

Distributional Characteristics of Price Earnings Multiple in Indian Stock Market

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Price Earnings (P/E) is commonly used by investors and market analysts in comparing potential profitability of different companies or industries. Cross sectional distribution of P/E multiple is a critical step in its application. It develops a good sense of how multiple is distributed across the entire market which can be very useful in sectoral analysis. Though thoroughly documented but most of the studies in price earnings multiple are related either to the effect of price earnings multiple or its determinants. Recognizing the significance of distributional characteristic of price earnings multiple, this study has been conducted to observe and analyze distributional characteristic of price earnings multiple in Indian stock market.

Key words: Price earning (P/E) multiple, distributional characteristics, stock market

INTRODUCTION

Price-Earnings (P/E) multiple is widely used by practitioners and thoroughly documented by researchers as a relative measure of corporate performance. It is commonly used by investors and market analysts in comparing potential profitability of different companies or industries. Sezgin (2010) found P/E ratio as a preferred measure of corporate performance due to its simplicity and usage of actual data in its calculation. Damodaran (2006) also ascribed its wide application ranging from pricing of initial public offerings to making judgments on relative value due to its simplicity.

The classical approach of estimating theoretical P/E multiple is based on the dividend discount model, being proposed by Williams in 1938. But Nicholson (1960) was first to study P/E effect when he concluded that stocks with lower P/E ratios are more productive than high P/E ratios.

This study is considered as the earliest sign of asset price anomaly even before formation of capital asset pricing model (CAPM) by Sharpe (1964). Ever since P/E multiple has been studied by numerous researchers and well documented.

There is a general notion that P/E multiple gives an idea what the market is willing to pay for each rupee of company's earning and thus reflects investor's confidence for company.

CONCEPT OF PRICE EARNINGS MULTIPLE

The price-earnings multiple has invariably been calculated as the ratio of the current share price to the previous year's earnings. Where both numerator i.e. value of equity per share and denominator i.e. earnings per share are measures of equity performance. There is a general notion that P/E multiple gives an idea what the market is willing to pay for each rupee of company's earning and thus reflects investor's confidence for company. For some investors a

high P/E indicates that the market has high hopes, while for others a high P/E is an indicator of overpricing. Conversely, a low P/E may indicate low confidence by the market.

Damodaran (2006) suggested four steps while using multiples. Definitional test is the first step to ensure consistency in definition and uniformity in its measurement. The second step is descriptive test to know distributional characteristics of a multiple. While the third step to analytical test is to understand what the third step to understand not only what fundamentals determine the multiple but also how changes in these fundamentals translate into changes in the multiple. The final step is application test to find the right comparable and controlling for differences that may persist across these firms. Damodaran (2006) also recommended cross sectional distribution of P/E multiple as a critical step in using a multiple. For this purpose an analyst needs to understand distributional characteristics of P/E multiple across market and sector.

The earliest sign of P/E effect can be traced in 1960 when Nicholson (1960) found stocks with lower P/E more productive.

According to Damodaran (2006) many analysts who use multiples have a sector focus and have a good sense of how different firms in their sector rank on specific multiples but do not have a sense of how the multiple is distributed across the entire market which can be very useful in sectoral analysis. Though thoroughly documented but most of the studies in price-earnings multiple are related either to the effect of price-earnings multiple or its determinants. Recognizing the significance of distributional characteristic of price-earnings multiple, this study has been conducted to observe and analyze distributional characteristic of price-earnings multiple in Indian stock market.

REVIEW OF LITERATURE

Price-earnings multiple is one of the thoroughly documented areas of valuation. The review of literature reveals that classical approach to estimate a theoretical P/E is based on the dividend

discount model, proposed by Williams in 1938. But the earliest sign of P/E effect can be traced in 1960 when Nicholson (1960) found stocks with lower P/E more productive. This study is considered as the earliest sign of asset price anomaly. So far, several studies has been conducted on P/E multiple. But the majority of studies related to P/E multiple are either based on P/E effect or its determinants.

