1.1 Introduction

In 1980s & 1990s, the exchange traded financial derivative instruments terminologies like forward, futures, options and swaps were limited to few developed countries, but today they are used across the globe. Currently investors are increasingly attracted towards financial derivative instruments.

In 2013, the estimate of global financial derivatives was 238.63 trillion USD in notional value. In 2013, the estimate global futures contract was 135.53 trillion USD in notional value. Futures contracts have become more popular and are attracting many investors across the globe because of the following reasons

1. Lower transaction cost
2. Higher liquidity
3. Only margin money is required to trade futures contracts rather than full transaction value

The Futures and Options (F&O) segment of National Stock Exchange (NSE), India is 382 trillion INR in transaction value and the size of F&O in terms of number of contracts traded and turnover witnessed a highest Compounded Annual Growth Rate (CAGR) of 97.40 % and 90.80 % in last 14 years respectively. The F&O segment of NSE, India, is on par with international trading and witnessed major microstructure changes and created considerable interest among worldwide investors, academicians and researchers, because of Automated Screen Based Trading (ASBT), Satellite communication technology, dematerialization of shares, quick response system for market participants, rolling settlement process (T+1), focusing on corporate governance practices. It enhanced liquidity, transparency, efficiency, speed and safety. Due to this, regional and global investors like Foreign Institutional Investors (FII) and Private Equity investors attracted & invested in Indian derivatives market.

The pricing of Individual Stock Futures (ISF) and stock index futures contracts is a key issue and has received much attention from market participants and finance academicians. Especially the behaviour of stock index futures has been assessed extensively in various markets across the globe. Many researchers have made an
extensive effort to predict stock index futures price under various assumptions and economic conditions.

The well-known standard model for predicting futures price is undoubtedly the Cost of Carry Model (CCM). This model was developed under the assumption of perfect market and no arbitrage argument. According to CCM, the futures prices will exceed spot prices by the cost of carry. The cost of carry equals to the cost of holding the underlying asset (interest forgone), less the benefit (cash dividend received). Suppose if any deviation of actual futures price from its theoretical ‘Fair Price’ estimated by CCM then arbitragers use an opportunity and earn riskless profit by simultaneously buying in one market at low price and selling in another market at high price. Arbitrager’s actions will continue till this price deviation will be adjusted back to equilibrium simultaneously and risk less profitable arbitrage opportunity will be eliminated.

Many researchers, Darren Butterworth & Phil Holmes (2012), Panayiotis C. Andreou and Yiannos A. Pierides (April 2008), Fung and Draper (1999), Gay & Jung (1999), Brailsford and Cusack (1997), Wolfgang Buhler & Alexander Kemp (1995), Yadav and pope (1994) and Brenner, Subrahmanyam, Uno, Jun (1990) have been documented the existence of mispriced futures contract i.e. The actual futures price was persistently below the theoretical price estimated by the cost of carry model.

In determining stock index futures prices, nevertheless, stock market volatility is excluded from the cost of carry model and states that market volatility should not have explanatory power for futures prices. However, Panayiotis C. Andreou and Yiannos A. Pierides (April 2008), Stephen P. Ferris, Hun Y. Park & K wangwoon Park (2002), Fung, Joseph K W, Draper, Paul (1999), Gay and Jung (1999), Nai-fu chen, charles j. Cuny, and robert a. Haugen (1995) and John J. Merrick, Jr (1987) found a significant correlation between index futures pricing error and index volatility. Motivated by the role of volatility Michael L. Hemler and Francis A. Longstaff (1991) followed the CIR (Cox et al., 1985a,b) framework and developed a closed form general equilibrium model of stock index futures prices in a continuous economy with risk free interest rate and market volatility. Hereafter Hemler and Longstaff Model (HLM). When the natural logarithm of the dividend – adjusted
futures /spot price ratio is regressed on market volatility and interest rates, they find that market volatility has significant explanatory power.

