Role of Futures in Risk Reduction: A Study with Reference to Select Banks' Futures

Thesis submitted to the
University of Calicut
for the award of the Degree of
Doctor of Philosophy in Commerce

by

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under the supervision of

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Declaration

I hereby declare that this thesis entitled "**Role of Futures in Risk Reduction: A Study with Reference to Select Banks' Futures**" submitted to the University of Calicut for the award of the Degree of Doctor of Philosophy is an original record of research work carried out by me under the guidance and supervision of Dr. Vinod Kumar. K.P., PG Department of Commerce, P.S.M.O. College Tirurangadi.

I also declare that no part of this thesis has been presented for the award of any degree, diploma, fellowship, or other similar title or recognition of any University/ Institution before.

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Certificate

This is to certify that this thesis entitled "**Role of Futures in Risk Reduction: A Study with Reference to Select Banks' Futures**" prepared by **Ms. Binoosa T**., for the award of the Degree of Doctor of Philosophy in Commerce of the University of Calicut, is a record of bonafide research work carried out by her under my supervision and guidance. No part of the thesis has been submitted for any degree, diploma, fellowship or other similar title or recognition before.

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Dr. Vinod Kumar. K.P.
Research Supervisor

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Binoosa T

Contents

List of Abbreviations

ADF	:	Augmented Dickey-Fuller Tests
ARCH	:	Auto Regressive Conditional Heteroskedasticity
BSE	:	Bombay Stock Exchange
CAPM	:	Capital Asset Pricing Model
CBOT	:	Chicago Board of Trade
CCC-M GARCH	:	Constant Conditional Correlation – Multi Variate GARCH.
CME	:	Chicago Mercantile Exchange
GARCH	:	Generalised Auto Regressive Heteroskedasticity
GDP	:	Gross Domestic Product
ISO	:	Indian Statistical Organization
M-T-M	:	Mark to Market
MCX	:	Multi-Commodity Exchange of India
NBOT	:	National Board of Trade
NSE	:	National Stock Exchange
OHR	:	Optimal Hedge Ratio
OI	:	Open Interest
OLS	:	Ordinary Least Squares
OTC	:	Over the Counter
SEBI	:	Securities & Exchange Board of India
VAR	:	Value at Risk
VECM	:	Vector Error Correction Model
WTO	:	World Trade Organization

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BINOOSA T. “ROLE OF FUTURES IN RISK REDUCTION: A STUDY WITH REFERENCE TO SELECT BANKS’ FUTURES”. THESIS. PG DEPARTMENT OF COMMERCE, P.S.M.O COLLEGE TIRURANGADI, UNIVERSITY OF CALICUT, 2018.

Chapter I

Introduction

1.1 Background of the Study

Before 1990, Indian stock market was lying as an inactive segment of the financial system. Globalisation and liberalisation of financial market and introduction of NSE brought extreme changes in the financial market. It required an innovation in financial instruments. Then SEBI appointed a committee included 24 members under the Chairmanship of Dr L. C. Gupta on November 18, 1996, to develop a proper regulatory framework for derivatives trading in India. The committee recommended the introduction of derivatives in Indian stock market in their report submitted on March 17, 1998. SEBI set up another committee to study measures for risk in the derivatives market. They submitted a report which explained the functioning of the derivative market. In 2000s derivative instruments were introduced in Indian capital market and it also gave vicissitude to the stock market.

The financial market is the essential part of a healthy economy in the country. It boosts up the economy by encouraging savings, mobilising and allocating funds to alternative uses. The financial market makes the arrangements for buying and selling of financial instruments like shares, debentures, derivatives, mutual funds, insurance etc. The financial institutions, corporations, individuals and governments trade in financial products in these markets either directly or through brokers or dealers. But the players in the market were facing risk due to volatility. Mitigation of risk was a global problem. In this context, derivatives are introduced as a risk reduction tool. But today, financial derivatives are the main attraction of global financial market. Important features of a well-developed financial market are safety, efficiency and innovation. Introduction of derivatives was brought these characteristics into the financial market. The derivatives market has shown a remarkable growth over the last few years. Many derivative contracts were launched at exchanges across the world. Some motivating factors in the growth of financial derivatives in global

markets are:

- High price volatility of underlying assets in financial markets.
- Global integration of financial markets.
- Improved technology in communications has helped in reduction of transaction costs.
- Greater understanding of market participants on stylish risk management tools to manage risk.
- Frequent innovations in the derivatives market and newer applications of products.

Initially, derivatives in India were introduced as a risk reduction tool in June 2000 through the introduction of stock index futures. This was followed by the introduction of the index option (June 2000), stock options (July 2001) and stock futures (Nov 2001). It was introduced due to the high volatility of the Indian stock market. The volume in derivatives markets especially on the futures and options on National Stock Exchange, witnessed a tremendous increase and recently the turnover is much higher than the turnover in the cash market. Increased volatility in asset prices in financial markets, increased integration of national financial markets with the international markets, improvements in the communication facilities necessitates the introduction of derivatives in India.

In simple terms derivatives means the instrument whose value is derived from underlying assets. Underlying asset may be commodities, stocks, currencies, metals, interest rate etc. Different types of derivatives include futures, forwards, options and swaps. It can be combined with traditional securities and loan to create fusion instruments. Most important derivative instruments are futures and options; it has become essential instruments of price discovery, portfolio diversification and risk hedging in recent times on the Indian stock markets.

Most popular and powerful instrument of financial derivatives is futures. Future contracts, better known as *Futures*, create an important instrument for handling or hedging risk in financial market due to price instabilities in the market. The new contract with the new product along with new possibilities in the future market has

become reality now. First future trading was started during the 1970s in the USA. Now it is to be traded in all parts of the world and 24 hours a day. The futures contract enables one to enter into an agreement to buy or sell a specified quantity of the underlying asset, after a specified time at a specified price. Futures contracts lock up the rate of the underlying asset and regardless of the actual rate at the time of expiry, the deal has to be executed at the rate agreed upon. This arrangement enables the parties to the contract to lock up their receipts or payments at convenient levels. Future markets have been familiar to meet the needs of three users. The users are:

- The trader, who wish to learn information about future prices of securities
- The trader, who looks for speculation
- The trader, Who reduce the risk in the market

Speculation does not consideras a social function. So, we can say, hedging and price discovery are the social functions of futures. Futures may be divided into commodity futures and financial futures. So many financial futures are available in the market. Futures products available in India are:

- Single Stock Futures
- Equity index futures
- Interest rate futures
- Commodity Futures
- Currency Futures

NSE is the exchange holding major market share of derivative trading in India. Lot of markets, where individual exchanges specialise in individual products. Unlike these markets, NSE takes place the trading of both futures and options. In India, both index and single stock futures are very popular with single stock futures being most predominant derivative instrument being traded in the market.

The equity derivatives segment has been sparkling with activity during recent years. Along with NSE and BSE, MCX-SX which started trading in equity derivatives in February 2013 registered significant volumes in 2013- 14. Indian Exchanges stand

out in the list of top five exchanges on a number of parameters in the report of World Federation of Exchanges (WFE).NSE ranks 3rd in terms of numbers of single stock futures and index futures traded. The total turnover in 2017-18 in the F&O segment of NSE was ₹ 16,49,84,859.05 crore. NSE has the majority share in the trading volumes at 80.3 percent while BSE contributed 19.4 percent and MCX-SX had a minor share of 0.3 percent. The total number of contracts traded in the derivative segment of NSE was 1913878548 in 2017-18 from 1399746129 in 2016-17. The value of the contracts traded in the stock futures in 2017-18 is ₹ 1,55,97,519.71 crore and in 2016-17 it was ₹ 1,11,29,587.14 crore. Turnover of single stock futures is high as compared to index futures and options.

Among various sectors in NSE, Banking sector witnessed a constant growth in last 10 years. In terms of number, the banking sector is the largest sector in NSE as compared to other sectors. So banking sector is most suitable for this study. Hence, the study considers Nifty as a proxy for the Indian stock market and a special focus to stock futures in the banking sector.

1.2 Statement of the Problem

The financial market liberalization in the early 1990s has brought major changes in the capital market with the introduction of derivative as a hedging tool. Risk analysis and risk management got much importance in the Indian economy during the liberalization period. The foremost among the challenges faced by banking sector today is the challenge of understanding and managing risk. Risk reduction is of particular interest to the banking sector. The volatility of banking sector shares is very high as compared to other sectors. At the same time, price earnings ratio of CNX Bank is 13.6 in 2012-13 and 14.3 in 2013-14.The market capitalization of the banking sector is second highest in NSE. During 2013-14, Banks/Financial Institutions raised the largest amount in the industry-wise classification of resource mobilisation. 14 issues from the industry contributed 53.3 percent to the total resource mobilisation. All these shows banking sector futures plays a vital role in the capital market. In the highly competitive market, financial innovations in the form of new financing and investment products as well as the design of efficient risk

management procedures are both crucial for the development of banking sector. Proper risk management tools were required in order to ensure the viable and stable growth of the industry. Futures are high profit and high loss instrument and its improper use without a good study will lead to huge loss. So the study examines the hedging effectiveness of futures in the banking sector and price discovery of banking futures and now far it is suitable for managing risk exposure in the banking sector.

In this background, research questions have been raised. The study has been undertaken to answer the following questions:

What is the attitude of traders towards banking futures?

What are the reactions of traders to various information related to capital market?

To what extend traders used bank futures for hedging?

Are the bank futures suitable for hedging?

How far hedging is effective by using banking futures?

Are the bank futures performing price discovery function of future market?

1.3 Significance of the Study

Kerala is a developed state in the manner of peoples' education level, the standard of living, usage of technology etc. People of Kerala give more importance to tertiary sector that is service sector rather than two other sectors. The banking sector is an important service sector which has high popularity among peoples. Demonetisation also increases the importance of banks. So the traders are very familiar with different banks and it always attracts the traders to shares of banks. Private sector banks, as well as public sector banks, have significant importance in peoples of Kerala. That's why NSE's top 50 stocks always include not less than 10 stocks of banks. Top 10 performing stocks of NSE include 3 or 4 stocks of banks.

Futures is an important derivative instrument. Two type of futures instruments are available, that are stock futures and index futures. Stock futures are preferable by

traders rather than index futures. The major motive behind the introduction of derivatives is hedging. The numbers of hedgers are increased in the market but proper users are very few. The reason for that is lack of knowledge about hedge ratio and hedging effectiveness. This method is helpful to analyse whether a stock is appropriate for hedging or not. This study gives an outlook about hedging, price discovery and traders behaviour in the market.