Nicholson (1960), Basu (1975, 1977), Banz and Rolf (1981), Basu (1983), Goodman and Peavy (1983), Peavy and Goodman (1983), Levy and Lerman (1985), Banz and Breen (1986), Goodman and Peavy (1986), Fama and French (1988, 1992), Fuller, & Levinson (1993), Lakonishok et. al. (1994), Loughlin (1996), White (2000), Anderson & Brooks (2006), Bhargava & Malhotra (2006), Weigand & Irons (2007), Dudney et al. (2008), Aras & Yilmaz (2008), Ikoku et al. (2010), Bunyamin (2012), are among those who had conducted studies on P/E effect. Whereas studies on determinants of P/E ratio were conducted by Zarowin (1990), Richard et al. (1991), Alford (1992), Kane et al. (1996), Barry (2000), Jones (2000), Jain and Rosett (2001), Donna and Thomas (2004), Dhaliwal et al. (2007), Wu (2007), Shen (2007), Kumar & Warne (2009), Jordon et al (2009), Kasilingam & Ramasundaram (2011) and Faezinia et al. (2012). A close review of aforesaid studies reveals that although P/E effect and its determinants have thoroughly been studied, there are few studies related to distributional characteristic of P/E multiple, a critical element of multiple application. Therefore, this study has been conducted to throw some light on distributional characteristic of P/E ratio in Indian Stock Market.

NEED AND SCOPE OF STUDY

The distributional characteristic of multiple across the market has been suggested as an integral part of analysis by Damodaran (2006). It is a critical step in analysis of multiples and helps in identifying under or overvalued firms. Thus realizing the significance of distributional characteristic of a multiple across the market, this study intends to empirically investigate the distributional characteristic of P/E multiple in Indian stock market. Though this study would be a contribution in this less documented area, yet at the same time findings cannot be generalized due to study being conducted for limited duration and on selected indices of Indian stock market.

OBJECTIVES AND HYPOTHESES OF STUDY

The objective of study is to analyze how P/E multiple is distributed across Indian stock market. In pursuance of aforesaid objectives, this study intends to test the validity of normality assumption in P/E multiple series of broad based and sectoral indices and for this purpose following hypotheses have been conceptualized:

H₀₁: Price Earnings Multiples of NSE's broad based indices are normally distributed.

H_{a1}: Price Earnings Multiples of NSE's broad based indices are not normally distributed.

H₀₂: Price Earnings Multiples of NSE's sectoral indices are normally distributed.

H_{a2}: Price Earnings Multiples of NSE's sectoral indices are not normally distributed.

DATA AND METHODOLOGY

To study distributional characteristics of P/E multiple broad based and sectoral indices of National Stock Exchange (NSE) have been selected. NSE is currently having eight broad based and eleven sectoral indices. Due to constraints of data availability, seven broad based and eight sectoral indices of NSE have been selected. The data was compiled from official website of NSE starting from January 2008 till December 2012. The broad based indices which are part of study are CNX Nifty, CNX Nifty Junior, CNX 100, CNX 200, CNX 500, CNX Mid Cap and Nifty Mid Cap 50. Besides this sectoral indices included in this study are CNX Auto, CNX Bank, CNX Finance, CNX IT, CNX Media, CNX Metal, CNX PSU Bank and CNX Realty.

To test the presence of symmetry in P/E multiple series, the Jarque-Bera Test (Jarque & Bera, 1987) has been applied. The Jarque-Bera statistic is computed from skewness and kurtosis and asymptotically follows the chi-squared distribution with two degrees of freedom. The Jarque-Bera test is used to test the null hypothesis that the data are from a normal distribution. The test statistic is:

$$JB = \frac{n}{6} \left[S^2 + \frac{(K-3)^2}{4} \right] \sim \chi^2_2 \quad (1)$$

Where:

n = the sample size

S = skewness

K = kurtosis

Thereafter distributional characteristic of P/E multiple has been analyzed on the basis nature of distribution and summary statistic. The summary statistics used in study are Mean, Median, Standard Deviation, Skewness, Kurtosis, Maximum and Minimum values. For statistical analysis, SPSS and Eviews softwares have been used.

FINDINGS & ANALYSIS

The preliminary study suggests that P/E multiples of all selected broad based as well as sectoral indices of Indian Stock Market are non-normal. Graph 1 to 15 presents histogram with normality curve which shows that many observations lie outside the normality plot. The Jarque-Bera test of normality, rejects the hypothesis of normality for P/E multiple of all selected indices at the 95% level of confidence.