From the literature it clearly indicates that cost of carry model and HLM are based on the assumption that perfect market and no – arbitrage argument. Hsu & Wang (2004) argues real capital markets are not perfect, arbitrage mechanism not complete and incorporates the factor of price expectation (expected growth rate) developed a pricing model of stock index futures in imperfect markets. Here after Hsu & Wang Model (HWM).

Further, the cost of carry model can be used to explain price discovery function. Price discovery function mainly depends on which of the two markets (futures & spot) reflects or reacts more quickly to the new information. If CCM holds then bidirectional information flows between futures and spot markets and there will be no time lag between futures and spot prices. If both the markets reflect new information simultaneously then the price discover takes place in both markets simultaneously and such market is known as efficient market or perfect market. Dr. Hiren (2010) and Suchismita (2007) found bidirectional information flows between Nifty futures and spot markets. Kailash & Bhat (2009) and Ramakrishna & Jayasheela (2009) found Nifty spot prices tend to discover new information more rapidly than Nifty futures prices. Dejong and Nijman (1995), Stoll and Whale (1990) and KavKawaller, Koch & Koch (1987) found that price discovery takes place first in the futures market. If futures market reacts more quickly to the new information then the price discovery takes place first in the futures market otherwise in the cash market.

Motivated by all these considerations the present study considers three futures pricing models (CCM, HLM & HWM) and compares pricing performance of these pricing models on Indian futures markets.

1.2 Statement of the problem

Generally, real capital markets are more volatile, complex, uncertain, imperfect and ambiguous in nature. Due to this, investors are exposed to a very large risk and may not beneficial in participating in the stock exchange.

Literature had shown that researchers developed their pricing models under various assumptions and economic conditions across the globe like real capital markets are
perfect, real capital markets are imperfect, company gives constant dividend yield, company gives lumpy dividend yield, market volatility should be an explanatory factor, interest rates are in risk free in nature, interest rates are in stochastic in nature, Degree Of Market Imperfection (DOMI) varies across markets, price expectation can be explanatory factor, complete arbitrage argument, incomplete arbitrage argument and so on. The market participants are in dilemma to select a specific pricing model which is more appropriately suitable to Indian markets in terms of pricing performance.

Moreover in India there are no studies on prediction of futures prices using established pricing models. The available studies of foreign markets used different methods and compiled results. However, this might not be the right method to advice to Indian investors. This study will aim at comparing established models to predict futures prices and help the market participants understand the market in the better way.

1.3 Objectives of the study

1. To assess the behavior of individual stock futures & stock index futures prices of selected stocks and indices in National Stock Exchange of India.
2. To examine futures pricing models.
3. To compare the pricing performance of futures pricing models for selected individual stock futures & stock index futures and determine the best futures pricing model.
4. To analyze the impact of various factors on Absolute Pricing Errors of futures pricing models for selected individual stock futures and indices.

1.4 Hypothesis of the study

Hypothesis 1

Ho = Futures and spot returns of both individual stocks and indices are normally distributed.

H1 = Futures and spot returns of both individual stocks and indices are not normally distributed.
**Hypothesis 2**

$H_0 =$ There is no significant difference in Mean Absolute Percentage Error (MAPE) statistics obtained from Cost of Carry Model, Hemler and Longstaff Model and Hsu and Wang Model for stock index futures.

$H_1 =$ There is a significant difference in Mean Absolute Percentage Error (MAPE) statistics obtained from Cost of Carry Model, Hemler and Longstaff Model and Hsu and Wang Model for stock index futures.

$H_0 =$ There is no significant difference in Mean Absolute Percentage Error (MAPE) statistics obtained from Cost of Carry Model, Hemler and Longstaff Model and Hsu and Wang Model for individual stock futures.

$H_1 =$ There is a significant difference in Mean Absolute Percentage Error (MAPE) statistics obtained from Cost of Carry Model, Hemler and Longstaff Model and Hsu and Wang Model for individual stock futures.