1.4 Scope of the Study

Financial derivatives are the most popular instrument in the financial markets arise reduction tool. This study does not consider commodity derivatives, currency derivatives etc. This study focused on the individual stock futures in NSE.136 stock futures in 11 sectors is available in NSE. Among these sectors only one sector that is banking sector selected for the study. 24 futures are traded in the banking sector. 8 banks are considered for the study. So this study limited to the area of banking futures only. Geographically this study limited to Kerala. The scope of the study narrowed to measuring optimal hedge ratios and hedging effectiveness of 8 banks selected among 24 bank futures in NSE's banking sector. It also checks the price discovery function of banking futures. This study makes use of both primary and secondary data. Hedging effectiveness and price discovery function of banking future measured by using secondary data. Primary data collected from individual traders who are using banking futures. This study tried to analyse trader's attitude towards banking futures, traders' extent of hedging by using banking futures and traders reactions to various information related to the capital market.

1.5. Selection of the Banks

Banking is the back born of Indian financial system. It plays a substantial role in our economy. The Indian banking system comprises of 27 public sector banks, 21 private sector banks, 45 foreign banks, 56 regional rural banks, 1,589 urban cooperative banks and 93,550 rural cooperative banks, in addition to cooperative credit institutions. The Indian economy became the fastest rising great economy for the financial year 2016. The economy has been on a relatively sound footing, growth and stable inflation. The announcement of demonetisation gave a big jolt to the

Indian economy. This sectoral importance of banking industry also gives an importance in the stock market. With regard to the economic importance of banks and the popularity in the futures market, 8 banks namely Axis Bank, Canara Bank, Federal Bank, HDFC Bank, Kotak bank, OBC, SBI and Yes bank are selected among 24 banks listed in NSE for the present study.

Axis Bank

It is a private sector bank. It commenced its operations on December 1993. At the beggining, its name was UTI. The Bank changed its name from UTI to Axis Bank On 30th July, 2007. It is the third largest bank in India. As per the statistics on 31st March 2017, it has 3304 branches,ATMs 14,003 and nine international offices. Across 55,000 people are working in the bank.

Federal Bank

The Federal Bank is a Kerala based private sector bank headquartered at Aluva. Federal Bank became a scheduled commercial bank in 1994. Federal Bank opened its first overseas representative office in Abu Dhabi in 2008. In April 2015, Federal Bank posted its highest ever net profit at Rs 1005.75 crore for the fiscal 2014-15. The net profit grew 20% during the year which saw the deposits and advances of the bank outgrow that of the industry by 40%. In August 2013, the first electronic passbook is introduced by Federal Bank as Fedbook. It is a mobile app through which customers can view their passbook details.

HDFC Bank

HDFC Bank is the largest private sector bank in India. It started on 1994 at Mumbai. The bank has 4,715 branches and 12,260 ATMs as on 30th June 2017. It provides different products and services like wholesale banking, retail banking, treasury, auto loans, two wheeler loans, personal loans, loans against property and credit cards. HDFC Bank merged with Times Bank in February 2000. This was the first merger of two private banks in the New Generation private sector banks category.

Kotak Mahindra Bank

Kotak Bank is an Indian private sector bank and its headquarters is situated in Mumbai. Kotak Mahindra Finance Ltd got licence issued by RBI to carry on banking business on February 2003. It offers different types of banking products and financial services for both corporate and retail customers. It has 1,369 branches and 2,163 ATMs in India (as of 31 March 2017). In terms of market capitalization, it was the fourth largest private bank in India on 2016.

SBI (State Bank of India)

SBI is included in the list of 50 largest banks in the world. It is a multinational, public sector banking and financial services company of India. Its headquarters is situated in Mumbai. On 1st April, 2017, the State Bank of India, merged with five of its associate banks (State Bank of Bikaner & Jaipur, State Bank of Hyderabad, State Bank of Mysore, State Bank of Patiala and State Bank of Travancrore), and with the BharatiyaMahila Bank. This was the first ever large scale consolidation in the Indian banking industry. It has more than 24,000 branches and 59,000 ATMs. It has 198 offices in 37 countries; 301 correspondents in 72 countries.

Canara Bank

Canara Bank is one of the largest public sector banks under the control of Government of India. It was established in 1906. The government nationalized the bank in 1969. As on 30th October 2017, the bank has 6639 branches and 10600ATMs all over India. The bank also has offices abroad in London, Hong Kong, Moscow, Shanghai, Doha, Bahrain, SouthAfrica, Dubai, Tanzania and New York. It is the first Indian Bank which got ISO certification. In 1996, Seshadripuram branch of Canara Bank in Bangalore achieved ISO certification for "Total Branch Banking".

OBC (Oriental Bank of Commerce)

OBC established in 1943. The bank was nationalised on 15 April 1980. OBC was ranked 19th among the 20 nationalised banks at the time of nationalisation. The

bank has crossed the Business Mix mark of ₹2 lac crores as on 31st March 2010 and making it as the seventh largest Public Sector Bank in India. The Bank has introduced 14 point action plan for strengthening of credit delivery to women and has opened 5 branches as specialised branches for women entrepreneurs.

Yes Bank

Yes Bank is India's fourth largest private sector bank, established in 2004. Yes Bank is achieved Greenfield Bank licence awarded by the RBI. It is a "Full Service Commercial Bank", and has established its business in the area of corporate, retail & SME banking franchise, financial markets, investment banking, corporate finance, branch banking, business and transaction banking, and wealth management business lines across the country. As on 31st December 2017, the bank has 1050 branches and 1724 ATMs.

1.6 Objectives of the Study

- To study the traders' attitude towards futures in banking sector
- To evaluate the hedging habits of hedgers in banking sector
- To analyse reactions of traders to various information related to the capital market.
- To estimate optimal hedge ratio and hedging efficiency of selected futures in the banking sector.
- To identify the price discovery pattern of selected banking sector futures.

1.7 Hypotheses

1. There is no significant difference between attitude of traders in bank futures and their demographic profile.
2. There is no significant difference between satisfaction of traders in bank futures and their demographic profile.
3. There is no significant difference between attitude of traders in bank futures and years of experience in the derivative market.
4. There is no significant difference between hedging habit of hedgers and their demographic profile.

5. There is no significant difference between hedging habit of hedgers and years of experience in the derivative market.
6. There is no significant difference between reactions of traders in bank futures to various information and their demographic profile.
7. There is no significant difference between reactions of traders in bank futures to various information and years of experience in the derivative market.
8. There is no significant difference between constant and time-varying hedge ratios of bank futures contracts.
9. There is no significant difference between constant hedging effectiveness and average dynamic hedging effectiveness of banking futures.
10. There is no significant difference in price discovery exist among bank futures.

1.8 Operational Definitions

The study uses some terms. Hence, they are operationally defined to avoid misunderstanding. These terms and their operational definitions are given below:

Derivative Traders/ Investors

Derivative traders/ investors are referred to as an individual trader who has to buy or selling of banking sector futures. It does not mean dealing only with banking sector securities, but a trader should be frequently or occasionally dealing with banking futures. It simply means traders who have a particular interest in banking sector stocks.

This study uses traders or investors interchangeably. Institutional traders did not include. It includes only traders who are trading through stockbroking firms.

Private Sector employee

The structured questionnaire incorporated questions related to occupation. The researcher included private sector as a category of occupation. It means the person

does not include in other three categories such as government employee, professional and business.

Investment

Traditionally, the word investment is used for long-term investment. But here the word investment is used for short-term and very short-term investments.

Traders Behaviour

It is the total of traders' attitude, hedging habit and traders' reaction to various information related to the capital market.

Traders' attitude

The attitude of a person is the sum of his beliefs, emotions and behavioural intentions. Five-pointLikert scales were used to test traders' attitude towards banking sector securities.

Investors/ Traders reaction

Here reaction means traders buying or selling decision while getting information or news related to the trading of banking stocks and futures.

Hedging Habit.

It includes the percentage of risk-reducing through hedging, type of contract used for hedging, the frequency of hedging and level of satisfaction from hedging.

1.9. Research Methodology

This study is designed as a descriptive and analytical one that makes use of both primary and secondary data.

1.9.1. Sources of Data

Both the secondary and primary data have been collected and used for the study

1.9.1.1 Secondary Data

Hedging efficiency and price discovery of banking futures are analysed by using secondary data acquired from the official website of NSE. Secondary data includes daily closing future price and daily closing of spot price in respect of 8 selected banks namely Axis Bank, Canara Bank, Federal Bank, HDFC Bank, Kotak Bank, OBC Bank, SBI and YES Bank. These 8 banks are selected from among 24 banks listed in NSE. Though different futures contracts of banks are traded simultaneously, the data in respect of current month contracts alone are considered. The details of secondary data used are shown below.

Table 1.1

Description of Secondary Data

Name of bank	Source of data	Description of Data	Period of data
Axis Bank	www.nseindia.com	Daily closing spot price Daily closing futures prices of current month contract	1 January 2011 to 28 July 2014 And 30 July 2014 to 17 July 2017
Federal Bank	www.nseindia.com	Daily closing spot price Daily closing futures prices of current month contract	1 January 2011 to 17 October 2013 and 18 October 2013 to 17 July 2017
HDFC Bank	www.nseindia.com	Daily closing spot price Daily closing futures prices of current month contract	1 January 2011 to 14 July 2011 and 16 July 2011 to 17 July 2017

Name of bank	Source of data	Description of Data	Period of data
Kotak Bank	www.nseindia.com	Daily closing spot price Daily closing futures prices of current month contract	1 January 2011 to 8 July 2015 and 9 July 2015 to 17 July 2017
SBI	www.nseindia.com	Daily closing spot price Daily closing futures prices of current month contract	1 January 2011 to 20 N0vember 2014 and 21 N0vember 2014 to 17 July 2017
Canara Bank	www.nseindia.com	Daily closing spot price Daily closing futures prices of current month contract	1 January 2011 to 17 July 2017
OBC	www.nseindia.com	Daily closing spot price Daily closing futures prices of current month contract	1 January 2011 to 17 July 2017
YES Bank	www.nseindia.com	Daily closing spot price Daily closing futures prices of current month contract	1 January 2011 to 17 July 2017

Secondary data is the major source of data. It will collect from the website of BSE, NSE, money control.com, SEBI Bulletin, SEBI annual report, RBI report etc.

1.9.1.2. Primary Data

The study used primary data for drawing conclusions on the trader's attitude towards banking futures, hedging habit of hedgers and traders' reaction to various information. The population of the study is the traders in banking futures in the state of Kerala. Primary data was collected from 360 sample respondents from 6 selected districts of Kerala. The required data was collected through structured questionnaire.

1.9.2. Sampling Design

Multi-stage sampling was used for the collection of primary data. In the first stage, the state of Kerala was divided into three regions namely southern region, central region and northern region. The classifications of districts in each region are given below;

Southern region: Thiruvananthapuram, Kollam, Pathanamthitta, Alappuzha and Kottayam

Central region: Idukki, Ernakulam, Thrissur and Palakkad

Northern region: Malappuram, Kozhikode, Wayanad, Kannur and Kasargod

In the second stage, 2 districts were selected from each region using random sampling. From southern region, Thiruvananthapuram and Kottayam were selected, Ernakulam and Thrissur from the central region and Kozhikode and Malappuram from the northern region. In the third stage, 10 stockbroking firms were selected from each district. In the fourth stage, 6 banking futures traders from each stockbroking firms were selected by using purposive sampling method.

