mean value (6850.91) and the median value (6800.73) happen to be quite close to one another. The low value of standard deviation (1478.57) coupled with low co-efficient of variation (21.58) indicate that the index is lesser volatile. The series is skewed to the negative close to zero (-0.0033) and the positive kurtosis value (2.1215) signals the observations to have longer tails than a normal distribution.

The statistics of Brazil from the BOVESPA SAO PAULO Stock Exchange over the study period reveal that the index has reached at a level of 61060 on 14th June 2011 after starting from 6955.5 on 2nd January 1997. While the index did not go below the level of 4761 during the study period, it did make a high of 73517 on 15th May 2008.The mean value of the index is 30054.06 while the median statistic of 21489 (which is quite different to the mean value) shows that data is almost non similar number of values is found above and below the mean. A high standard deviation and high coefficient of variance i.e. 21010.13 and 0.70 which is 0.70 times of the mean signs that the Brazil Stock Exchange has been highly volatile over the study period.The skewness statistic of 0.70 shows the series is positively skewed. The Kurtosis statistic of 1.978 infers that the observations of the Brazil Stock Exchange cluster less and have shorter tails.

For **South Korea** and **Malaysia,** closing levels of KOSPI (Korea Stock Exchange and Kuala Lumpur Stock Exchange have been used respectively. A summary of statistics from both finds place in table. The statistics exhibit that the index fell to the low of 280 and 262.7 after starting in the study period from758.03 and 1230.53. Later, it rose to the high of 2228.96 and 1574.49 finally closed the study period at 2111.5 and 1563.43. The mean value of both the countries index during the study period was observed to be 1067.79 and 930.9559 while the median value of the index (908.51) and (887.635) is found to be quite equal the mean value. The standard deviation of both the countries are 489.1536 and 287.492 respectively which are comparatively low and the co-efficient of variation as well 45.80991and 30.88138 are low imply less risky avenue. These series are positively skewed 0.489492 and 0.448209 and the kurtosis value are also positive 2.052886 and 2.351771 signalling the observations to have longer tails than the normal one.

Column China in table explains that the indices is 1406.37 at the starting 04-01-2000. The index recorded a high of 6092.06 and a low of 1015.5 while ending the study period at 2642.82 with a mean of 2206.75 and the median of 1886.75. The mean and median values of the series are not too far from each other. The standard deviation of the index is 992.35 during the study period with a co-efficient of variation value of 44.97. Positive value of skewness (1.4694) exhibits the positively skewed series while the positive kurtosis (5.067) implies that the observations cluster more and have longer tails than those in the normal distribution.

Index levels at India from table outline the movement of NSE-50 index of the National Stock Exchange. The index, which was at 939.55 at the beginning of the study period, touched the high of 6312.42 before touching the low of 808.7 and finally closing at 5222.35 at the end of the study period, i.e., on27th May 2011. The mean level of the index during the study period was 2520.59, which is higher than the median value of 1685.95. The standard deviation of 1666.42 and the co-efficient of variation value of 66.11 show the series to be quite volatile. Too far from zero skewness value (0.77) shows the index to be highly positively skewed and the kurtosis value of 2.09 implies the observations to have tails.

Table-3.1

Descriptive statistics for Indices

Descriptive	TAIWAN	BRAZIL	South Korea	CHINA	INDIA	MALYASIA	MEXICO	Philippine	INDONESIA	RUSSIA	JAPAN	USA
Mean	6850.915	30054.06	1067.79	2206.747	2520.593	930.9559	15089.02	2165.908	1255.452	823.8503	13270.82	1169.087
Median	6800.73	21489	908.51	1886.745	1685.95	887.635	9926.67	1984.62	773.39	572.34	12879.97	1171.36
Minimum	3446.26	4761	280	1011.5	808.7	262.7	2856.1	979.34	256.83	38.53	7054.98	676.53
Maximum	10202.2	73517	2228.96	6092.06	6312.45	1574.49	38696.24	4397.3	3872.95	2487.92	20833.21	1565.15
Std. Dev.	1478.57	21010.13	489.1536	992.3518	1666.415	287.492	10932.82	844.2616	966.2615	676.2896	3394.339	193.3726
Coef. of Variation	21.58208	69.90779	45.80991	44.96899	66.11202	30.88138	72.45547	38.97957	76.96523	82.08889	25.57746	16.54048
Skewness	-0.003326	0.699527	0.489492	1.46941	0.767176	0.448209	0.647411	0.757102	1.035112	0.717188	0.250615	-0.1543
Kurtosis	2.121545	1.978905	2.052886	5.0675	2.090366	2.351771	1.86845	2.726046	2.938704	2.114099	1.829292	2.24725
start date	03-07-1997	02-01-1997	02-07-1997	04-01-2011	03-01-1997	03-01-1997	02-01-1997	07-02-1997	02-07-1997	03-01-1997	06-01-1997	03-01-1997
First Value	8996.72	6955.5	758.03	1406.37	939.55	1230.53	3359.5	2764.89	731.62	213.38	9351.4	737.01
last date	23-05-2011	14-06-2011	20-05-2011	17-06-2011	27-05-2011	17-06-2011	17-06-2011	17-06-2011	17-06-2011	03-06-2011	17-06-2011	13-06-2011
Last Value	8747.51	61060	2111.5	2642.82	5222.35	1563.43	35025.74	4153.11	3721.38	1858.08	19446	1271.83

Mexico of the Mexico Stock Exchange started the study period from a level of 3359.5. The low of2856.1 and the high of 38696.24 were recorded on the exchange before closing the period at 35025.74. The mean value (15089.02) and the median value (9926.67) have to be quite difference to one another. The high value of standard deviation (10932.82) coupled with high co-efficient of variation (72.46) indicate that the index is highly volatile. The series is skewed to the positive (0.647411) and the positive kurtosis value as well (1.86845) signals the observations to have longer tails than the normal one.