**Hypothesis 3**

$H_0 =$ There is no impact of explanatory factors on the Absolute Pricing Error of three futures pricing models (Cost of Carry Model, Hemler and Longstaff Model and Hsu and Wang Model) for all the three stock index futures.

$H_1 =$ There is an impact of explanatory factors on the Absolute Pricing Error of three futures pricing models (Cost of Carry Model, Hemler and Longstaff Model and Hsu and Wang Model) for all the three stock index futures.

$H_0 =$ There is no impact of explanatory factors on the Absolute Pricing Error of three futures pricing models (Cost of Carry Model, Hemler and Longstaff Model and Hsu and Wang Model) for all the individual stock futures.

$H_1 =$ There is an impact of explanatory factors on the absolute Pricing error of three futures pricing models (Cost of Carry Model, Hemler and Longstaff Model and Hsu and Wang Model) for all the individual stock futures.
1.5 Research Methodology

1.5.1 Type of Research
Empirical research is used to determine the pricing performance of individual stock futures and stock index futures using established futures pricing models based on secondary data and application of quantitative techniques to analyse mispricing of futures pricing models.

1.5.2 Sample Technique
Judgemental sampling technique has been used to select the samples of individual stock futures and stock index futures.

1.5.3 Sample & Sample Size

Selection of futures pricing models
The study considered three futures pricing models to predict futures prices as under
(1) Cost of Carry Model (CCM) (2) Hemler and Longstaff Model (HLM) (3) Hsu and Wang Model (HWM).

The CCM incorporates risk-free interest rate and constant dividend yield and developed with an assumption of capital markets are perfect and arbitrage mechanism completes.
\[ F_t = S_t e^{(r-q)(T-t)} \]  
(1)
The equation (1) is known as the cost of carry model equation.
Where \( F_t \) is the theoretical futures price at time \( t \) for a contract that matures at a time \( T \), \( S_t \) is the current stock price at time \( t \); \( r \) is the annualized risk free interest rate (Cost of financing); \( q \) is the constant annual dividend yield, \( T-t \) represents time to maturity.

(2) Hemler and Longstaff Model (HLM)
HLM incorporates risk free interest rates & market volatility and developed with an assumption of capital markets are perfect.
\[ L_t = \alpha + \beta_1 r_t + \beta_2 v_t + e_t \]  
(2)
The equation (2) is known as Hemler and Longstaff model regression equation.
Where \( L_t = \ln (F_t e^{\tau T}/S_t) \) is the logarithm of the dividend adjusted futures / spot price ratio, \( F_t \) is the theoretical futures price, \( S_t \) is the underlying spot index, \( \tau \) is the time to maturity (\( T-t \)), \( r_t \) is the risk free interest rate, \( V_t \) is the market volatility. \( \alpha, \beta_1, &
\( \beta_2 \) are the regression coefficients. \( \varepsilon \) is the error part assumed to be normally distributed with mean zero.

(3) Hsu and Wang Model (HWM).

The HWM argued capital markets are imperfect; arbitrage mechanism cannot be completed, incorporates price expectation parameter and developed the pricing model.

\[
F_t = S_t e^{u_\alpha (T-t)}
\]  

(3)

The equation (3) is known as Hsu & Wang model.

Where \( F_t \) is the theoretical futures price at time \( t \) for a contract that matures at a time \( T \), \( S_t \) is the current stock price at time \( t \); \( T-t \) represents time to maturity, \( u_\alpha \) is the Hsu-Wang price expectation parameter.

**Selection of stock index futures**

Currently nine major indices are available for trading in futures and options in NSE. They are CNX Nifty (NIFTY), CNXIT, and CNX Bank Nifty (BANKNIFTY), Nifty Midcap 50 (MIDMCAP50), CNX Infrastructure Index (CNXINFRA), CNX PSE Index (CNXPSE), S&P 500, Dow Jones Industrial Average (DIJA) and Financial Times Stock Exchange 100 Index (FTSE100). Out of these nine indices only three indices (CNX Nifty, CNXIT & CNX Bank Nifty) have been selected for the study.