1.9.2.1. Sample Size

The following statistical equation was used to determine the sample size of traders in banking futures. The highest Standard Deviation (SD) of the items under the relevant variables estimated from the trial sample was taken for calculating the sample size.

Sample size for the study has been determined based on the following formula

$$n = \frac{Z^2 \times \sigma^2}{e^2}$$

Where;

n = Size of the sample

σ = Standard Deviation of the population (Highest standard deviation from the pilot study)

z = Standard Variation at a given confidence level (1.96 for 95% confidence level)

e = Acceptable Error (The precision limit assumed as 0.143)

Table 1.2

Determination of Sample Size

	Value
Z @95%	1.96
σ	1.38
SE	.143
Sample size	**358.3 ≈ 360**

1.9.3 Pilot Study and Pre Testing

In order to finalise the questionnaire and measurement scale, a Pilot survey was conducted among 60 traders from selected 6 districts.10 traders were selected from each district. After conducting the Pilot survey, the reliability and validity of the scale were tested by using appropriate methods. On the basis of the reliability and validity testing, suitable modification was incorporated in the questionnaire and the measurement scales.

1.9.3.1. Reliability Testing

Reliability testing is an important tool tomeasure the accuracy and consistency of the questionnaire. Reliability is the degree to which an instrument consistently measures a construct. Cronbach's Alpha, a statistical index of internal consistency was used to test the reliability of the measurement scale. The main variables of the questionnaire and their respective alpha values are presented in table 1.3.

Table 1.3

Results of Reliability Analysis of Various Scales Used

Sl. No.	Variables	No. of items	Alpha Value
1	Awareness about derivatives	5	0.763
2	Attitude towards derivatives	22	0.770
3	Attitude towards banking futures	18	0.721
4	Reactions of traders	13	0.747
5	Satisfaction from trading	6	0.714
6	Satisfaction from hedging	6	0.721

The table1.3 shows that all the alpha values are above or near 0.7 and hence it is proved that the measurement scale has internal consistency.

1.9.3.2. Content Validity Test

Validity is the extent to which a measurement iswell-founded and its ability to measure what it are supposed to measure. It is the extent to which the measurement process is free from systematic errors. The validity of the questionnaire was tested by an appropriate method. Content validity refers to the extent to which a measurement tool taps into various aspects of the specific construct. Content validity of the questionnaire and scale were measured by relying on a set of experts in the subject matter who were asked to provide feedback on how well each question measured the construct in question. Academicians, statisticians, and experts in the stock market were consulted for this purpose and ensured that all the questions are

relevant and suitable for fulfilling the research objectives. It was also ensured that the scale is suitably fixed for the intended analysis.

1.9.4. Tools for Data Collection

A structured pre-tested questionnaire was used for collecting data from the respondents. A detailed questionnaire covering all aspects of the study was prepared in consultation with experts in the field and officials of the stock exchanges and broking firms. The draft questionnaire was pre-tested by way of conducting a pilot study among 60 selected investors. After the pre-test of the questionnaire was modified by adding certain relevant questions and deleting some unwanted questions. The modified schedule contains 23 questions.

1.9.5. Variables Used in the Study

Traders' attitude, extent of hedging and reactions to various information are the key variables used in the study. A number of specific variables within the key variables are also involved in the research design. The variables used in the study are listed out in table 1.4.

Table.1.4

Variables Used in the Study

1	Demographic Variables	Region
		Gender
		Age
		Educational qualification
		Monthly income of family
		Occupation
2	Basic Facts about Trading	Years of experience in stock market trading
		Years of experience in derivative trading
		Frequency of trading
		Duration of investment
		Amount of investment in stock futures

3	Awareness towards Derivative Instruments	Futures
		Options
		Swaps
		Stock Futures
		Index Futures
4	Attitude of Traders	Features of derivatives
		Preference of various sector in NSE
		Features of banking futures
		Experience from banking sector
		Satisfaction from trading of banking futures
		Percentage of investment in banking futures
		Amount of investment in banking futures
		Duration of holding securities
		Purpose of selecting bank futures
		Reason for selecting bank futures
5	Reactions of Traders to Various Information	Source of information
		Preference of various information
		Reactions to information
		Usage of various method of analysis
		Role intermediaries
6	Hedging Habit	Percentage of risk coverage
		Type of contract
		Frequency of hedging
		Satisfaction from hedging

1.9.6 Testing Normality of Data

As the normal data is an underlying assumption in parametric testing, an assessment of the normality of data was done numerically and graphically for all the variables. Kolmogorov-Smirnov test (KS test) and Normal Q-Q Plot were used to

assess the normality of the data collected. The result of both the tests revealed that the data are normally distributed. Therefore, parametric tests were used in the study for arriving at inferences from primary data.

1.9.7 Randomness Test

The Run test is used to test the randomness of data. The result shows that for all the variables, the p values are above 0.05. Therefore, the randomness of the data is assumed.

1.9.8 Tools for Data Analysis

A detailed explanation of the tools and methods used for the analysis of data ~~is~~ are furnished below.

1.9.8.1 Optimal Hedge Ratio and Hedging Effectiveness.

For calculating hedge ratio, a series of steps to follow. Steps of calculating Hedge ratio and hedging effectiveness as follows.

First, the spot price and futures price data are subjected to a logarithmic transformation. Then the stationarity of the 'log series' is evaluated using the Augmented Dickey-Fuller (ADF) test. The ADF test consists of estimating the following regression.

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta_{yt-1} + \sum_{i=1}^{m} \alpha_i \Delta y_{t-1} + \varepsilon_t$$

Where εt is a pure white noise error term and where Δyt-1 = (yt-1 – yt-2), Δyt-2 = (yt-2 – yt-3) etc.

Next, the researcher examined whether the 'log spot' and 'log futures' series are co integrated using Johansen Co integration Tests (both Eigen value and Trace Statistic). Where the log series are found to be first difference stationary and are co integrated, we use Vector Error Correction Model (VECM) to estimate the constant hedge ratio. The parameters of VECM are estimated and the residuals obtained are used to calculate Optimal Hedge Ratio and Hedging Effectiveness.

The Optimal Hedge Ratio $H = \frac{\sigma_{sf}}{\sigma_f^2}$

Where:

σ_{sf} = Cov. (ε_{st}, ε_{ft})

σ_s^2 = Variance (ε_{st})

σ_f^2 = Variance (ε_{ft})

Hedging Effectiveness is calculated as:

$$E = \frac{\text{Var (u)} - \text{Var (H)}}{\text{Var (u)}}$$

Where,

Var (u) = σ^2_s (i.e, Variance of unhedged portfolio)

Var (H) = $\sigma^2_s + H_2 \sigma^2_f - 2H \sigma_{sf}$ (i.e., variance of hedged portfolio)

H = Hedge Ratio, σ_s and σ_f are the standard deviations of spot price and future price returns and σ_{sf} is the covariance.

The residuals obtained from VECM are tested for ARCH effect. Since ARCH effect is present in the residuals, the time-varying hedge ratios are also calculated using constant conditional correlation-multivariate GARCH (CCC- M GRACH) model.

Errors from VECM are obtained and these errors are modeled as univariateGARCH. Then covariance is calculated as.

$h_{ss,t} = \omega_s + \alpha_s,1\ \varepsilon^2_{s,t-1} + \beta_{s,1}\ h_{ss,t-1}$

$h_{ff,t} = \omega_f + \alpha_{f,1}\ \varepsilon^2_{f,t-1} + \beta_{f,1}\ h_{ff,t-1}$

$h_{sf,t} = \rho(h_{ss,t} \text{ x } h_{ff.t})^{1/2}$

Where, $h_{ss,t}$ is the conditional spot price variance at time t, $h_{ff,t}$ is conditional future prices variance, $h_{sf,t}$ is covariance and ρ is the constant conditional correlation.

Average Time-Varying Hedge Ratio (H_t) = $\frac{h_{sf,t}}{h_{ff,t}}$

Average Time-Varying Hedge Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)}$

1.9.8.2 Checking Price Discovery

It is the methodology for checking price discovery of spot price and future prices of the banking sector. The first three steps are same for estimating hedge ratio and effectiveness that is transforming the data into log form, test the unit root of the series and testing co integration. Cointegration test used to check long run relationship between spot price and future price market, but this test itself not suitable for predicting the direction of causality. In other words,cointegration test does not help to predict which type of causality exists among them. If the co integration test proves the long run relation between the spot price and future price, there should exist at least one direction causality. Granger-causality really means only a correlation between the current value of one variable and the past values of others. Granger causality test is most suitable to test the direction of causality and it can be applied only to stationary data.

1.9.8.3. Tools for Primary Data Analysis

Primary data collected were analysed by using statistical tools such as ratios, percentages, averages, charts, statistical tests etc. Chi-square tests, one way ANOVA, correlation, regression test were used for arriving at inferences from the data.

1.10. Period of the Study

The secondary data relevant for the study were collected for a period of six and half years from 2011 to 2017. The primary data were collected during 2016.

1.11. Limitations of the Study

The study has number of drawbacks as described below

- Respondents were very busy and they mark their response without thinking. So the information may be subject to some errors.
- Number related reviews are very few. So there is some difficulty in developing proper tool and methodology. The researcher made attempt to reduce maximum errors.
- The area of the study is limited to Banking sector futures in NSE among various other sectors. Equity derivatives include index futures, index option, and stock option and stock futures. For this study, only stock futures were considered.
- Attitude and behaviour of traders have so many variables. This study includes a limited number of variables.

1.12 Chapter Scheme of the Study

1. Introduction

This chapter deals with Introduction to the study, Research problem of the study, significance of the study, Methodology of the study, Objectives of the study, scope of the study, Limitations of the study, Further scope of the study, Organisations of thesis etc

2. Review of literature

This chapter will include various reviews related to the topic. The collected literature categorize into four namely studies related to Futures, hedging and price discovery of derivatives, investor attitude and investor behaviour and other studies related to derivatives.

3. Futures: An Overview

This chapter is devoted to giving a theoretical overview of financial derivatives in the Indian context. The chapter is divided into two sections: Section 1 furnishes a theoretical overview of financial derivatives and their functions. Section 2 discusses the Indian scenario. It discusses the growth and development of the futures market in India highlighting the present trends

4. Futures Trading in Kerala

It includes traders attitude towards various aspects related to bank futures, extend of hedging and traders reactions to various information

5. Hedging and Price Discovery of Banking Sector Futures

The fifh chapter discusses the role of banking futures in hedging against unexpected price variations in the spot market and presents the optimal hedge ratio and hedging effectiveness of selected bank futures.