Index levels of PhilippinesStock Exchange in table show the statistics from the closing levels of **PSEI^PSI** General Index during the study period. The index level in the beginning of the study period was 2764.89while in the end of the study period was 4153.11. The highs and lows of the index during the study period remained 4397.3 and 979.34 respectively. The mean of the index during the period was 2165.908 which is quite far from the median value. The low standard deviation of the series is 844.26 and so is the Co-efficient of variation at 38.97. These clearly signals low volatility and less risky returns at the exchange. Positive skewness (0.757) indicates positively skewed series and high positive kurtosis (2.726) shows that the observations cluster more and have longer tails than those in the normal distribution.

For Indonesia, the closing levels ofJakarta Stock Exchange have been used. The statistics exhibit that the index fell to the low of 256.835 after starting in the study period from 731.62. Later, it rose to the high of 3872.95 and finally closed the study period at 3721.38. The mean value of the index during the study period was observed to be 1255.45 while the median value of the index (773.39) is found to be lower than the mean value. The standard deviation (966.26) and the co-efficient of variation (76.96) imply the Jakrata Stock Exchange to be a risky avenue. This series is positively skewed (1.035112) and the kurtosis value is positive as well (2.938704) signs the observations to have longer tails than normal distribution.

For RTS Stock Exchange of Russia, the closing levels of RTSI have been used. The statistics exhibit that the index fell to the low of 38.53 after starting in the study period from213.38. Later, it rose to the high of 2487.92 and finally closed the study period at 1858.08. The mean value of the index during the study period was observed to be 823.85 while the median value of the index (572.34) is found to be lower than the mean value. The standard deviation (676.289) and the co-efficient of variation (82.088) imply the Russian Stock Exchange to be a very risky avenue .Russia is highly volatile among the selected one. This series is positively skewed (0.717) and the kurtosis value is positive as well (2.114) signs the observations to have longer tails.

This evidence is strongly consistent with a number of characteristics—in fact, highvolatility, nonnormality of distributions, excess kurtosis—that contemporary studiestend to find in emerging markets (Bekaert and Harvey 1997; Bekaert et al. 1998)

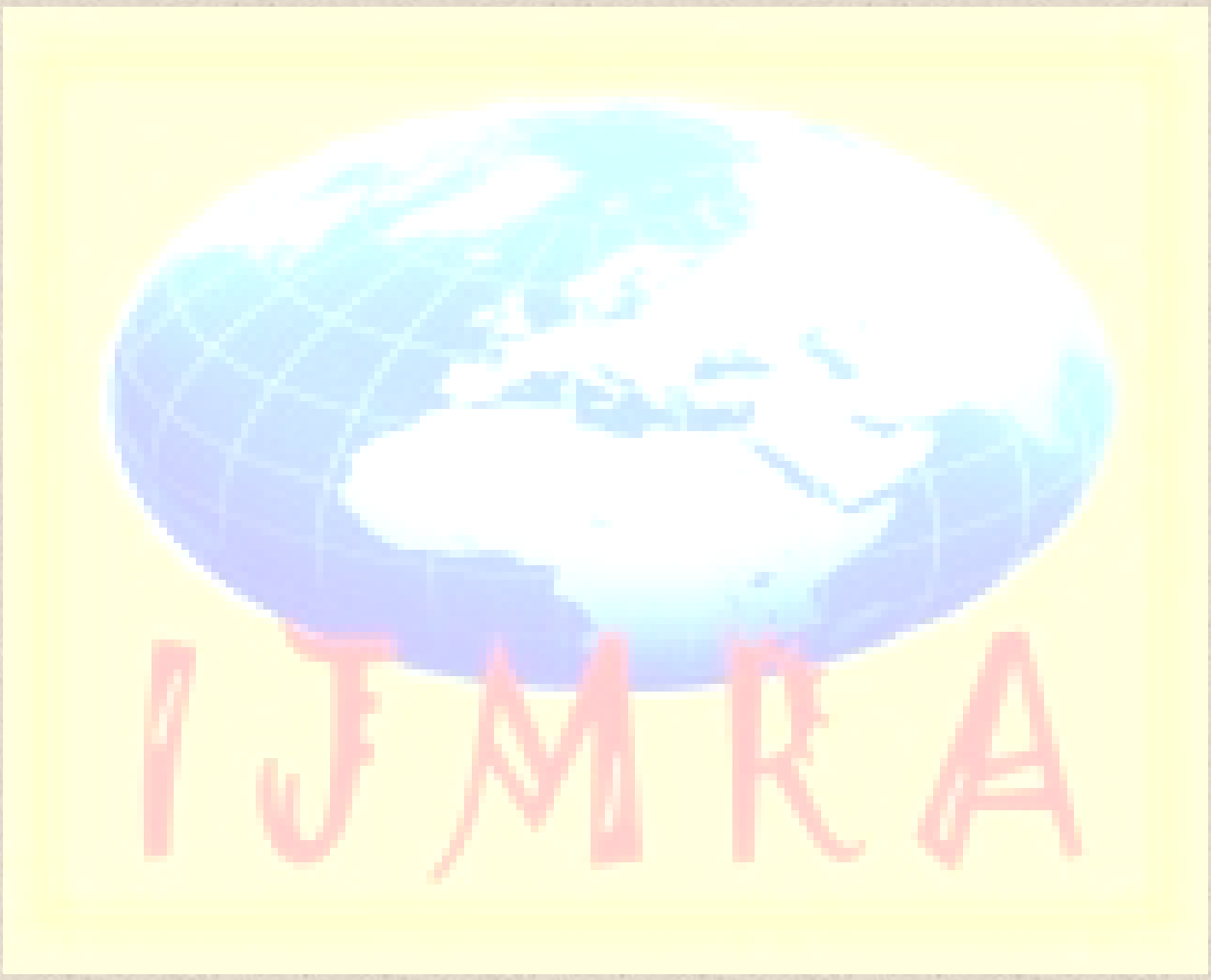
Japan in the table of the Nikkei Stock Exchange started the study period from a level of 9351.4. The low of 7054and the high of 20833.21 were recorded on the exchange before closing the period at 19446 on 16-06-2011. The mean value (13270) and the median value (12879) happen to be quite close to one another however this was not possible in emerging economies it is possible due to low value of standard deviation (3394.34) coupled with low co-efficient of variation (25.577) indicate that the index is lesser volatile. The series is skewed to the positive (0.25) and the positive kurtosis value (1.829) signals the observations to have longer tails than a normal distribution.