Indices are selected based on their trading history in NSE. In precise, the indices which were launched before April 1 2007 are considered for the study. Because, the period of the study and the data collected from April 1 2007 to 31st March 2014.

Table 1.1 clearly shows all the stock index futures, which are trading in NSE and their respective launching dates. It indicates that only three stock index futures (CNX Nifty, CNXIT & CNX Bank Nifty) were launched before April 1 2007, remaining six indices were launched after that period.
Table 1.1 - Launching dates of stock index futures on NSE

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Index futures</th>
<th>Launching Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NIFTY</td>
<td>June 12, 2000.</td>
</tr>
<tr>
<td>2</td>
<td>CNXIT</td>
<td>August 2003</td>
</tr>
<tr>
<td>3</td>
<td>BANKNIFTY</td>
<td>June 2005</td>
</tr>
<tr>
<td>4</td>
<td>NFTYMCAP50</td>
<td>October 2007</td>
</tr>
<tr>
<td>5</td>
<td>CNXINFRA</td>
<td>September 2011</td>
</tr>
<tr>
<td>6</td>
<td>CNXPSE</td>
<td>September 2011</td>
</tr>
<tr>
<td>7</td>
<td>S&amp;P 500</td>
<td>29th August 2011</td>
</tr>
<tr>
<td>8</td>
<td>DIJA</td>
<td>29th August 2011</td>
</tr>
<tr>
<td>9</td>
<td>FTSE100</td>
<td>May 03, 2012</td>
</tr>
</tbody>
</table>

Global Indices

| 7 | S&P 500 | 29th August 2011 |
| 8 | DIJA    | 29th August 2011 |
| 9 | FTSE100 | May 03, 2012     |

(Source: Retrieved & Adapted From www.nseindia.com)

Selection of Individual stock futures

Currently 145 individual securities are available for trading in F&O segment of NSE. Out of these only 50 CNX Nifty stocks (as on 2012) are considered for the study. Further data available for only 41 securities out of 50 Nifty stocks for entire sample period from April 1st 2007 to 31st March 2014. Finally, only 41 Individual Stock Futures (ISF) of Nifty are selected for the study based on the availability of data for the entire sample period.

ACC Limited (ACC), Ambuja Cements Ltd (AMBUJACEM), Axis Bank Ltd (AXISBANK), Bank of Baroda (BANKBARODA), Bharat Heavy Electricals Ltd (BHEL), Bharti Airtel Ltd (BHARTIARTL), Bharat Petroleum Corporation Ltd (BPCL), Cairn India Ltd (CAIRN) , Cipla Ltd ( CIPLA), Dr. Reddy's Laboratories Ltd (DRREDDY), Gas Authority of Indian Ltd (GAIL), Grasim Industries Ltd (GRASIM), HCL Technologies Ltd (HCLTECH), HDFC Bank Ltd (HDFCBANK), Housing Development Finance Corporation Ltd (HDFC), Hero MotoCorp Ltd (HEROMOTOCO), Hindalco Industries Ltd (HINDALCO), Hindustan Unilever Ltd (HUL), ICICI Bank Ltd (ICICIBANK), Infrastructure Development Finance Company Ltd (IDFC), Infosys Ltd (INFY), ITC Ltd (ITC), Jindal Steel & Power Limited (JINDALSTEL), Jaiprakash Associates Limited (JPASSOCIAT), Kotak
Mahindra Bank Limited (KOTAKBANK), Larsen & Toubro Ltd (LT), Lupin Limited (LUPIN), Mahindra & Mahindra Limited (M&M), Maruthi Suzuki India Limited (MARUTI), Oil & Natural Gas Corporation Limited (ONGC), Punjab National Bank (PNB), Ranbaxy Laboratories Limited, Reliance Industries Ltd (RELIANCE), State Bank of India (SBI), Sun Pharmaceutical Industries Ltd (SUNPHARMA), Tata motor Ltd (TATAMOTORS), Tata Power Co. Ltd (TATAPOWER), Tata Steel Ltd (TATASTEEL), Tata Consultancy Services Ltd (TCS), UltraTech Cement Ltd (ULTRACEMCO), WIPRO Ltd (WIPRO).