Table 1: Summary Statistics of Broad Based & Sectoral Indices of NSE

Name of Indices	N (Size of Sample)	Mean	Median	Standard Deviation	Skewness	Kurtosis	Maximum Value	Minimum Value	Jarque-Bera Statistic	Probability
CNX Nifty	1239	19.63699	19.93	3.16054	-0.39524	3.21345	28.29	10.68	34.61076	0
CNX Nifty Junior	1238	15.39675	15.63	3.164	-0.24601	4.72393	27.71	7.34	165.7901	0
CNX 100	1238	18.809	19.09	3.0569	-0.44715	3.70661	28.15	10.14	67.00936	0
CNX 200	1239	18.61409	18.84	2.95353	-0.27373	3.95983	28.5	9.6	63.03277	0
CNX 500	1239	18.09651	18.49	2.8654	-0.51123	3.96933	27.07	9.29	102.4776	0
CNX Mid Cap	1238	15.68472	15.635	3.41027	-0.07535	3.37783	26.35	7.13	8.53507	0.01402
Nifty Mid Cap 50	1238	14.78726	15.015	3.545016	-0.402565	3.105472	24.41	6.43	34.01193	0
CNX Auto	1238	18.28082	18.835	4.0043	-0.59031	3.05836	27.53	7.8	72.07476	0
CNX Bank	15.06944	14.68	27.44	3.529847	0.252783	3.591488	27.44	6.22	31.2566	0
CNX Finance	1240	18.62864	17.97	4.40646	0.69923	4.94351	36.87	8.47	296.1994	0
CNX IT	1238	20.02135	20.35	4.52082	-0.39319	2.66363	29.6	9.58	37.73509	0
CNX Media	1239	34.89892	36.71	8.87027	-0.30883	3.30436	65.62	13.77	24.47744	0.000005
CNX Metal	1239	13.31524	13.01	4.52344	0.333135	3.66621	27.41	3.74	45.82986	0
CNX PSU Bank	1236	9.12004	8.93	2.07253	0.628686	3.52632	16	4.43	95.68686	0
CNX Realty	1239	24.90818	21.54	13.37117	0.74681	2.99947	62.42	4.15	115.1695	0

As per the numerical results shown in table no. 1, p value of Jarque-Bera statistic for P/E multiple of all selected broad based and sectoral indices is less than 0.05 at 5% level of significance which offers an evidence to reject the null hypothesis and endorse absence of normalization in distribution.

Since all selected indices have non-symmetric distribution, it has brought a philosophical

To study distributional characteristic of P/E multiple, mean is used to estimate typical value of P/E multiple for market as well as for its different sectors.

complexity to the very process of estimating a "typical value" for the distribution. If the distribution is symmetric, the typical value is unambiguously center of the distribution. But in case of a skewed distribution, there is no "center", rather than it has several "typical value" metrics like mean, median and mode.

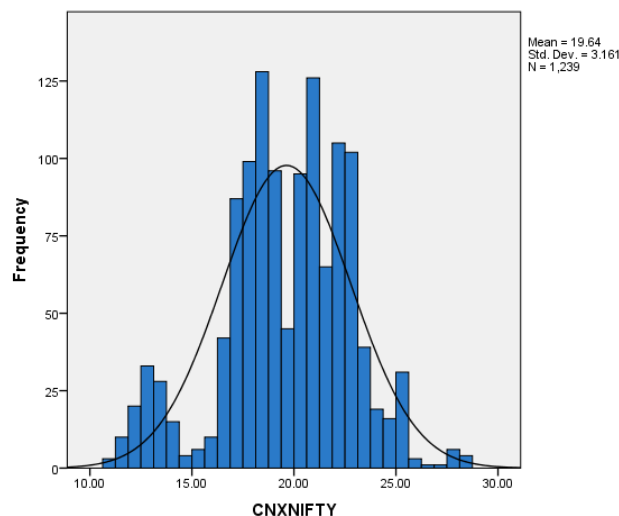
In practice, for skewed distributions the most commonly used typical value is the mean. Therefore, to study distributional characteristic of P/E multiple, mean is used to estimate typical value of P/E multiple for market as well as for its different sectors.