The index of USA has reached at a level of 1565.15 after starting from 737.01 while the index did not go below the level of 676.53 during the study period. The mean value of the index is 1169.06 while the median statistic of 1171.36 (which is quite equal to the mean value) shows that data is almost similar number of values is found above and below the mean comparative to emerging economies. A low standard deviation of 193.3726 and this fact is also strengthened by a low value of Co-efficient of Variation (16.54048) and indicates lowest volatility among the selected sample. The skewness statistic of -0.1543 shows the series is negatively skewed. The Kurtosis statistic of 2.24725 infers that the observations of this series cluster have longer tails.

In order to comment on the returns offered by the twelve stock exchanges under study, we move forward to computing the return of the twelve series. We arrive at the return from the twelve series by computing the log of the series. The findings regarding the return on the twelve series are presented in **table 3.2** below.

Table 3.2 depictsstochastic properties for each return series including Jarque- Bera statistic and p value for the selected period. The data on return is analyzed for mean return, mean % return, average annual return, maximum (one-day) return, minimum (one-day) return, risk at the stock exchanges (measured by the standard deviation), variations in the return (Co-efficient of variation), skewness, kurtosis statistic, and the Jarque-bera statistic for the exchanges under study. We firstly analyze the whole table in totalityand then column-by-column (for each country). We supplement the analysis by preparing the figures outlining return patterns at the twelve stock exchanges.

2nd row analyzed for mean return and 3rd row for mean % return. Multiplying this daily mean % return with the total number of observations under study, we find that the *total return* during the study period of 14 years. By mulipluing mean% by 365, we can get the *average annual return* offered by the Exchange during the period of January1997 to June 2011. The maximum row shows the daily return offered by the exchange during the period



while the 7th row ascertain minimum daily return at the exchange offered. The 8th row show the standard deviation of the mean return at the exchanges. Similarly, the co-efficient of variation for the Exchanges shown in row 9th and 10th row shows skewness and kurtosis for normality test and peakedness of data. 12th row coupled with the p-value for Jarque-Bera statistic of 11th row to test the series normal or non-normal.

Table-3.2

Descriptive statistics of the return

Descriptives	TAIWAN	BRAZIL	SOUTHKOREA	CHINA	INDIA	MALYASIA	MEXICO	PHILIPPINES	INDONESIA	RUSSIA	JAPAN	USA
Mean	-0.000807	0.000412	0.000194	0.000151	0.000332	0.0000453	0.000445	0.0000801	0.000323	0.000413	-0.0000807	0.000103
Mean of % return	-0.001 %	0.041 %	0.019 %	0.015 %	0.033 %	0.005 %	0.045 %	0.008 %	0.032 %	0.041 %	-0.001 %	0.010 %
Mean % return over the entire period Mean x observation)	-4 %	217 %	98 %	63 %	174 %	24 %	234 %	41 %	163 %	217 %	-4 %	54 %
Average annual return(Mean*365)	-0.29 %	15.04	7.08 %	5.51 %	12.12 %	1.65 %	16.24 %	2.92 %	11.79 %	15.07 %	-0.29 %	3.76 %
Maximum%	6.5246	28.8325	11.2844	9.4008	9.9339	19.8605	12.1536	9.4146	11.4909	20.2039	6.5246	10.2457
Minimum%	-6.8441	-17.208	-12.805	-9.2562	-13.0142	-24.1534	-10.8224	-12.3508	-12.7318	-21.103	-6.8441	-9.4695
Std. Dev.	0.012466	0.017919	0.015995	0.012987	0.013573	0.012887	0.012746	0.012496	0.01417	0.021863	0.012466	0.010593
Co-efficient of Variation	-1544.734	43.493	82.448	86.007	40.883	284.481	28.643	156.005	43.870	52.937	-1544.734	102.845
Skewness	-0.074224	0.517643	-0.27125	-0.10159	-0.263728	0.295247	0.137663	-0.121938	-0.077601	-0.40478	-0.074224	-0.179464
Kurtosis	6.625551	23.81333	8.780724	9.123655	10.21514	76.7785	11.83652	12.94392	12.47235	14.3844	6.625551	11.49216
Jarque-Bera	2782.553	95466.24	7121.466	6536.727	11457.33	1197822	17143.09	20934.26	18836.17	28570.33	2782.553	15869.94
Probability	0	0	0	0	0	0	0	0	0	0	0	0
Observations	5072	5276	5070	4179	5254	5281	5264	5078	5037	5264	5072	5272

Mexico (0.045 percent), Russia(0.041 percent) and Brazil (0.041) provides the highest mean daily return which is followed by India (0.033 percent), Indonesia(0.032 percent), South Korea(0.019 percent), China(0.015 percent) andUSA(0.010 percent). Taiwan (-0.001 percent) and Japan(-0.001 percen)having the lowest mean daily returns. Now, we saw the daily mean return Index of the developed markets was in general lower than the mean returns in emerging economies. Volatility of returns in emerging economies was relatively higher compared to developed economies represented by S.d and C.V. Table 3.2 further illustrates that 9 out of 12 economies have negative Skewnesscoefficient. In addition, the kurtosis coefficient is by far greater than three, which corresponds to the normal case.This evidence is strongly consistent with a number of characteristics—in fact, highvolatility, nonnormality of distributions, excess kurtosis—that contemporary studiestend to find in emerging markets (*Bekaert and Harvey 1997; Bekaert et al. 1998; Rakesh and Dhankar, 2009; Ananth Rao 2008).*The final statistic in table is the calculated Jarque – Bera Statistic and corresponding p value used to test the normal hypothesis that the daily distribution of return is normally distributed. With all p values equal to zero at six decimal places, we reject the null hypothesis that returns for the economies are well approximated by the normal distribution. Emerging markets are significantly deviated from the normal distribution based on the results of the Jarque – Bera's test for normality has also been proved stated by; *Nguyen and Bellelah (2008).*