6. Summary, Findings, Suggestions and Conclusion

This chapter deals with the summary of the present study, major findings, the researcher's suggestions and conclusion.

BINOOSA T. “ROLE OF FUTURES IN RISK REDUCTION: A STUDY WITH REFERENCE TO SELECT BANKS’ FUTURES”. THESIS. PG DEPARTMENT OF COMMERCE, P.S.M.O COLLEGE TIRURANGADI, UNIVERSITY OF CALICUT, 2018.

Chapter II

Literature Review

2.1. Introduction

Review of literature is a core part of research and it will light up the way of searching facts. There are only a few number of studies related to hedging and price discovery. No studies are found on the basis of different sectors of futures in stock exchanges. Reviews are collected from various universities across India such as Bangalore university, IIM Bangalore, ISEC Bangalore, IIM Calicut, Kerala university, CDS Trivandrum, Calicut university etc and from various journals , websites, periodicals etc…

The collected literature is categorized into four, namely, studies related to futures and options, hedging and price discovery of derivatives and investor attitude and investor behavior and other studies related to derivatives. Studies are arranged under each heading according to year.

2.2. Study Related to Futures and Options

Kumar (2002) studied the price relationship between NSE 50 futures and the NSE 50 index. The study focused to check whether there is any change in the volatility of the underlying index due to the introduction of NSE 50 index futures and whether movements in the futures price provide predictive information regarding subsequent movements in the index. It proved that the volatility in the post futures period is less than the volatility before the introduction of futures. Information coefficient in the post futures period is more than that of pre-futures period.

Rambhia (2002) compares stock futures and badla and also compare options and futures. The study highlighted that the introduction of stock futures in November 2001 has made the entire family of derivatives products including Nifty, Sensex futures, Sensex options, Nifty futures and Nifty options available to investors.

Snehal Bandivadekar and Saurabh Gosh (2003) evaluated the impact of introduction of derivative products especially index futures on spot market volatility in Indian stock markets. BSE Sensex and S&P CNX Nifty have declined in the period after index future was introduced.

Sibani etal (2005) provides empirical evidence of changes in spot market volatility due to the introduction of futures and options by using various GARCH techniques. It is the case study of Nifty index. Authors used daily opening and closing price of S&P CNX Nifty, Nifty Junior and S&P 500 index from 1st January 1997 to 31st March 2005. It showed that introduction of futures and option did not reduce spot market volatility but changed the structure of volatility. Spot market volatility more depends on market information like inflation rate, growth forecast, exchange rate, monetary policy etc. Spot market also responds to the changes in the global stock market fluctuations.

Amuthan (2005) studies the investor protection system in both options and futures. It also tries to find out the business growth of derivatives in NSE market. The researcher sampled 18-month index futures and index options of NSE and has been analyzed by means of percentile analysis. This is done to find out the growth in the derivative segment and to compare the performance between index futures and index options with the help of mean, standard deviation and coefficient of variations.

Banerjee and Bhattacharya (2005) examine the relationship between stock index futures and underlying spot index prices in Indian context. The study uses the most popular index futures, Nifty in India. The purpose is to see whether futures contracts market in India behave differently than similar markets in other parts. The study also tries to provide better price discovery in spot market. The lead lag relationship is tested using the methodology of Granger causality. The goodness of fit is examined using root need square error and need absolute error. Nifty spot price lead to future prices but Nifty futures prices and the underlying spot prices are known normal

Afsal E.M (2007), analyzed the impact of introduction of derivatives in the underlying market. Derivatives didn't change the volatility of the underlying market. But it showed that there is a trend towards decline in persistence level and

unconditional volatility in the post-derivatives period. This is a positive indication of general market stabilization of the post-derivatives market. Lack of observable reduction in market volatility with the introduction of derivatives owes to the limited liquidity in the derivatives market. Spot market and futures market are identical in the process of information assimilation and price discovery. Call options market is more active than put options market in India. If the options market is more active, their predictive capacity will also be higher. The study suggested that derivatives have potential ability to reduce the risk in the spot market, to supply prior information and to improve the quality and quantity of information flow into the stock market. To capitalize on the real potential of derivatives, the market should be more competitive and liquid.

Viswanathan (2007) presents an overview of the fundamentals of the financial derivatives by briefly discussing forward contracts, their features, futures trading in India, model of option pricing etc

Girdhari (2007) says about growth and future of derivatives in India. He pointed the need of market structure regulatory framework, risk management system and innovations in derivative product. Indian derivative has the global investment avenue as compared to other countries.

Barik and Supriya (2007) examine the signaling effect of the efficient pricing and different order entry system on trading in Nifty index futures market. GARCH model is used in this study. Nifty future market leads monopoly in India. Asymmetric information shows market inefficiency.

Naresh (2007) examines the effectiveness of Black Scholes option pricing model, put call parity relationship and their fairness. It also compares implied volatility for selected stocks and volatility disclosed by NSE on the underlying security. The study also evaluates the views of market participants on the regulatory structure and trading system. Stocks of 15 different companies were selected for analysis. The study reveals that there is significant difference between fair price and market price and implied volatility and actual volatility. Years of experience shows differences in investors' opinion.

T. Mallikarjunappa and Afsal E.M (2008) studied the volatility implications of the introduction of derivatives on stock market volatility in India using the S&P CNX Nifty Index as a benchmark. The results suggest that the introduction of derivatives does not have any stabilizing effect in terms of decreasing volatility. The separate estimates for pre-derivatives and post derivatives reveal that the sensitivity of the Nifty return to the Nifty junior index and the day of the week effect disappear after the introduction of derivative contract. The price sensitivity to old news is higher during pre-futures than post futures periods and with the introduction of futures, the market volatility is determined by recent innovations. Authors infer that any change in the volatility process is not due to the introduction of derivatives.

Anil Kumar Gopal Garag (2009) attempts to understand the relationship between the cost of carry and the risk free rate of return, the relationship between the change in cost of carry and the change in risk free rate of return, the relationship between the change in futures price and the change in cost of carry and the relationship between change in open interest and the change in futures price. It finds that the change in future price cannot be explained by the change in open interest and the change in cost of carry. The study suggests that investor does not consider that the risk free rate of return is as the cost of carry and there is no relation between the change in cost of carry and change in risk free rate of return.

Ruchika etal. (2010) examined the impact of introduction of derivatives in stock market volatility. For analyzing the market selected five derivative stocks and five non derivative stocks and its closing price and construct GARCH Model. This model depicts derivative did not reduce stock market volatility, but changed the structure of volatility.

Ashutosh Vashishta etal (2010) overviewed financial derivative market in India. Introduction of financial derivative is an important revolution in financial industry. It is introduced as a risk management tool in equity market. In India NSE is the market leader in derivative market. Role of equity derivative market in arranging price discovery is very high. It also facilitates the opportunity to transfer risk from

the person who is not ready to take risk to the person who is willing to take risk. Derivatives help to increase efficiency of trading.

Srinivasan (2010) analyzed price volatility, trading volume and market depth of future market in India. Various linear and nonlinear models were used for sample forecast. The forecasting models considered for this study were random walk, linear regression, moving average, autoregressive, GARCH (1,1), TGARCH (1,1), EGARCH (1,1) and IGARCH (1,1) models. The uncertain nature and the relationship between price movements, trading volume and open interest for select stock future contracts were examined over the period from April 1, 2003 to December 31, 2008. This study found that there is a significant positive relationship between return volatility, expected trading volume and expected open interest. There was a strong positive correlation between price movements and trading volume for BHEL, Dr. REDDY, HCLTECH, MTNL, RELIANCE, TATATEA and WIPRO. Correlation between return and trading volume were negative for ACC, BEL, BPCL, CIPLA, GRASIM, HEROHONDA, INFOSYSTCH, ITC, ICICIBANK, M & M, ONGC, POLARIS and RANBAXY. Unexpected volume and open interest have more impact on volatility than the expected trading volume and open interest.

Devanadhen (2011) studied the implied volatility structure and forecasting efficiency of Indian option market. Option market increases the efficiency of the market by providing information to decision-makers and planners to cater to the needs of the market participants.

Sunitha (2012) examined the implications of financial derivatives in the Indian Capital market. For this the researcher divided the total study period into two that is pre derivative and post derivative period and compare each other. Influence of US market is very high in post derivative market. Introduction of derivative trading increases the volume of trading and changed the structure of conditional volatility. Market efficiency increased during post derivative period as compared to pre derivative period. Derivatives open an opportunity to make profit through hedging. This study also indicates that investors' knowledge and awareness are very low in the Indian capital market.

Aaron Nasurutia (2013) state that derivative usage has significant relation with foreign exchange exposure. But this relation is negative. Increases in derivatives lead to decreases in foreign exchange exposure and vice versa. For analyzing the study regression analysis was used. Foreign exchange exposure is dependent variable and derivative usage is the predictor variables. Control variables are US dollar, British pound, European euro and market return. 10 banks in Nairobi stock exchange are selected for the study. Regression analysis shows that there is a significant relationship between dependent and independent variables in this study.

K. Saniya etal (2013) opinioned that call option writer suffer losses in bullish market. So it is better the investor choose call option. At the same time put option holder incurs loss in the bullish, he has better to write put option. Call option holder and put option writer suffer huge losses from bearish market. So, it is better they choose call option to write and put option to hold. In case of future, if the purchase price is less than settlement price, the buyer will get profit. Seller incurs loss when the selling price is less than settlement work. This study shows SBI futures and option less volatile.

Dr.K.Govindankutty etal (2014) says derivatives help to reduce risk not avoid risk. It is a hedging tool only. In a volatile market, risk is very high; an experienced investor can make huge profit through the proper use of financial derivatives than a newcomer. Futures and options are very helpful to make profit through portfolio maximization or minimization of loss. Awareness of investors about these uses of derivatives is very low.

2.3. Hedging and price discovery of derivatives

Tong (1996) compares GARCH - modelled dynamic hedging strategies with conditional OLS - modelled strategies to determine which performs better. The study shows that dynamic hedging reduces risk more than static hedging, but only slightly. This is consistent with some previous findings that more complex hedging methods may not improve the performance much. Co integrating relationship between the spot and forward rates in the macroeconomic component is also considered but its effect is minimal. The asset specific component has effect in the

out of sample period, especially under dynamic strategies and under short term hedging horizon.

Norvald Instefjord (2000), analyzed the impact of credit derivatives on bank risk. Bank's risk is systematic risk. Credit derivatives have no capacity to hedge bank risk. Its risk is related to demand and price elasticity of loan in the market.