A review of mean as an estimate of typical value of P/E multiple for the market shows that the average value of P/E multiple in case of CNX Nifty, CNX Nifty Junior, CNX 100, CNX 200, CNX 500, CNX Mid Cap and Nifty Mid Cap 50 is 19.63699, 15.39675, 18.80900, 18.61409, 18.09651, 15.68472 and 14.78726 respectively. Thus, in case of broad based indices, the average value of P/E multiple is ranging between 14.79 and 19.64. Whereas, in case of sectoral indices, the average value of P/E multiple for CNX Auto, CNX Bank, CNX Finance, CNX IT, CNX Media, CNX Metal, CNX PSU Bank and CNX Realty is respectively 18.28, 14.68, 18.63, 20.02, 34.90, 13.32, 9.12 and 24.91 respectively. It shows that average P/E multiple is widely fluctuating in case of sectoral indices since it is ranging between 9.12 to 34.90.

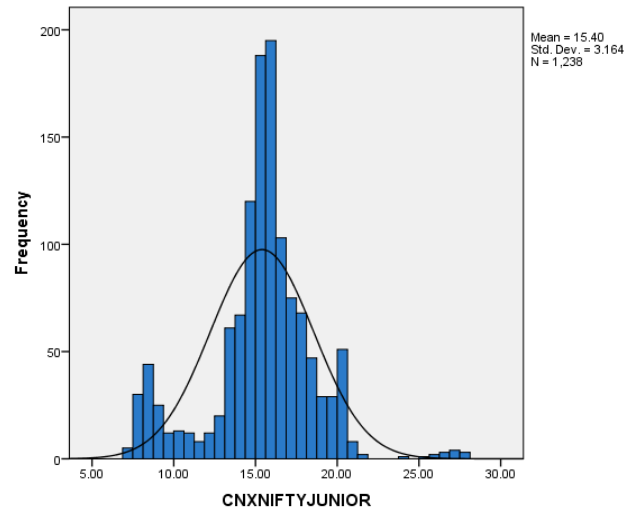
Further, inspection of table 1 suggests some evidence of skewness and excess kurtosis in the P/E multiples of broad based and sectoral indices, In case of broad based indices, the value of skewness for P/E multiples of CNX Nifty, CNX Nifty Junior, CNX 100, CNX 200, CNX 500, CNX Mid Cap and Nifty Mid Cap is 50 -0.39524, -0.24601, -0.44715, -0.27373, -0.51123, -0.07535 and -0.402565 respectively. Since, in this case, value of skewness is ranging between - 0.25 to – 0.51, it shows that distributions are skewed to left (see graph 1 to 7). As the value of kurtosis is reviewed, it was observed that all broad based indices have positive kurtosis. It indicates a "peaked" (leptokurdic) distribution and thus along with negative skewness in series, it further endorses non-normality of distribution in P/E multiple of broad based indices.