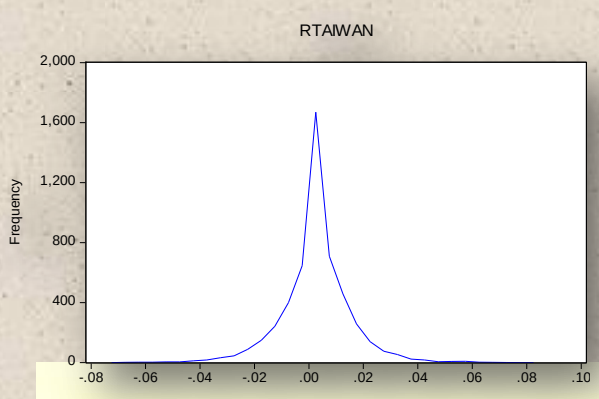
The statistics for **Taiwan** Stock Exchange is presented in Table 3.2 reveal the average daily return at-0.001% translating into -0.29% annual return at the exchange. The maximum daily return at the exchange happens to be 6.52 % while the minimum return at the exchange during the period comes out

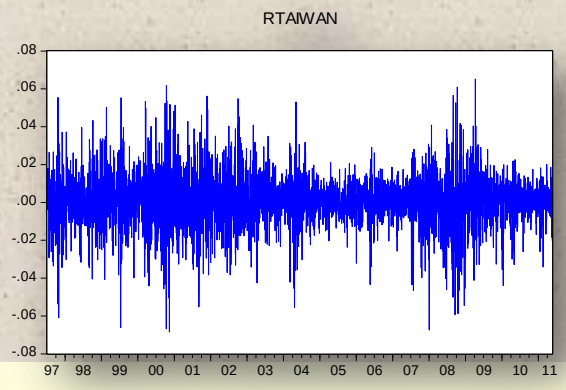
Figure 3.1

Average shifted Histogram for Taiwan

Figure 3.2

Line chart for Taiwan





to be -6.84%. The standard deviation at the exchange is 0.012466 and the co-efficient of variation is 1544.73. The series for TSE is negatively skewed (-0.07422) while the kurtosis for the exchange ismore than 3, laptokuratic (6.62). The skewness of this series is found to be different from zero and the kurtosis is different from 3. Further, the p-value for Jarque-Bera statistic is less than 0.05, which implies that the distribution is non-normal. Figure 3.1 and 3.2 present the Average shifted Histogram and the line chart of the return data respectively on the Taiwan Stock Exchange.

The BOVESPA Stock Exchange (**Brazil**) has offered a return of 0.041% on daily basis during the study period on average i.e. second highest afterMexico and equal to Russia. The total return during the study period of 14 years Brazil provide to the Investors is 217% and annualised daily return is 15.04%. The maximum daily return offered by the exchange during the period has been 0.29% while the minimum daily return at the exchange was –0.017%. The standard deviation of the mean return at the exchange has been 0.017%, which is among the second highest in the sample. The positive skewness inplies that these three series have a long right tail. The kurtosis for the normal distribution is 3. From table –3.2, where the kurtosis statistic for the stock exchange is 23.81, we infer that the distribution is more peaked (leptokurtic) relative to the normal.

This factor is clear from the average shifted histogram of the return series presented in Figure 3.3. The skewness of this series, which is different than zero and the kurtosis, which is different than 3, coupled with the p-value for Jarque-Bera statistic being lesser than 0.05 clearly implies that the series is non-normal.Harvey (1994c) also presents a test of normality based on *Hansen's (1982)* generalized method of moments and rejects normality in fourteen of twenty

emerging markets.The line chart of the return data on the BOVESPA Stock Exchange is presented in Figure 3.4.

Figure 3.3

Average shifted Histogram for Brazil

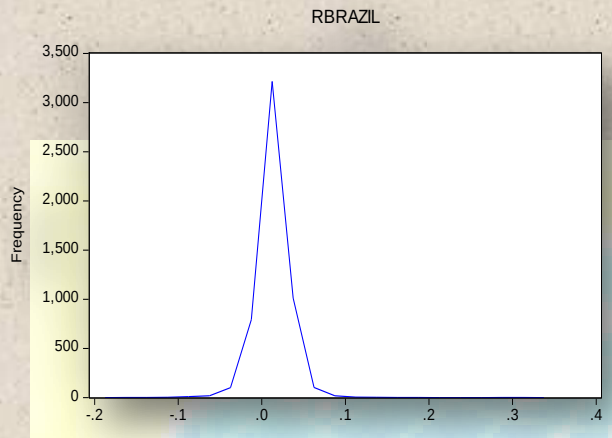
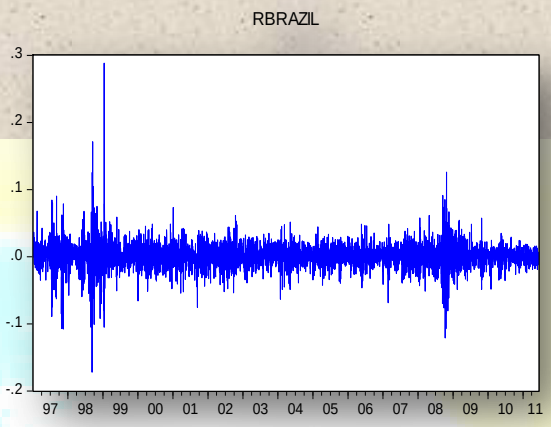