### Selection of Futures Contract Cycle

NSE futures contracts have a maximum of three month trading cycle - one month (near), the two month (next) and the three month (far). A new futures contract is introduced on the immediate next trading day of the expiry of the first month (near month) contract. The new contract will be introduced for three months duration. Only near month (one month) contracts have been selected for this study because the nearest maturity contracts have significant trading volume compares to next month (two months) & far month (three months) contracts.

### 1.5.4 Sources of Data

The study based on secondary data obtained from National Stock Exchange (NSE) website, RBI website and Accord Fintech database (ACE Equity).

**Data**

Daily closing prices of all the three stock index futures and all the forty one Individual Stock Futures were obtained from National Stock Exchange, India.

**Risk free interest rate**

The 364- day government of India Treasury bill rates were used as proxy for annualized risk free interest rates and obtained from RBI database. The annualized risk free interest rates were used to test the cost of carry model and Hemler and Long staff model for both stock index and stock futures.

**Dividend**

Annualized daily dividend yield data for all the three underlying indices – CNX Nifty, Bank Nifty and CNX IT were obtained from National Stock Exchange (NSE) website. Annualized dividend yield data for all the forty one individual underlying stocks were obtained from Accord Fintech database (ACE Equity).
1.5.5. Period of the study

The study carried out for the period of seven years from 1\textsuperscript{st} April 2007 to 31\textsuperscript{st} March 2014

1.5.6 Tools of Analysis

Measuring the pricing performance all the three futures pricing models

Following Hsu & Wang (2004), pricing performance among cost of carry model Hemler and Longstaff model (1991) and Hsu& Wang model (2004) can be measured by calculating the Mean Absolute Error (MAE), the Mean Percentage Error (MPE) and Mean Absolute Percentage Error (MAPE) are illustrated as follows.

Pricing Error ($\varepsilon$) = $AF_t - F_t$  \hspace{1cm} (4)

$$MAE = \frac{1}{N} \sum_{t=1}^{N} |AF_t - F_t|$$ \hspace{1cm} (5)

$$MPE = \frac{1}{N} \sum_{t=1}^{N} \frac{AF_t - F_t}{AF_t} \times 100$$ \hspace{1cm} (6)

$$MAPE = \frac{1}{N} \sum_{t=1}^{N} \left| \frac{AF_t - F_t}{AF_t} \right| \times 100$$ \hspace{1cm} (7)

Where,

$AF_t$ is the actual price of stock index futures and individual stock futures are obtained from National Stock Exchange at time $t$, $F_t$ is the theoretical price of stock index futures and individual stock futures are obtained from the pricing models at time $t$.

Parameter estimation of the Hemler and Longstaff model

Volatility of the underlying index returns and underlying stock returns ($V_t$) is the only parameter that cannot be directly observed in Hemler and Longstaff model. Following Hsu & Wang (2004), the study used Equally Weighted Moving Average (EWMA) of past spot index returns and individual stock returns to estimate the variance of underlying index returns and spot individual stock returns.