GRAPHS: HISTOGRAM & NORMALITY PLOT OF BROAD INDICES OF NSE

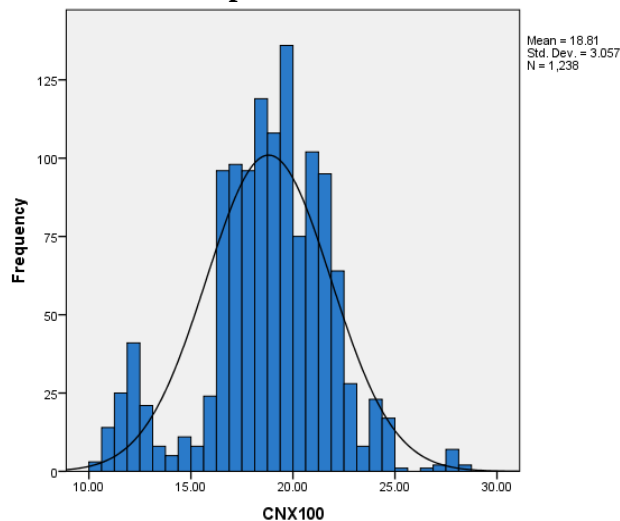
Graph 1: CNX Nifty



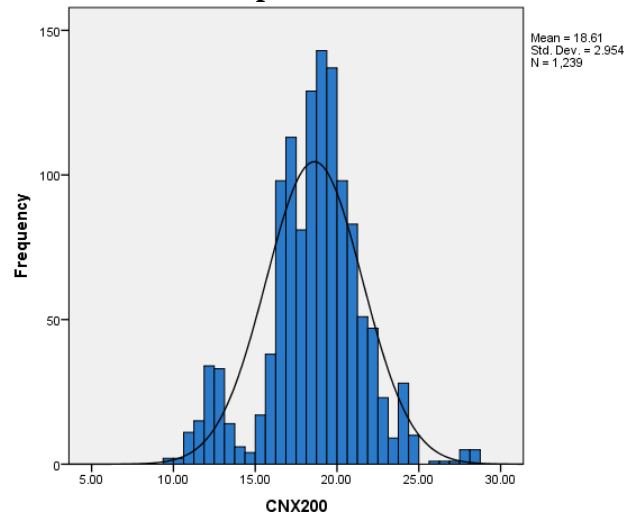
Graph 2: CNX Nifty Junior



Graph 3: CNX 100

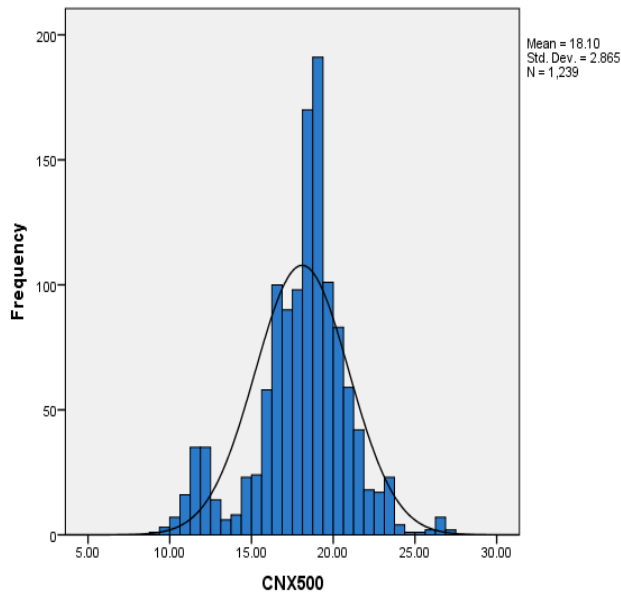


Graph 4: CNX 200

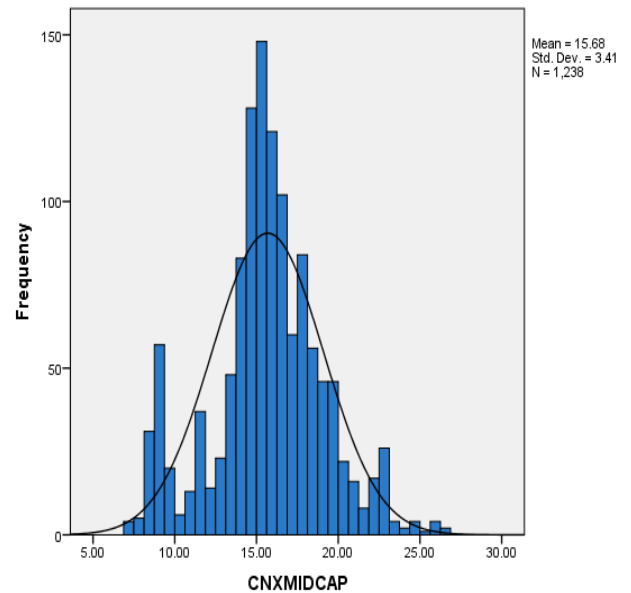


GRAPHS: HISTOGRAM & NORMALITY PLOT OF BROAD INDICES OF NSE

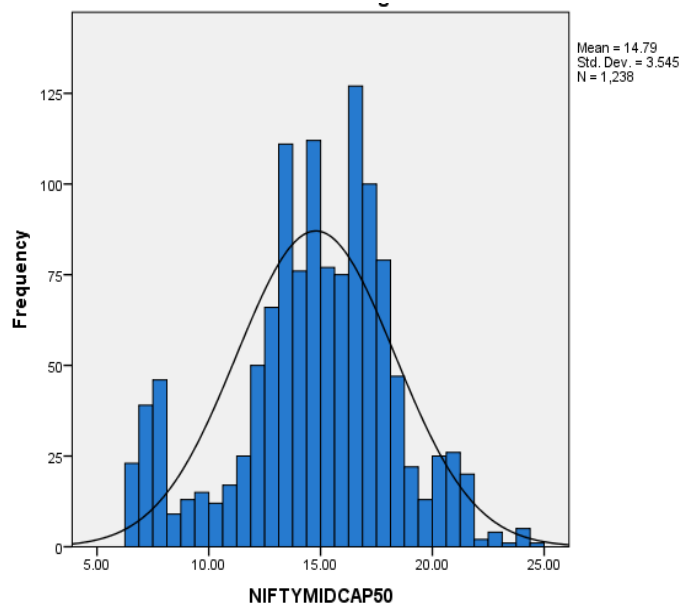
Graph 5: CNX 500



Graph 6: CNX Mid Cap



Graph 7: CNX Mid Cap 50

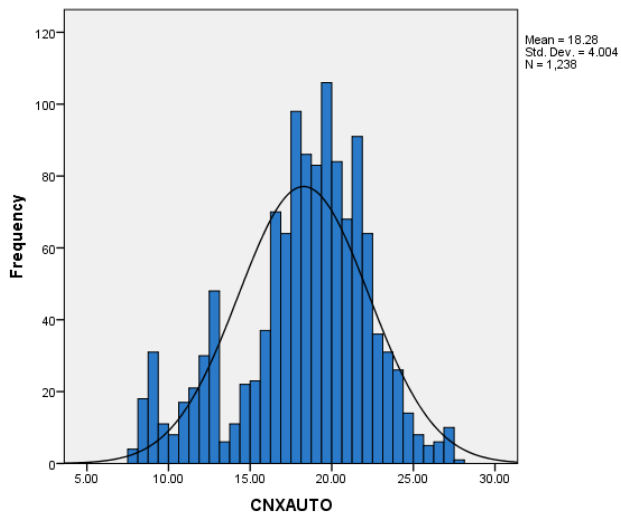


In case of CNX Auto, CNX Bank, CNX Finance, CNX IT, CNX Media, CNX Metal, CNX PSU Bank and CNX Realty index, value of skewness is -0.59031, 0.252783, 0.69923, -0.39319, -0.30883, 0.333135, 0.628686 and 0.74681 respectively. Thus, in case of sectoral indices, the value of skewness is lying between -0.59 and 0.75. It