Figure 3.4

Line chart for Brazil



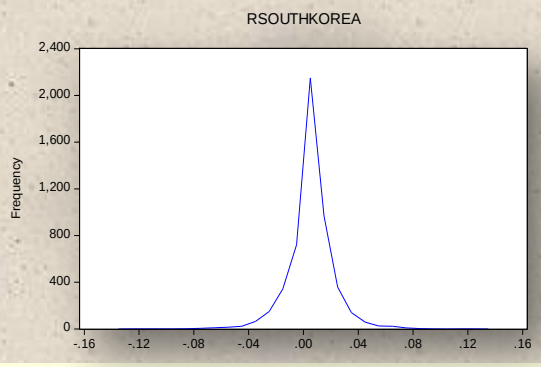
The basic statistics for the KOSPI Stock Exchange **South Korea** show the mean return to be at 7.08% per annum. The maximum return at the exchange for the reference period has been11.28% and the minimum return has been -12.805%. The standard deviation and co efficient of variance at the exchange has been noted at 0.015995 and 82.448 respectively. The series is found to be negatively skewed at-0.27125. Similarly, the kurtosis statistic is also found to be more peaked than normal (of 3) at 8.780724. These suggest that the return series at the Kospi Stock Exchange is non-normal. The Average shifted Histogram and the line chart for the return at South Korea Stock Exchange are presented in Figure 3.5 and Figure 3.6.

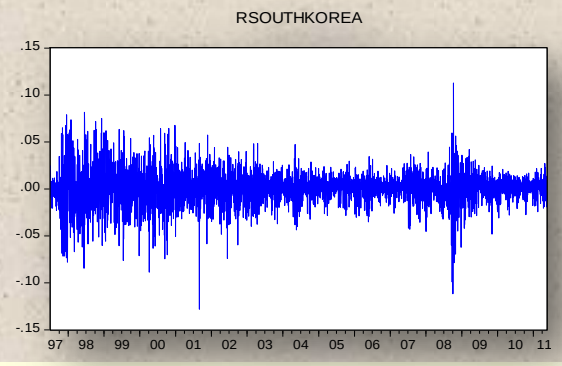
Figure 3.5

Average shifted Histogram for South Korea

Figure 3.6

Line chart for South Korea





The mean daily return at the Shanghai Stock Exchange, **China** has been 0.015% during the study period. Annualized at an average for the 14 years under the study period, the return comes out to be 5.51%per annum. The maximum daily return at the exchange during the period was 9.4% while the minimum return during the period was -9.2%. The standard deviation at the exchange is computed to be 0.012987. The co-efficient of variation for the exchange is computed to be 86.007%.. Negative skewness for the SSE indicates that the distributions for these three series have a long left tail. The kurtosis statistic implies that the distributions are peaked (leptokurtic) relative to the normal.

Figure 3.7

Average shifted Histogram for China

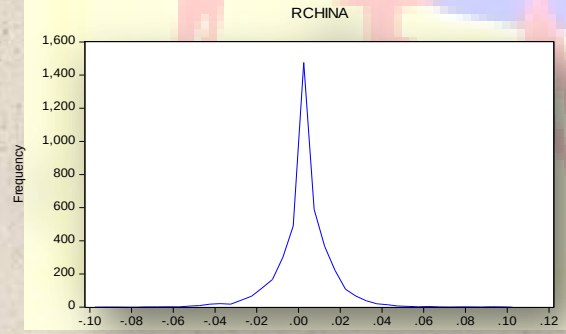
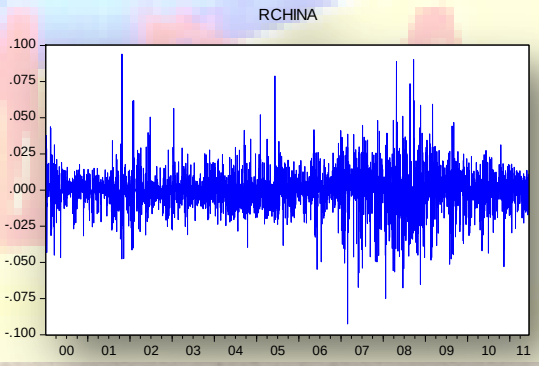


Figure 3.8

Line chart for China



The Average shifted histogram of this series is presented in Figure 3.7 while Figure 3.8 presents the line chart of the return at Shanghai Stock Exchange during the study period. The skewness of the return series for China is different than zero and the kurtosis is different than 3. Further, the p-value for Jarque-Bera statistic being lesser than 0.05 implies that the distribution is non-

normal.Figure 3.8 also makes clear that (i) there are no fat tales; and (ii) there are no outliers. Therefore, we find out that the series is a symmetrical one.

The Nifty of the National Stock Exchange of **India** offered an average daily return of 0.033 % during the said period. This translates to be 12.12 %annual return, when annualized. The maximum and minimum daily returns at the exchange during the study period amounted to 9.9339% and -9.256% respectively. The standard deviation at the exchange during the period has been 0.0135. This coupled with the co-efficient of variation of 40.883 signals lowest volatility of the return at the exchange among the selected sample. The series is negatively skewed and shows a skewness of-0.263728 while the kurtosis of 10.215 signals that distributions are peaked (leptokurtic) relative to the normal . negative skewness and positive kurtosis of India is also shown by (Sharma and bodla). This factor is clear from the average

Figure 3.9

Average shifted Histogram for India

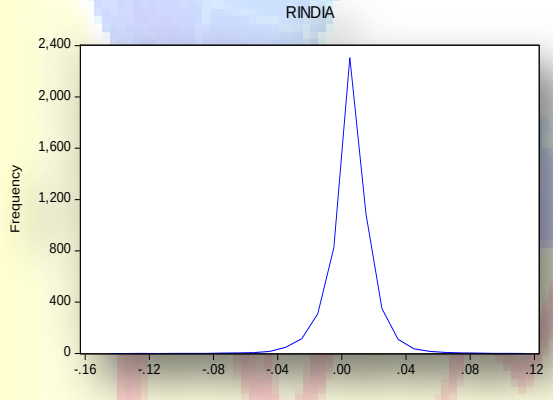
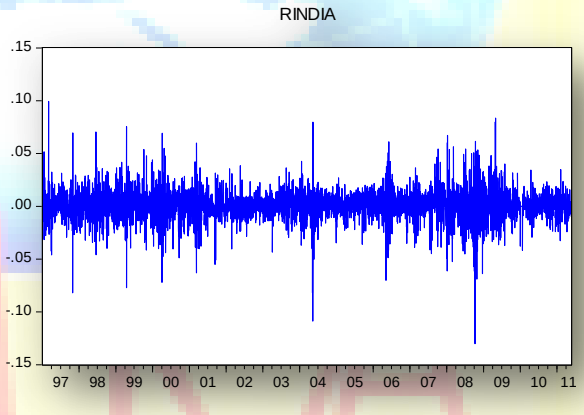