Where

$$V_{dt} = \frac{1}{N} \sum_{i=t-N}^{t-1} (R_i - \overline{R})^2$$ \hspace{1cm} (8)
\[ R_t = \ln(S_t | S_{t-1}) \]  

(9)

\[ \bar{R} = \frac{1}{N} \sum_{i=t-N}^{t-1} R_i \]  

(10)

Where, \( V_{it} \) is the variance of underlying index and individual stock return estimate on day \( t \); \( R_i \) is the spot index and individual stock return on day \( i \); \( S_i \) is the spot index and stock price on day \( i \); \( S_{i-1} \) is the spot index and stock price on previous day (\( i-1 \)). \( \bar{R} \) denotes the mean return of spot index and stock and \( n \) is the length of the period set to a value of 20 days, as suggested by Chiras and Manaster (1978). The variance of underlying index and stock returns per annum (\( V_t \)) should be calculated from the variance per trading day \( V_{it} \) using the formula:

\[ V_t = V_{it} \times \text{(Number of trading days per annum)} \]  

(11)

**Estimation of price expectation parameter for Hsu & Wang model:**

**Implied method**

For Hsu & Wang Model in imperfect markets, only price expectation parameter (\( u_{\alpha} \)) cannot be estimated directly. This parameter (\( u_{\alpha} \)) can be estimated same as implied volatility in the black-scholes model using the actual futures prices. The spot index and stock that pays constant dividend yield, the implied \( u_{\alpha} \) at time \( t-1 \) can be obtained from Eq. 28 of Hsu and Wang model. The implied \( u_{\alpha} \) at time \( t-1 \) is used as the estimator of \( u_{\alpha} \) at time \( t \).

\[ u_{\alpha|t-1} = \frac{1}{\tau-(t-1)} \ln \frac{F_{t-1}}{S_{t-1}} \]  

(12)

Where

\( \tau \)- Time to maturity

\( F_{t-1} \) = Actual futures price at time \( t-1 \)

\( S_{t-1} \) = Underlying price at time \( t-1 \)

**Regression Model**

1. The results of the linear regression equation of Hemler & Longstaff model can also be used to test the specifications of two pricing models CCM and HLM (If HLM holds then the coefficients of the Hemler & Longstaff equation would be \( \alpha \not= 0 \), \( \beta_1 > 0 \), and \( \beta_2 \not= 0 \) and if CCM holds \( \alpha = 0 \), \( \beta_1 = T-t \) and \( \beta_2 = 0 \)
\[ L_t = \alpha + \beta_1 r_t + \beta_2 v_t + \varepsilon_t \]

Where \( L_t = \ln \left( \frac{F_t e^{\gamma \tau}}{S_t} \right) \) is the logarithm of the dividend adjusted futures / Spot price ratio.

\( F_t \) is the theoretical Futures price, \( S_t \) is the underlying spot index, \( \tau \) is the time to maturity \((T-t)\), \( r_t \) is the risk free interest rate, \( V_t \) is the market volatility, \( \alpha, \beta_1 \& \beta_2 \) are the regression coefficients. \( \varepsilon \) is the error part assumed to be normally distributed with mean zero.

2. The study followed Hsu & Wang (2009) and examined the impact of four explanatory factors on the absolute pricing errors of three futures pricing models for both individual stock futures and stock index futures as defined in the below equation

\[ APE = \alpha + \beta_1 APE_{t-1} + \beta_2 APE_{t-2} + \beta_3 \text{MAT}_t + \beta_4 \text{VOL}_t + \varepsilon_t \quad (13) \]

Where

APE is the absolute percentage errors of three futures pricing models – CCM, HLM & HWM. \( APE_{t-1} \) and \( APE_{t-2} \) are the absolute percentage errors of 1 day and 2 day lags respectively. \( \text{MAT}_t \) is the time to maturity \((T-t)\). \( \text{VOL}_t \) is the futures trading volume. \( \alpha \) is the constant coefficient. \( \beta_1, \beta_2, \beta_3, \text{and} \beta_4, \) are the regression coefficients of the absolute percentage errors of 1 day lags, the absolute percentage errors of 2 day lags, time to maturity and futures trading volume respectively.