reflects that P/E multiples of sectoral indices are skewed to left as well as to right (see graph no. 8 to 15). The P/E multiples of CNX

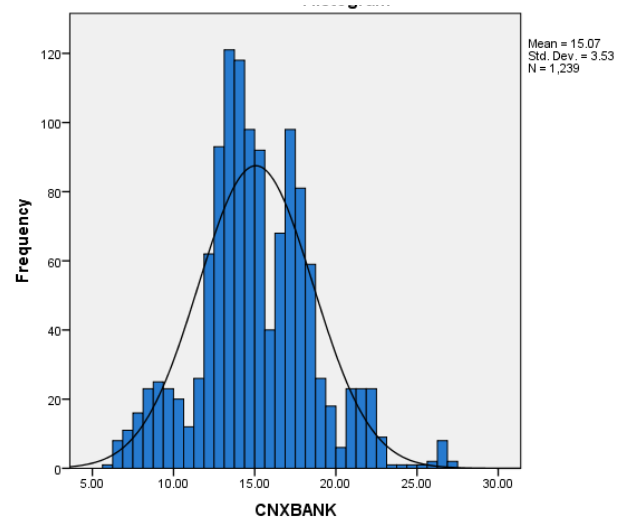
Bank, CNX Finance, CNX Metal, CNX PSU Bank and CNX realty are positively skewed whereas CNX Auto, CNX IT and CNX Media are negatively skewed. The analysis of kurtosis reveals that CNX AUTO, CNX BANK, CNX FINANCE, CNX MEDIA, CNX METAL and CNX PSU BANK have positive kurtosis. It indicates a "peaked" (leptokurdic) distribution. Whereas CNX IT, and CNX REALTY have negative kurtosis and thus indicates "flat" (platykurdic) distribution. This endorses absence of normality in distribution of sectoral indices. Thus, P/E value in case of broad based as well as sectoral indices is skewed with excess kurtosis and thus showing absence of normality in distribution.