Figure 3.10

Line chart for India



shifted histogram of the return series presented in Figure 3.9. The skewness of this series, which is different from zero and the kurtosis, which is different from 3, alongwith with the p-value for Jarque-Bera statistic being less than 0.05 clearly implies that the series is non-normal.The Average shifted Histogram and the line chart of the return data on the National Stock Exchange are presented in Figure 3.9 and Figure3.10 respectively.

The statistics for Malyasia (Kaula Lumpur Stock Exchange) as presented in Table 3.2 reveal the average daily return at 0.005% translating into 1.65% annual return at the exchange. The maximum daily return at the exchange happens to be 19.86 % while the minimum return at the

exchange during the period comes out to be -24.15%. The standard deviation at the exchange is 0.01288 and the co-efficient of variation is 284.48, which is on the higher side indicating a higher volatility. The series for KSE is positively skewed (0.292) while the kurtosis for the exchange is positive (76.77). The skewness of this series is found to be different from zero and the kurtosis is different from 3. Further, the p-value for Jarque-Bera statistic is less than 0.05, which implies that the distribution is non-normal. Figure 3.11 and 3.12 present the Average shifted Histogram and the line chart of the return data respectively on the Kaula Lumpur Stock Exchange.

Figure 3.11

Average shifted Histogram for Malyasia

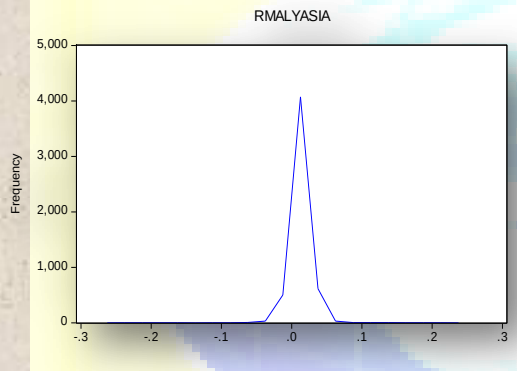
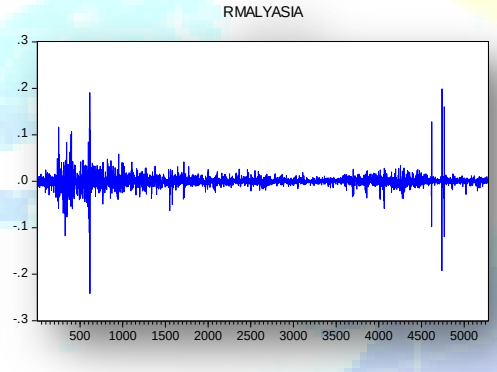


Figure 3.12

Line chart for Malyasia



The statistics for the **Mexico Stock Exchange** as shown in the Table 3.2 exhibit the average daily return to be at a very high level of 0.045% and as well the annualised return 16.24%. The maximum return at the exchange during the reference period has been 12.15% and the minimum return during the period has been -10.822%. Lowest standard deviation of 0.0127 and co-efficient of variation at 28.643 indicates a very low volatile market in Mexico. The series is found to be positively skewed (0.137663) and the kurtosis is highly positive as well (11.83652). Both Skewness and Kurtosis of this series point towards a non-normal distribution. The less than 0.05 p-value for Jarque-Bera statistic also means that the distribution is non-normal

The Average shifted Histogram and the line chart of the return data on the Mexico Stock Exchange are presented in Figure 3.13 and 3.14 respectively

Figure 3.13

Average shifted Histogram for Mexico

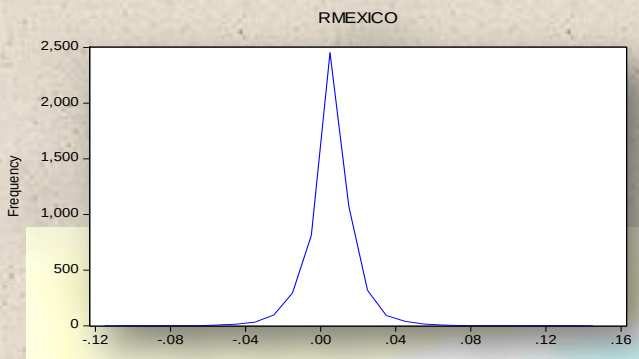
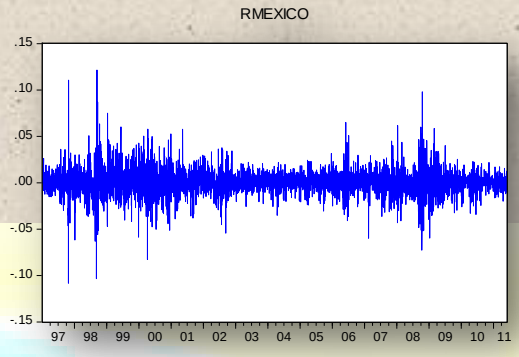


Figure 3.14

Line chart for Mexico



The basic statistics for the **Philippine's** Stock Exchange show very low mean return to be at 2.29% per annum. The maximum return at the exchange for the reference period has been 9.41% and the minimum return has been -12.35% respectively. The standard deviation at the exchange has been noted at 0.0124 and the co-efficient of variation has been observed at 156.005. The series is found to be negatively skewed at -0.122. Similarly, the kurtosis statistic is also found to be high than normal (of 3) at 12.94. These suggest that the return series at the Philippines Stock Exchange is non-normal. The Average shifted Histogram and the line chart for the return at Nepal Stock Exchange are presented in Figure 3.15 and Figure 3.16.