Chan and Lin (2004) examine all the four index futures contracts available on the Taiwan futures exchange to investigate the price discovery of the Taiwan index futures market. Empirical results show that the interaction patterns between index futures and spot prices of these four systems are different. While index futures contracts are faster in updating prices and disseminate more information in the Tx, MTx and TE systems. The TF index futures do not dominate the process of information transmission.

Esteban etal. (2005) checked the capacity of foreign exchange derivative market to reduce risk of currency rate fluctuations. This market did not increase the volatility of currency rate and decreased the aggregate currency risk. Derivative market did not help the market participants to find future price.

Surabha (2005) found that derivatives are effective instruments to hedge the risk of unexpected price fluctuations, example- foreign currencies, commodities, stocks and government bonds. One key purpose for the existence of futures and other derivatives is to modify risk exposures.

Saumitra etal (2005) overviewed different models of calculation of optimal hedge ratio. The study used daily data of NSE Stock Index Futures and S&P CNX Nifty Index for the time period from 4th September 2000 to 4th August 2005. The outcomes clearly states that the time varying hedge ratio derived from DVEC-GARCH model gives a higher mean returns compared to other models. On the average variance reduction front the DVECGARCH model stretches better performance only in the long time horizons associated to the simple OLS method that scores well in the short time horizons. The DVEC-GARCH model informs a slight edge over the OLS in the out of sample validation. This DVECGARCH

model cannot be unnoticed for its modeling complexities as it provides a better result in terms of effective hedging against simple naïve and other strategies.

Luiz Augusto etal. (2006) describes the interest rate hedge demand by Australian companies. Size of the company is the important factor while taking decision of hedge against interest rate risk. At the same time total leverage has no role in this decision. Other factors that are considered for hedging interest rate risk are floating interest rate debt ratio, annual log returns and type of industry.

Pradhan and Bhat (2006) checked the price discovery of stock index and it futures in India also had similar results. They studied price discovery and casual nexus between S&P CNX Nifty and Nifty futures for near- month, mid-month and far-month contracts separately. They used Johnson's co integration test and the Vector Error correction Model for the study. The analysis reveals that spot leads futures and the spot market transfers the information to the futures market

Guptha and Sahi (2006) investigate whether the Indian equity futures market is an efficient price discovery vehicle. The hypothesis has been investigated through near month Nifty index futures and 24 stock futures. Results of Augmented Dickey-Fuller indicate that cash market as well as futures market returns are non-stationary in their level forms. However, the log first difference of these variables is stationary. Consequently, both Nifty and stock return and Nifty and stock futures returns contain unit root and they may be integrated of order one. From impulse response analysis it is found that both the markets are sensitive to the price movements in the other. All futures contracts which have good trading volume like Nifty, Dr.Reddy's Labs, HDFC, Hindustan Petroleum, Infosys, M&M, Ranbaxy, Reliance, SBI, Tata Power, Tata Tea and TISCO lead the cash market which implies that these future contracts are efficient price discovery vehicles. Anyway in case of other stocks like Bajaj Auto, BHEL, BPCL, CIPLA and ITC spot market leads the futures market. The study observes mixed results on the price discovery. The significant causal relationship clearly suggests that efficient cost of carry relationship exists between two markets, which leads to long-run equilibrium and may be helpful for traders and the regulatory bodies.

Sah and Kumar (2006) employ cointegration and error correction method using data from June 12 2000 to March 31 2005. A stationarity test is also conducted which is closely related to the degree of integration. The results establish that there exists a long run relationship between Nifty spot and Nifty futures prices. Further Error Correction Model leads to the conclusion that there is a feedback mechanism between Nifty spot and Nifty futures.

Kapil Gupta etal (2007) try to propose an optimal hedge ratio for Indian traders. The study used three indices that are Nifty, Bank Nifty and CNXIT and 84 individual stock futures traded on National Stock Exchange of India. Selected sample period is Jan. 2003 to Dec. 2006. The study also discoveries that hedging through index futures in India decreases portfolio variance by 96% however hedging through individual stock futures decreases portfolio variance in the range of 79% for SUNPHARMA and 98.50% in case of TITAN subject to the strength of link and stable undertaking between two markets,

Anbalagan and Amudha (2007) cover role played by stock exchanges, factors affecting stock market, investors' behavior. For the study index futures are selected and its application as risk management tool has been studied. The primary objective of hedging - loss minimization and not profit maximization- has been analyzed by selecting a portfolio and applying the hedge value, to obtain the expected result for the study.

Hiren M Maniar (2007) discusses role of derivatives market in price discovery and volatility of stock market. The study selected index futures from NSE. The study concluded that the introduction of derivatives changed volatility of Indian market. Since 2000, reduce the the volatility in S&P CNX Nifty. It also proved that new market information disseminated both spot and futures market.

Bose (2007) analyses whether the Indian stock index futures market place an important role in the assimilation of information and price discovery in the stock market. Using futures prices for the S&P CNX Nifty index traded on the NSE of India, the study find that there is significant information flow from the futures to the spot market and the futures prices/returns have predictive power for the spot prices.

For this analysis daily closing price of the futures on S&P CNX Nifty and underlying index values available at NSE were used. Analysis is made from the period March 2002 to Sep 2006

Dimitris Kenourgios (2008), investigated hedge ratio and hedging effectiveness of (S&P) 500 stock index futures. Data period considered for the study was July 1992 to June 2002. Weekly settlement price was used for calculations. It used various methods for estimating hedging effectiveness and found that ECM is the appropriate method and S&P 500 stock index futures contract is a better tool for hedging risk. It is a powerful financial instruments which the users can avoid risk at times they wish to do this without liquidating their spot position or changing their portfolios composition

Babu Jose (2011) studied informational efficiency of futures market. Whole study period is divided into four sub period that is initial development of derivative market, pre-financial crisis period, financial crisis period and post financial crisis period. This study considered NSE as representatives of Indian derivative market. For analyzing the overall performance of future market, researcher analyzed the long term and short-term relationship between spot and future market. This attempt found that long term relationship existed in the whole study period and sub period. But at the financial crisis period, there was no long-term relationship. It concluded that future market very quickly responds to the new information.

Olajde Solomon Fadun (2013) examined the role of financial derivatives to reduce the risks in the financial service sector in Nigeria. If the derivatives were properly used it will provide suitable economic benefits to nation. In the case of Nigeria derivative market is new and passive. So it should develop liquidity and mobilize sufficient capital for the economic growth.

Dhanya (2013) focused to understand hedging effectiveness of Indian futures market and traders attitude towards hedging. The study concluded that Indian future market is more effective for hedging. But the traders are not aware about hedging

Salvador Arago teal (2014) analyzed hedging effectiveness of European stock index by using non-linear GARCH models. The study revealed that significant differences exist in the variance equation parameters between states. It is the fact that the volatility process is not defined by a unique process as proposed by linear GARCH models but by two different volatility processes observed during high and low volatility periods. The consideration of one instead of two volatility processes leads to poor estimations of volatility and this may influence the estimated hedge ratios. Differences in volatility between low and high volatility states are observed in terms of the (asymmetric) impact of shocks and past variance on the volatility formation in each state

Anuradha etal examined various options of corporate for hedging their financial risk. Author developed a model of framework for risk management. Its steps are forecast, risk estimation, benchmarking, hedging, stop loss and reporting and review. Indian firm used short term measures for hedging. Forward and options are preferred as short term hedging instruments. Swaps are preferred as long term hedging instruments.

2.4. Investor attitude and investment behavior

Elke. U. Webberetal. (1998) examines investors risk preference across different countries like USA, China, Germany and Poland. Cross cultural differences show difference in risk attitude and perception. Chinese are least risk averse compared to Americans and Germans. Cultural differences also make difference in the perception of riskiness of investment options. Risk perception related to various factors such as outcome from the previous risky investment, aspiration level, trust expectation and loss functions of outcome.

Pandian (2001) examines the investment information seeking behavior of equity traders. It also ascertains the investment behavior of investors and problem faced by traders and to find out the factors associated with the level of awareness. This study suggests suitable measures to enhance the level of awareness.

Hong Kong Exchange and Clearing Limited (2002) surveyed retail investors participation in Hong Kong derivative market. It includes investors' attitude, investment behavior and opinion of investors. Most attracting factor of derivative market in Hong Kong is liquidity and high rate of return. Clearing and settlement procedure of Hongkong stock exchange is efficient.

Nikola Tarashev (2003) etal, examined the nature of asset price changes and level of investors effective risk aversion. High risk aversion leads to low return and high volatility. Return on most assets exhibit different statistical behavior in periods characterized by different level of risk aversion. Investors would tend to withdraw from riskier asset classes as they become less inclined to take on risk. While increasing risk tolerance, price of asset also will increase.

Essie Tsoi (2004) measures investors' behavior in Hong Kong Stock Exchange (HSE) and emerging derivative market. Number of investors in derivative segment of HSE shows an increasing trend. For retail traders knowledge is the main constraint. Institutional traders always look for policy or regulation changes in the market. Institutional investors are more stable than retail investors.

Shylajan and Sushama (2006) identify the major responsible factor for determining the attitude and trading behavior of stock market investors. These major factors are confidence. Cluster analysis was carried out to segment the individual traders based on their attitude. It is segmented into aggressive investors and non aggressive investors

Ravichandran (2008) surveyed investors' preferences in the capital market and derivatives by selecting 100 sample investors in Chennai city. It shows age, income, education level and occupation are positively correlated to investments in Derivative market. Most of investors preferred cash market and futures among financial derivatives. Income percentage on investment and participation in derivative market are negatively correlated. Majority of investors are afraid of market risk and them opinioned that growth of derivative market is very slow. This study concludes that derivatives can be used to reduce high risk in the stock market to certain extent.

Michael Sammanasu (2010) enquired about investors' preferences in capital market investments. Investors are exposed to unsystematic risk arising from inadequate diversification in capital market assets. Nature and type of the product is the major factor considered by investors before making investment through the primary market. The investment decisions in the secondary market are primarily based on the result of fundamental analysis and movement of market indices. NSE is the most preferred stock exchange for secondary market operation. Majority of investors are satisfied with overall experience from capital market investment. Investors mainly suggested the extension of more powers to SEBI on investor protection with a view to improving capital market operations. This study suggested that the potential investors must be properly educated and guided to invest more money in capital market and it will help the Indian capital market to become developed capital markets.

P.Varadharajan (2011) etal focused on investors' perception in equity market. Degree of purchasing equity depends on stock affordability, corporate earnings, dividend announcement, firm's reputation and economic indicators. Years of experience in equity market and return from the investment are closely related. Profit maker in the market also will be a loser. Risk appetite highly influence on investment decision. Investment strategies of investors are always changing according to market condition. Continuous monitoring and tracking the market is necessary to take investment decision.

Kala (2011) studied various corporate announcements in BSE and its effect on security prices and investment pattern of individual investors. Most of the investors gave more importance to overall past performance of the market. Priority given by the investors is on financial result of the company and least priority on press and media release.