GRAPHS: HISTOGRAM & NORMALITY PLOT OF SECTORAL INDICES OF NSE

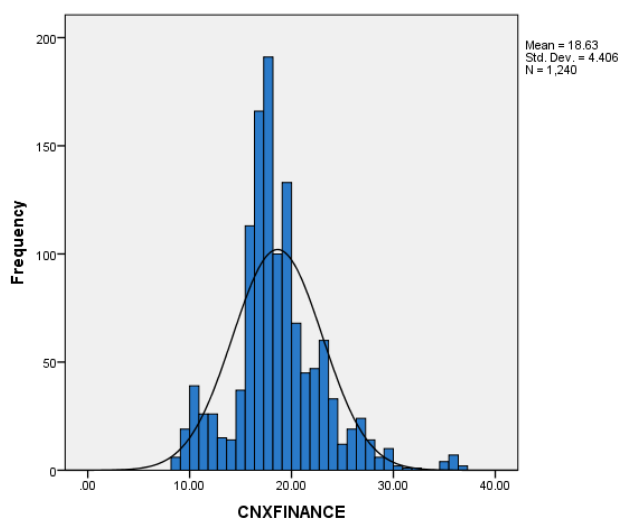
Graph 1: CNX Auto



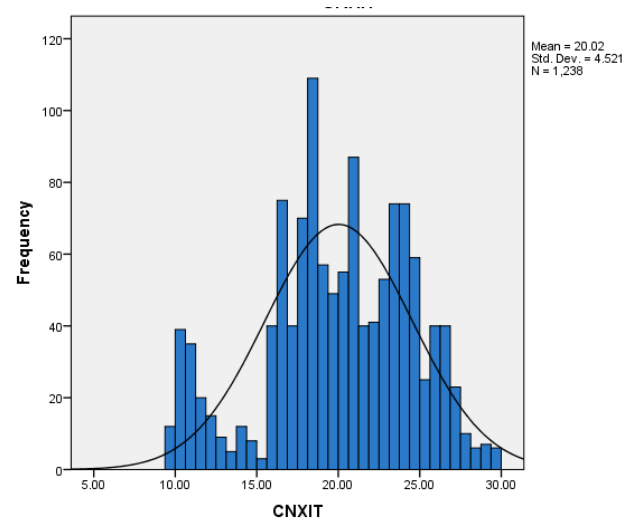
Graph 2: CNX Bank

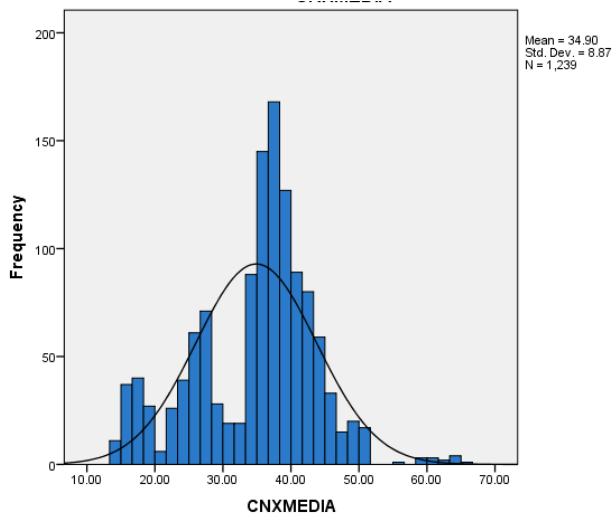
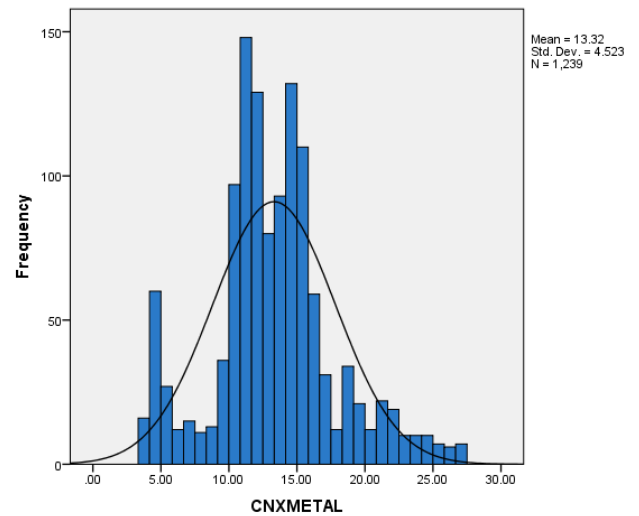