Figure 3.15

Average shifted Histogram for Philippines

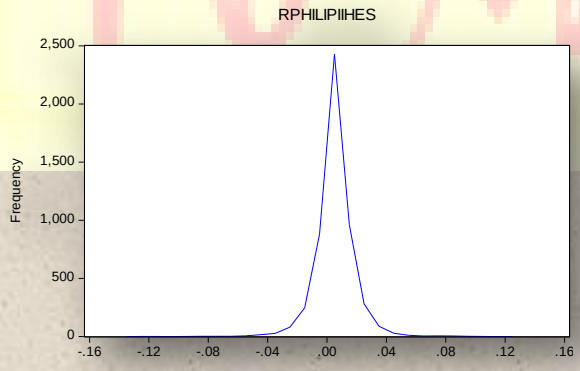
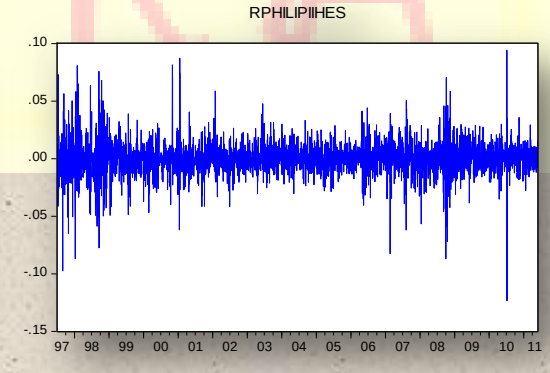


Figure 3.16

Line chart for Philippines

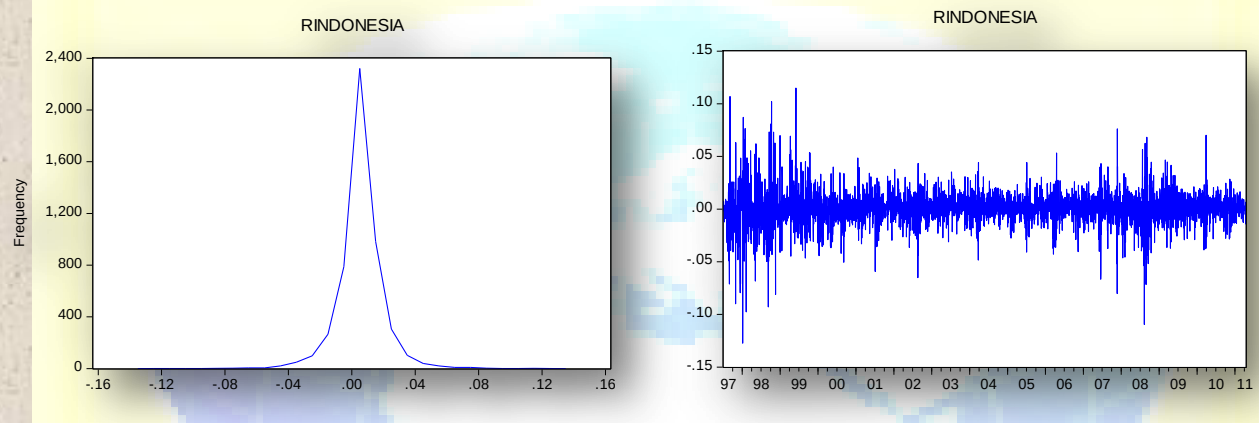


The basic statistics for the **Indonesia**, Jakrata Stock Exchange show the mean daily return to be at0.0.032% and 11.79% per annum. The maximum return at the exchange for the reference period

has been 11.49% and the minimum return has been -12.73%. The standard deviation at the exchange has been noted at 0.01417 and the co-efficient of variation has been observed at 43.87. The series has found to be negatively skewed at -0.077. Similarly, the kurtosis statistic also finds to be more than normal (of >3 Laptokuratic) at 12.94. These suggest that the return series at the Jakrata Stock Exchange is non-normal. The Average shifted Histogram and the line chart for the return at Jakrata Stock Exchange are presented in Figure 3.17 and Figure 3.18.

Figure 3.17 **Figure 3.18**

Average shifted Histogram for Indonesia **Line chart for Indonesia**



The **Russia** offered an average daily return of 0.041% and 15.07% annual return i. e. second highest among the sample economies. The maximum and minimum daily returns at the exchange during the study period amounted to 20.20 and -21.1% respectively. The standard deviation at the exchange during the period has been0.021863. This coupled with the co-efficient of variation of 52.94 signals high volatility of the return at the exchange. The series is negatively skewed and shows a skewness of -0.40478 while the kurtosis of 14.38 signals that distributions are peaked (leptokurtic) relative to the normal. This factor is clear from the average shifted histogram of the return series presented in Figure 4.19.

Figure 3.19

Average shifted Histogram for Russia

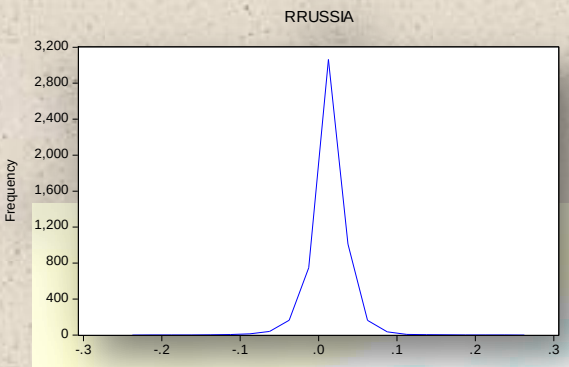
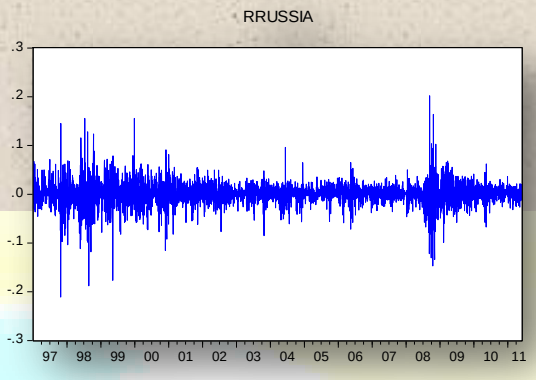


Figure 3.20

Line chart for Russia



The skewness of this series, which is different from zero and the kurtosis, which is different from 3, alongwith with the p-value for Jarque-Bera statistic being less than 0.05 clearly implies that the series is non-normal.The Average shifted Histogram and the line chart of the return data on the Stock Exchange are presented in Figure 3.19 and Figure 3.20 respectively.