Barbbara Wanyana (2011) examines how investor awareness and perceived risk attitude affect investor behavior while trading stock market with special focus on Uganda stock exchange. When making investment decisions, investors tend to be influenced by what can be readily remembered, much highly publicized events such

as stock market crashes. Investor behavior in stock market is the combination of cognition, emotion and social influence. Incorporation of investors' perception and their reaction to uncertainties affect the investment decision.

Tai - Yuen Hon (2012) analyses the behavior of small investors on Hong Kong Derivative market. To find out the factors affecting the behavior of small investors, author used factor analysis. For this analysis, he highlighted five factors that are personal background, reference group, return performance, risk tolerance and cognitive style. Through analysis, only three factors are found significant that is return performance, reference group and personal background. Factors of return performance include average income on investment of derivative products , factors of reference group include commentators recommendation from news papers , TV, magazines , relatives or friends , internet, investment consultants and companies annual report and factors of personal background include age, personal income and investment experience.

Gagan Kukreja (2012) explored the perception of investors towards various stock market instruments and systems in India. Investors are selected from National Capital Region (NCR). Highly educated people made investment for tax advantage. Influence of others and investment benefits are dominant factors among various reasons for selecting capital market investments. At the same time investors give equal importance to charges, liquidity and investment attributes. Age of the investor and investment in stock market are highly correlated.

Rajivjain (2012) explains the factors responsible for the unusual movements in stock market and attitude of investors. Displayed attitude of investors categorized into three as follows.

- The expectation of investors about the future performance of market.
- Confidence of investors regarding their investments.
- herd instincts

Most of the investors preferred online trading. Experience is the big factor which determines success or loss of investment.

Srividhya (2012) found that the investment decision is a composition of five factors that are general information, company management, details of present issue, project details and financial parameters. Investors in Chennai select a stock after careful analysis of the sector considering the company in which it belongs. Investors have the knowledge about the malpractices done by the intermediaries like share brokers etc. Different sources of information play the vital role in the investor's behavior which promotes the knowledge of every investor to think prudently about the consequences of their investment. The NSE is the most popular among the investors of capital market.

Venkata Ramana Murthy (2013) tries to analyze the investment behavior of working women. This study's result shows age and investment behavior is closely related. Young investors are more interested in equity oriented investments and aged working women are interested in household investment. Majority of women equity investors are entering into the market through mutual fund and insurance. Kind of job and nature of organizations in which they work are the main component of working women's investment decisions. Instead of risk minimization, derivatives are used to wealth generation by women investors and they choose online investments. As compared to men investors, women investors are busy with their domestic work and duty; it is the main reason of lack of knowledge about investment.

Aravind. O. L. Hoffmann etal (2013) studied the changes of investors' perception and behavior during financial crisis of 2008-2009. Investors' perception was highly fluctuated during this period. Investors risk tolerance and return expectation decreased and risk perception increased. Behavior of investors during this period is risk taking. Investors recovered from risk tolerance, return expectations and risk perception of investors at the end of the crisis period.

Thamotharan etal (2013) states that investors in derivatives has wide scope in India. But there is lack of trust, guidance and regulation among stock brokers and investors. He suggests information should smoothly flow into the market. Age, educational qualification and occupation have significant influence in the investment behavior of investors.

Sivarethinamohan (2013) tested investors' behavior and attitude towards commodity market in India. Factors considered by an investor while taking investment decision is different from person to person. Majority of the investors considered both risk and return. Major portion of investors take their investment decision through self analysis. In the commodity market bullions have huge volume trade. Investors make huge profit from bullions. Long term investment gives a stable return for long time as compared to short term investment. It is also helpful to acquire knowledge about trend and directions of market.

Agha Nuruzzaman (2013) found behavioral bias reflect in the investment behavior. When an investor makes profit from futures trading, they consider themselves as knowledgeable; otherwise they consider it as bad luck. Demographic factors and self attribution bias are closely related. Investors immediately respond to the information related to stock market. Main reference point of an investor and basis of investment decision is purchase price.

S. Prakash etal. (2013), inferred that most of the people invested for children's education and tax benefit. Numbers of factors that affect the investment patterns are risk diversification, tax exemption, safety, professional management. Liquidity, flexibility, balanced and consistent returns, choice of schemes, reliability and affordability. Educated people use internet for searching information about investment and females prefer professionals for gathering information.

Aravind (2013), tried to analyze the customers preferences of financial derivatives in south Kerala. Majority of investors came to know about derivatives through stock broking firms. Fund allocation by investors is highly influenced by previous trading experiences and they give more importance to speculation than risk management. The investors are demotivated towards derivative instruments by lack of awareness and confidence, asymmetrical information from different sources etc.

Rakesh (2014) aims to study the investors' behavior in stock market and factors affecting different types of investors. For this, data collected from 150 investors in Mysore city by using structured questionnaire. Family members have major role in taking investment decision by an investor. Market movement and investment pattern

of individual investors are closely related. Majority of investors are bothered about stock market movements and risk.

Gujan Tripathi (2014), investigated the perception of investor towards derivative trading. 75 % of the stock market investors in Delhi are aware about derivative trading and products. Out of these aware investors, 74% of investors invested in derivatives and 10 - 20 % of their investment are invested in derivative instruments. Among this derivative investors, above 75 % preferred options. They enjoyed the benefit of option like risk diversification and great profit with minimum investment. While trading in derivatives, investor first considers stock market movement, second risk diversification and third return. Level of income has significant role in investors' perception. At the same time, education and profession have no effect in the perception of investors. Complex understanding about derivatives is the main reason for not investing in derivatives. Brokers advice have major role in investors' decision.

Saranya and Kavitha examined attitude of investors in currency market. It includes investors preference, sources of information, investor preferred level of risk, factors influencing investor, duration of investment, savings of investment etc. Occupation and willingness to take risk is not associated .Investors give equal preference to income and growth. They like to play it somewhat safe. Investors take advice before their investment decisions. Educational qualification and investors getting source of information has no relation. Most of the investors have no adequate knowledge about market. Income level of investors and their capacity or ready to take risk are positively correlated.

Sumeet Khurana found that the most influential factor of investors' perception is popularity of stock. 80% of amount invested in derivative segment out of total amount in capital market and only 20% is in cash segment. Movements of spot market affect derivative trading. Brokers face problem while providing investment suggestions to investors. But they are interested to provide suggession. Most of the investors are males between the ages of 31 - 40. Trading of FIIs and fluctuations in

international factors also influence the investors' perception. Two main risk of capital market is credit risk and market risk.

Thomas Dohmen etal. tries to make a global assessment of individuals' willingness to take risk. He proved that an economically significant impact of gender, age, height and parental background on individual willingness to take risk.

Rishi Manrai tested retail investors' behavior towards Derivatives. Risk averse investors selected mutual fund, insurance, government bonds and securities while risk takers selecting derivative market. Derivative market offer maximum profit and minimum loss. Commission agent and brokers had major role in attracting investors to market. Investors' lack of knowledge is the main threat in this market.

2.5. Other Studies Related to Derivatives

Jennifer Lynch (1996) explored the use of derivatives by mutual fund industry. This study analyzed 675 equity mutual fund and found 21% of these mutual funds were used derivatives. Use of derivatives did not reduce fund risk, it depends on past performance. Derivatives helped to change fund risk exposure.

Keith sill (1997) opined that derivatives are zero sum monetary games while using derivatives for hedging risk, it is a kind of insurance against bad future outcomes. Liquidity risk has increased with the size of derivatives market. Derivative helps the economy to achieve an efficient allocation of risk. It provides new investment opportunities for firms and individuals.

Mark Grinblatt etal. (2000) examined the use of STRIPS (Separate Trading of Registered Interest and Principal of Securities) programme of US treasury. It is treasury derivative securities. This programme helped the arbitrageurs and speculators to earn maximum profit from the market.

Jayabal (2001) points out the contribution made by capital market to the economic development of the country and examines the extra ordinary growth of derivative market, complex instruments in derivative market, users of derivative market etc.2001 was introducing period of derivatives in Indian market

Jobest (2008) tracks the development of derivatives market in emerging economies. The paper discusses recent developments and future challenges of equity derivatives market in emerging Asia and informs about the current efforts by RBI to implement comprehensive guidelines on derivatives. The challenges for further development of equity derivatives market in emerging Asia is also being discussed

Faiza Sajjad etal. (2013) states that derivatives are useful risk management tools when used appropriately. Derivative market creates platform for transferring financial risk to other parties. Derivative market in Pakistan helps to enhance nation's economic efficiency and liquidity and can attract foreign investment.

Hoa Nguyen etal. analysed different factors considered by Australian companies while using derivatives. Main factors are leverage and liquidity. Australian companies used derivatives for enhancing their firms' value rather than maximizing wealth.

2.6. Conclusion

The review of the literatures from the above four areas revealed that many studies have been undertaken in these areas but a study which covers risk reduction aspects of futures market with their trading behavior were not found. Sectoral wise studies did not found in this area. Hence the present study which comprehensively analyses the different aspects of risk reduction capacity of selected banks' futures with traders' trading behavior.

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Chapter III

Futures: An Overview

3.1. Introduction

"*Financial Futures represent the most significant financial innovation of the last twenty years" - Merton Miller, 1990 Nobel Laureate*

This chapter is dedicated to give a theoretical overview of futures as a financial derivatives instrument and its historic evolution and present status of financial derivatives in India. Growth of futures market is remarkable all over the world in terms of size and trading volume. In India, start financial derivative trading only at the beginning of the 20th century. Financial derivative like stock futures, stock options, swaps etc. have been developed to mitigate the risk level of stock market traders. Increased financial risks have threatened the very existence of business firms. Futures came up as a mode of reducing these risks. Transactions in futures market are used to offset the risk of price changes in the underlying assets. Stock market trading is at high risk due to uncertainty in price fluctuations. Derivatives, especially futures provide a valuable set of tools to manage this risk. New products and different combinations of existing products are widely used to cope with the changing environment. Concept and meaning of derivatives and futures are described below.

3.2. Concept and Theory of Derivatives

The term "derivatives" point out that it is derived from others value, i.e., its value is entirely derived from the value of the underlying asset. Derivatives are contracts; its payoff depends upon the value of an 'underlying asset'. Underlying may be a commodity, stock, stock index, currency, interest rate etc.Simply means one which is derived. Life of derivative instrument is pre-determined. That means expiry of contract already fixed at the time of contract. Derivatives in finance work on the

same principle. The Securities Contract Regulation Act 1956 defines Derivative as under;

"Derivatives" include

1. Security derived from a debt instrument, share, loan whether secured and unsecured, risk instrument or contract for differences or any other form of security.