Graph 3: CNX Finance

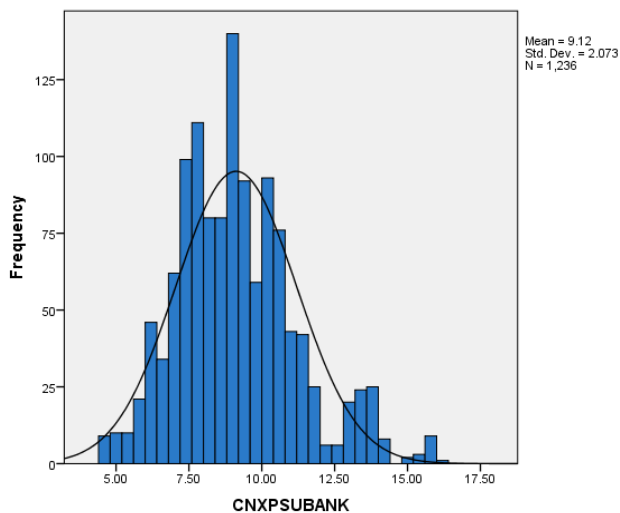
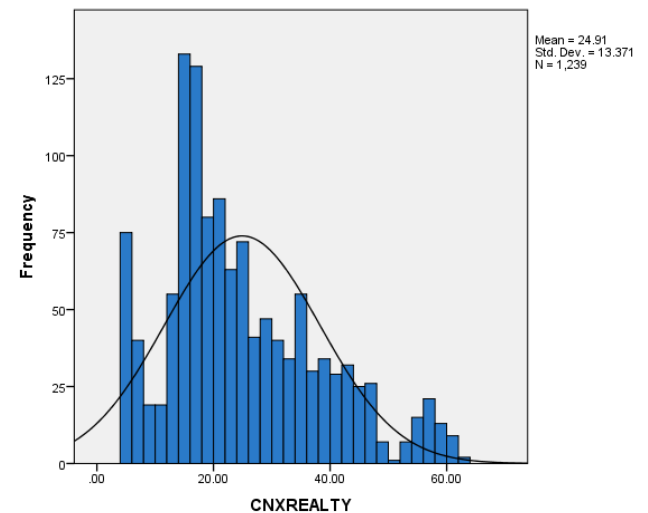


Graph 4: CNX IT



Graph 5: CNX Media**Graph 6: CNX Metal**

GRAPHS: HISTOGRAM & NORMALITY PLOT OF SECTORAL INDICES OF NSE

Graph 7: CNX PSU Bank**Graph 8: CNX Realty**

CONCLUSION

Thus, the results of study detail departure from normality and show how skewness and kurtosis have evolved in case of P/E multiple of broad based as well as sectoral indices. When investors are faced with skewed price earnings multiple, it is reasonable to assume that they may prefer positively skewed P/E multiple, reflecting high growth expectations in the form of high P/E ratio

or negatively skewed P/E multiple, using as an indicator of under pricing. Since investors may prefer positively skewed distributions to negatively skewed distributions in case they perceive high P/E multiple as an indicator of high growth expectations. Else they may also prefer negatively skewed P/E multiple, if they perceive high P/E as an indicator of overpricing. Hence, it is reasonable to assume that investors may have a preference over positive or negative skewness. Therefore, this study suggests that investors needs to keep track of skweness of P/E multiple apart from mean as a measure to estimate typical value of P/E multiple for market as well as for its different sectors.

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