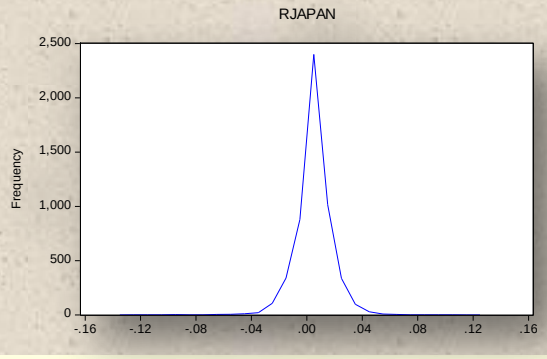
Before this we have discussed the markets of emerging economies, now we will discuss the developed markets. **Japan** depicts the lowest daily average return -0.001% for the reference period but for 01-01-1997 to 31-12-2010 it is 0.034%. This is due to Tsunami disaster. The maximum return at the exchange for the reference period has been 6.52% and the minimum return has been -6.8% respectively. The standard deviation at the exchange has been noted at 0.012466 and the co-efficient of variation has been observed at 1544.734i. e. also very high due to the above sided reason C.V. of 01-01-1997 to 31-12-2010 is 2.169. The series is found to be negatively skewed at -0.074224. Similarly, the kurtosis statistic is also found to be more peakedness than normal (of 3) at 6.625551. These suggest that the return series at the Nepal Stock Exchange is non-normal. The Average shifted Histogram and the line chart for the return at Nepal Stock Exchange are presented in Figure 3.21 and Figure 3.22.

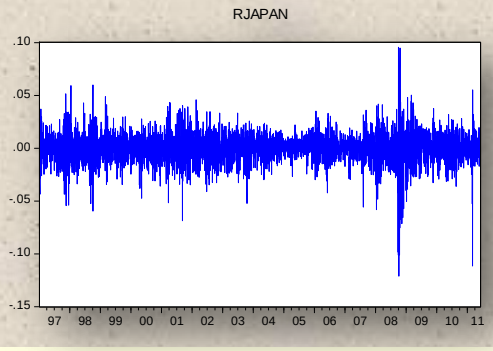
Figure 3.21

Average shifted Histogram for Japan

Figure 3.22

Line chart for Japan





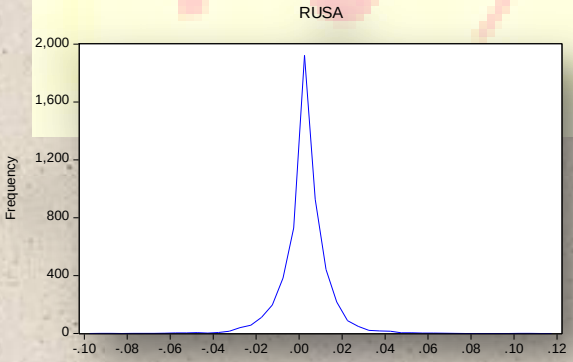
The statistics for **USA** (New York Stock Exchange) has shown in the Table 3.2 exhibit the average annual return to be at a very low level of3.76%. The maximum return at the exchange during the reference period has been 10.25% and the minimum return during the period has been -9.46%. lowest standard deviation of 0.0105 and co-efficient of variation at 102.845 indicates a low volatile market in USA. The series is found to be negatively skewed (-0.1794) and the kurtosis is highly positive as well more peakdness than normal one laptokuratic (11.49). Both Skewness and Kurtosis of this series point towards a non-normal distribution. The less than 0.05 p-value for Jarque-Bera statistic also means that the distribution is non-normal. The Average shifted Histogram and the line chart of the return data on the New York Stock Exchange are presented in Figure3.23 and 3.24 respectively.

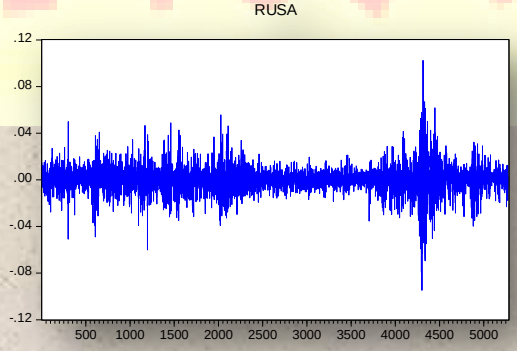
Figure 3.23

Average shifted Histogram for USA

Figure 3.24

Line chart for USA





Conclusion:

The study concludes that the highest annualised average daily returns during the study period at the Mexico (0.045 percent),Russia(0.041 percent) andBrazil (0.041) followed by India (0.033 percent), Indonesia(0.032 percent) and South Korea(0.019 percent) economies. The risk at Russia (0.02186), Brazil(0.017919) have remained the maximum whileUsa (0.010593) and Japan (0.012466) have the lowests. C.V. (Coefficient of variation) of the absolute series also confirms the higher risk at Russia, Indonesia, Mexico, Brazil and India. Further, all the twelve series are observed to be non-normal. The higher values of Kurtosis imply the series to be leptokurtic while the rejection of null hypothesis in all the cases further confirms that the series are not normal.

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