2. A contract which derive its value from the prices or index of prices of underlying securities

Example; 100 stocks of Axis bank are not derivatives. Its value fluctuates with the changes in stock market. When an investor enters into an agreement with another investor for buying these stocks at ₹ 500/ stock on a specified future date, its current market rate will be more or less of 500. It is Derivatives. Investor can use these for speculation or hedging. The contexts of using derivatives determine whether it is speculation or hedging.Some important features of derivative listed in below.

- Derivative instrument relates to a future contract between two parties. As indicated in the meaning of derivatives, there must be a contract binding on the underlying parties and same to be fulfilled in the future. Duration of contract depends on the nature of contract. It may be short term or long term.

- The value of derivatives is derived from the value of underlying assets. Underlying assets may be agricultural commodities, metals, energy or a financial asset, intangible assets etc. Value of derivative is changed as per changes in the value of underlying assets.

- Under the derivative contract, the counter parties have specified obligations. The obligation may differ as per the type of the instrument of a derivative. Obligation of counterparties under the different derivative contracts like forward contract, futures contract, option contract and swaps contract would be different.

- Derivative contracts can be undertaken either directly between two parties or through an exchange. The exchange traded derivative contracts are more liquid than OTC contract. Transaction cost of exchange traded derivatives is low as compared to OTC derivatives.

- Financial derivatives are carried off balance sheet. The size of the derivative contract depends upon its notional amount. The notional amount is the amount used to calculate the pay off.

- In derivative trading, transactions are mostly settled by offsetting positions in the derivatives themselves. Therefore, there is no effective limit on the quantity of claims, which can be traded in respect of underlying assets.

- In the case of derivatives, it is easier to take a short position or long position when compared to other assets or securities. So, it is also known as deferred delivery or deferred payment instrument. It is more easily open to financial engineering.

- Derivatives are mainly secondary market instruments and have little usefulness in mobilizing fresh capital by the corporate world.

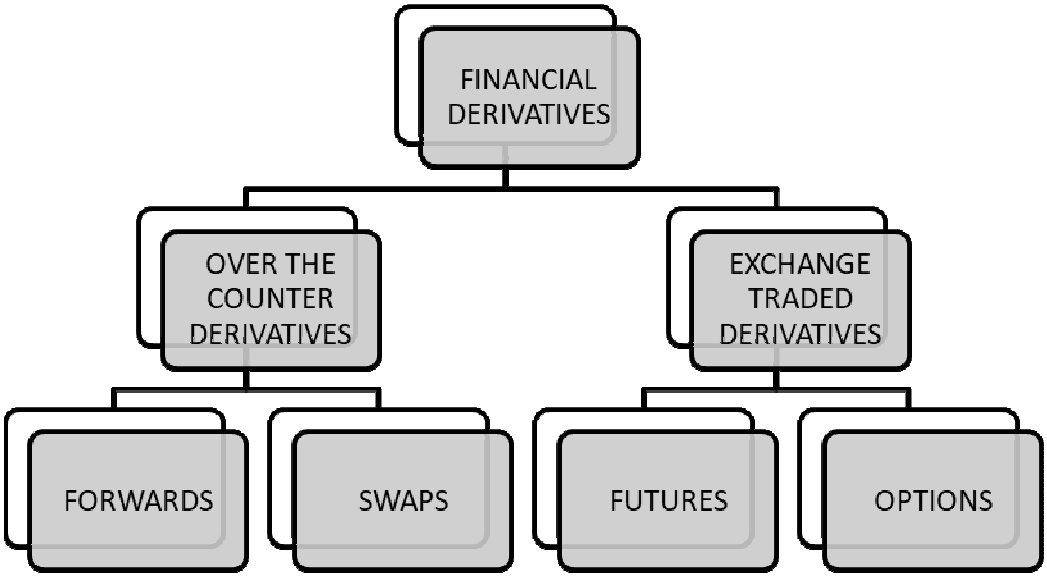
In the derivative market various types of derivative instruments are available. Important derivative instruments are described below.

3.3. Types of Derivatives

Based on trading take place, derivatives are divided into two i.e. Over the Counter (OTC) Derivatives and Exchange traded Derivatives. OTC Derivatives are not regulated. Standardized derivatives are Exchange traded Derivatives. Counter party risk is higher in OTC than Exchange traded derivatives. Pictorial presentation of types of derivatives as follows.

Figure 3.1

Classifications of Derivatives



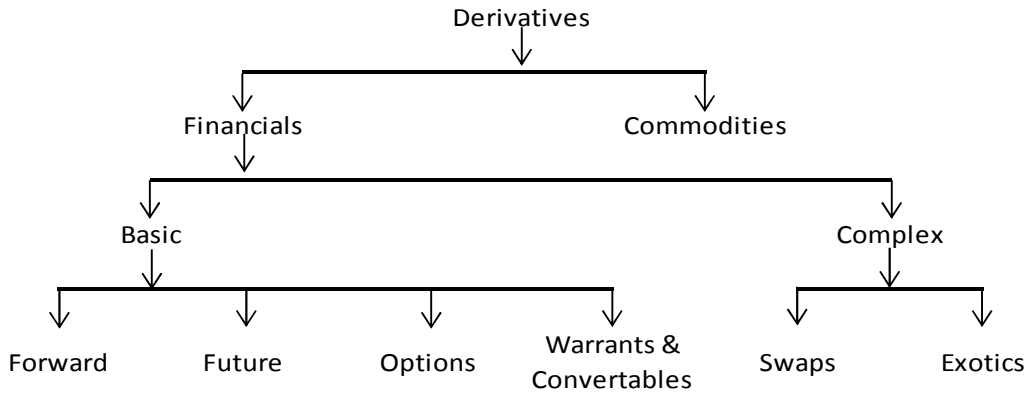
Based on underlying assets, derivatives can be broadly divided into two categories i.e,

1. Financial Derivatives; and
2. Commodity Derivatives.

Pictorial representation of classification of derivatives based on nature underlying assets as follows

Figure 3.2

Classifications of Derivatives



3.4. Financial Derivatives

Financial derivatives are the financial instruments whose value derived from financial assets like stocks, T- bill, bond etc. Some important financial derivatives are described below.

3.4.1. Forwards

A forward contract is a contract between two parties for buying or selling a security or commodity on a specific date in future at a price agreed today. In Forward market, any two people can enter into the contract like real estate. The main features of forward contracts are

- It is a bilateral contracts and counter-party risk is high
- This contract is designed by custom, so its contract size, expiration date and the asset type and quality are unique nature
- The contract price is generally not available in public domain.
- The contract must be settled by delivery of the asset on expiration date.
- In case the party wishes to reverse the contract, it must compulsorily go to the same counter party, which being in a monopoly situation can command the price it wants.

Forward market faces mainly three problems that is counter party risk, illiquidity and lack of centralization.

3.4.2. Futures

Futures are the standardized form of forwards. It traded only through stock exchanges. In other words, it is a firm legal commitment between a buyer and seller in which they agree to exchange something at a specified price at the end of a designated period of time. The buyer agrees to take delivery of something and seller agrees to make delivery. In other words, it is an agreement between two parties to buy or sell a specified quantity of an asset at a specified price and at a specified time and place.

Example: Consider two investors in the stock market. First investor who hold the equity of SBI. Its current market value is 150. He expects decrease in the price into ₹ 130 in the period of three months. It will affect his investment value. So, he wants to hedge this risk. The second investor, who watching the performance of SBI and on the basis of his experience and intuition, he expects the price of SBI will increase to ₹ 170 in the period of three months. So, he decides to buy this security at lower price to sell later. Now he needs pay only a nominal amount and arrange full amount within three months. Now both submit their orders to the exchanges for enter into a future contract of three months. When the order will be matched and traded, they are the holders of a future position. First investor holds the position of short and second investor holds the position of long. When the price of SBI is falling, first investor hedges his investment risk. Futures can use both for hedging and speculation. The future contracts have following features;

- Organized Exchange: Futures contacts are traded only through exchanges. Financial futures are traded along with stocks in the stock exchanges, having separate segment for trading in futures and options.
- Standardization: The future contracts are standardized in terms of quantity and quality of assets, date and month of expiry, unit of price quotation etc.
- Clearing House: Every stock exchange has a clearing house. Clearing house act as an intermediary between stock exchanges and counter party. It arranges for the delivery of assets and payments of money to the counter parties.
- Settlement Price: At the closing of every trading day, each contract is marked- to- market. For this, exchange establishes a settlement price. This price is used to calculate profit or loss on each contract on that day.
- Margin System: When a person enters into a contract he is required to deposit a certain amount with the broker, which is called ‘margin’.
- Tick size: The futures price is expressed in currency units with a minimum price movement called a “tick size”.

- Cash Settlement: Most of the futures are settled in cash by the short or long making cash payment on the difference between the futures price at which the contract was entered and the cash price at the expiration date.

Table 3.1

Difference between Futures and Forwards

Forwards	Futures
Trading is undertaken directly between buyers and sellers.	It is traded through exchanges.
Liquidity is low because contracts are tailor made contracts catering to the needs of the buyer and seller. Further, they are not easily accessible to other market participants.	It is standardized through exchanges. So liquidity is high.
Counter party risk is high in this contract.	Clearing and settlement agency helps to reduce counterparty risk.
Contracts specification is differ from trade to trade.	Contracts are standardized by exchanges
These markets are not organized. So price discovery mechanism is not efficient.	Price discovery is efficient in futures market because it is well organized.

Source: Workbook for NISM- Series- VII

Different types of contracts in financial futures are categorized into various groups which are as under:

1. Interest Rate Futures

Futures trading on interest bearing securities are called interest rate futures. Important interest bearing securities are treasury bills, notes, debentures, bonds, euro dollar deposits, municipal bonds etc. Almost all types of maturity bearing securities are traded in this market.

2. Foreign Currency Futures

It is also known as exchange rate futures. These financial futures are trade in foreign currencies. Important currencies in which these future contract are made such as US dollar, Pound sterling, Yen, French Francs, Marks, Canadian dollar etc. These contracts are used for hedging by exporters, importers, bankers, financial institutions and large companies.

3. Stock Index Futures

These futures are based stock market indices. In other words, its underlying assets are stock indices.

4. Bond Index Futures

These futures contracts are based on certain bond indices. Prices of debt instruments inversely related to interest rate. In the same manner, bond index is inversely related to interest rate.

5. Cost of living Index Futures

It is also known as inflation futures. It is based on certain cost of living index. For example, consumer price index, wholesale price index etc.

3.4.3. Options

An option is a contract which gives the right, but not an obligation to buy or sell the underlying at a pre-determined price and pre-determined date. Pre-determined price in the option contract is known as exercise price or strike price. Pre-determined date in the option contract is known as expiration date or maturity. Buyer giving price is known as option premium. The option buyer, who is also called long on option, has the right but no obligation. On the other hand, the option writer/seller, who is also called the short on option, has an obligation but no right, with regard to buying or selling of the underlying asset. Options do not make obligations when the market becomes favorable. So, it protects the investor from unfavorable movements in the market and also gives the opportunity to utilize positive trends in the market. Two

types of options are call options and put options. An option contract that gives the right to its holder to buy the asset is called call option and that gives the right to sell asset is called put option.