**Independent t test and Kormogorov- Smirnov Z test**

The study used both parametric test (Independent t test) and non-parametric test (Kormogorov-Smirnov Z test) to test whether the Mean Absolute Percentage Error (MAPE) statistics are obtained from each model for both stock index futures and individual stock futures is significantly different. Independent t test and Kormogorov-Smirnov Z test is used between daily MAPE values of two pricing models for both index and stock futures. To be more meaningful, Independent t test and Kormogorov-Smirnov Z test has been used between daily MAPE values of CCM & HLM, CCM & HWM and HLM & HWM for both stock index futures and individual stock futures.
Shapiro-Wilk test

The study uses Shapiro - Wilk test to test normality of futures and spot returns for both individual stocks and indices.

1.6 Significance of the Study

The study examined the research gaps by evaluating and applying various statistical and financial tools and techniques. This study aims at comparing established models to predict futures prices in Indian markets by considering various economic factors like risk-free interest rates, dividends and market volatility. Finally the study helps the market participants to identify the best pricing model which is more suitable to our Indian markets. Further, the study helps market participants to understand the relationship between stocks & futures, profitable arbitrage opportunities, price discrepancies and other issues related to futures pricing. So the investigation of the pricing performance of the models can be informative and beneficial for the market participants.

1.7 Scope of the Study

In terms of scope, the study is confined to 3 stock index futures out of 9 stock index futures and 41 individual stock futures out of 145 securities, currently trading in NSE, India respectively. The study considers only the near month futures contracts. The daily data covers the period from 1st April 2007 to 31st March 2014 based on which the analysis has been done. Equally weighted moving average method and implied method has been used to estimate Hemler- Longstaff model parameter (Vt) and unobservable parameter (Uα) for Hsu- Wang model respectively.

1.8 Limitations of the Study

1. Only three stock index futures selected for the study.
2. Only forty one individual stock futures selected for the study.
3. Only three futures pricing models selected for the study.
4. Only near month futures contracts selected for the study.
5. EWMA method is used to determine the market volatility parameter which to be used in HLM
6. Implied method is used to determine price expectation parameter which to be used in Hsu & Wang model.
7. Constant dividend yield used to test the Cost of Carry Model.
1.9 Outline of chapter scheme

Chapter-1: Deals with introduction. In this chapter general introduction of the study, problem statement, objectives of the study, hypothesis, methodology – type of research, sample techniques, sample size, brief profile of global derivatives market, growth of futures and options, futures pricing models, importance of pricing models, brief profile about three stock index futures, sources of data, period of the study, tools and techniques, scope & significance of the study and limitations of the study are discussed.

Chapter-2: Deals with Review of Literature. This chapter focuses on six main concepts they are (i) The lead- lag relationship between the futures and spot prices (ii) Empirical testing of futures pricing models. (iii) Comparison of pricing performance of different futures pricing models. (iv) The mispricing and arbitrage of stock index futures market. (iv) The relationship between futures price & market volatility and the relationship between futures price and trading volume. (v) Finally, the last group contains several miscellaneous studies that do not fit into the above groups

Chapter-3: Deals with Conceptual Frame work. This chapter focuses on the concepts of Indian securities market, National Stock Exchange (NSE), stock index futures and individual stock futures, stock futures terminologies and mechanism, global derivatives market, Indian derivatives market and finally brief introduction about the futures pricing models.

Chapter-4: Deals with Data Analysis and Interpretation. This chapter classified in to six groups. they are (i) Descriptive statistics of daily trading volume, spot return and futures returns (ii) Testing the specifications of HLM (iii) Pricing performance of stock futures and indices (iii) Independent t test results (iv) Impact of various factors on absolute pricing errors (v ) Percentage Errors charts

Chapter-5: Deals with Findings, Suggestions and Conclusions of the study. Consolidates of findings, suggestions are presented, conclusions are drawn and implications are stated.