Based on timing of exercising the contract, options classifieds into European options and American options. European options are those contracts that give a right that can be exercised only at the time of maturity whereas American options can be exercised at any time up to maturity.

Warrants

Warrant is another important category of financial derivative. Warrants are just like an option contract. The holder has the right to buy specified number of shares at a fixed price in a fixed period from issuing company. In other words, warrants are options with longer maturity. Longer dated options which are generally traded over the counter are called warrants.

LEAPS

LEAPS (Long term Equity Anticipation Securities) are options having maturity up to three years.

Basket

It is the options on portfolio of underlying assets. The underlying asset is usually a moving average of a basket of assets. Equity index options are a form of basket options.

3.4.4. SWAPS

It is an agreement between two parties to exchange cash flows for a specific period of time. The agreement specified the dates of payment and the way of its calculations. In the simplest swap, one party promises to pay cash flows corresponding to the interest payments of fixed rate debt on a given amount to a party that promises to pay cash flows corresponding to the payments of floating-rate debt on the same principal amount. Commonly it is used in Forex and fixed income

security market. In the market two types of swaps are available, interest rate swaps and currency swaps. An interest rate swaps involve exchange of interest amount between two parties within a specified period. Currency swaps are exchange of cash flows denominated in different currencies.

3.5. History of Derivatives Market

Today's organized form of derivative market is established through various stages. Some of the important events that lead to the evolution of derivative market are described in this section. Non-standardized form of derivative trading started in the 12^{th} Century, European sellers entered agreement to sell or buy of goods for future in their trade fair. Then English Cistercian Monasteries made agreement to sell their wool for twenty years with foreign merchants in the beginning of 13^{th} Century. After that, Tulip Mania in Holland Fortunes was lost in after a speculative boom in tulip futures burst during 1634-1637. Then a future market developed in Japan for protecting rice farmers from loss due to bad weather condition at the end of 17th Century. This was the starting of modern form of derivative trading. Then in 1848, CBOT (Chicago Board of Trade) started Forward contracts on various commodities. First exchange traded derivative contracts are introduced in the US market by CBOT in the year of 1865. In 1919, Chicago Butter and Egg Board, a supplement of CBOT was restructured futures trading and its name was changed to Chicago Mercantile Exchange (CME). Chicago Mercantile Exchange formed International Monetary Market in 1972 which permitted trading in currency futures. In 1975, CBOT announced Treasury bill futures contract. It was the first popular pure interest rate futures. After that CBOT created T -bond futures contract in 1977. In 1982, CME created Eurodollar futures contract and Kansas City Board of Trade launched the first stock index futures. Chicago Board Options Exchange decided to create an option on an index of stocks in 1983.

3.6. Evolution of Derivative Market in India

Financial derivatives introduced in the graceful of L.C Gupta committee report. As the first step towards introduction of derivatives trading in India, SEBI set up a committee under the Chairmanship of Dr. L. C. Gupta on November 18, 1996. SEBI

appointed this committee to develop appropriate regulatory framework for derivatives trading in India. On March 17, 1998 the committee yielded its report and recommended to include derivatives in the category of securities. SEBI set up another group in June 1998 under the Chairmanship of Prof. J.R.Verma, to recommend measures for risk in derivatives market in India. The committee submitted its report in October 1998. Their report included operational details of margining system, methodology for charging initial margins, membership details and net worth criterion, deposit requirements and real-time monitoring of positions requirements. The new amendment of Securities Contract Regulation Act (SCRA) in 1999 was included "derivatives" within the domain of 'securities' and regulatory framework was developed for governing derivatives trading. In March 2000, government prohibited forward trading in securities. In Indian security market, derivatives introduced on June 2000. First derivatives were futures contract launched in NSE and BSE. It was index futures of BSE Sensex and NSE Nifty. After that, Index option introduced on June 2001. Options on individual stocks were started trading on July 2001. Futures on individual stocks started trading on November 2001. In June 2003, took off interest rate futures.

Chronology of derivatives products launches in NSE, India

June	2000	- Index futures
June	2001	- Index Options
July	2001	- Stock Options
November	2001	- Stock futures
June	2003	- Interest rate futures
August	2003	- F&O in CNX IT Index
June	2005	- F&O in Bank Nifty Index
June	2007	- F&O in Nifty Junior & CNX 100
October	2007	- F&O in MIDCAP 50
January	2008	- MINI Nifty Derivatives
March	2008	- Long term option contracts on Nifty
August	2008	- Currency Derivatives

August	2009	- Interest Rate Futures
February	2010	- Launch of currency futures on additional currency pairs
October	2010	- European style stock options
October	2010	- Currency options on USD INR
August	2011	- Futures on DJIA index and F&O on S&P 500 index

3.7. Structure of Derivative Markets in India

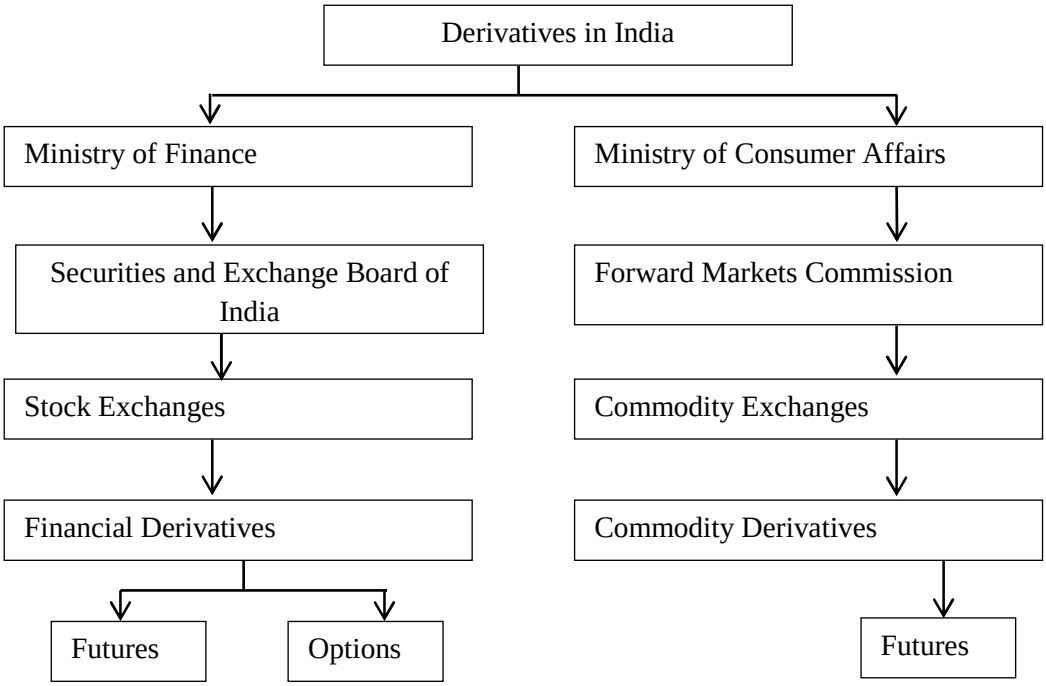
Derivative markets in India can be broadly divided into two segments viz.

1. Financial Derivatives and
2. Commodity Derivatives

Two separate regulators set up under different Acts of Parliament govern financial and commodity derivatives markets in India. They are also under the control of different ministries (see Figure 3: 3).

Figure 3.3

Organizational structure of Derivative market



3.8. Futures Market and Its Trading

Futures market has remarkable growth throughout the world in terms of size and trading volume. New contract with new products along with entirely new possibilities in the futures market have become the reality now. First futures trading were started in USA during 1970s. Common underlying assets in the future market are commodities, precious metals, interest rates, stocks etc. Today, Futures market is an essential part of financial market all over the world. This section tries to explain trading aspects of futures.

3.9. Evolution of Futures Market in India

The first commodity exchange in India was set up by Bombay Cotton Trade Association and formal organized futures trading started in cotton in 1875. After that, many exchanges came up in different parts of the country for futures trade in various commodities. In 1900, Gujarati Vyapari Mandali came into existence. They undertook futures trade in oilseeds for the first time in the country. In 1919 Calcutta Hessian Exchange was set up and the East India Jute Association was set up in 1927 for futures trade in raw jute. Between 1920s and 1930s futures trading was undertook in various commodities such as cotton, raw jute, jute goods, castor seed, wheat, rice, sugar, gold and silver. During 1940s, trading in futures and forwards was made difficult through price controls till 1952 when the government passed the Forward Contract Regulation Act, which controls all transferable forward contracts and futures... In 1966, government appointed Datwala committee and in 1980, government appointed another committee named khusro committee. This two-committee suggested the re introduction of futures trading. In 1993, another committee named Kabra committee recommended the up gradation of future trading. In 1996, SEBI set up L.C Gupta committee to develop appropriate regulatory framework for financial derivatives trading in India. In 1998, they submitted their report by suggesting introduction of futures and options. Then 2000, government of India introduced futures and options in security market.

3.10. Business Growth of Financial Derivatives in India

Indian financial derivatives market shows tremendous growth over years. Growth in terms of turnover of NSE as explained in the below table.

Table 3.2

Business Growth in Indian Derivative Market

Year	Index Futures	Stock Futures	Total Turnover of Futures Market	Index Options	Stock Options	Total Turnover of Option Market	Total Turnover of Derivatives Segment
2000-01	2,365	0	2,365	0	0	0	2,365
2001-02	21,483	51,515	72,998	3,765	25,163	28,928	1,01,926
2002-03	43,952	2,86,533	3,30,485	9,246	1,00,131	1,09,377	4,39,862
2003-04	5,54,446	13,05,939	18,60,385	52,816	2,17,207	2,70,023	21,30,408
2004-05	7,72,147	14,84,056	22,56,203	1,21,943	1,68,836	2,90,779	25,46,982
2005-06	15,13,755	27,91,697	43,05,452	3,38,469	1,80,253	5,18,722	48,24,174
2006-07	25,39,574	38,30,967	63,70,541	7,91,906	1,93,795	9,85,701	73,56,242
2007-08	38,20,667	75,48,563	1,13,69,230	13,62,111	3,59,137	17,21,248	1,30,90,478
2008-09	35,70,111	34,79,642	70,49,753	37,31,502	2,29,227	39,60,729	1,10,10,482
2009-10	39,34,389	51,95,247	91,29,636	80,27,964	5,06,065	85,34,029	1,76,63,665
2010-11	43,56,755	54,95,757	98,52,512	183,65,365	10,30,344	1,93,95,669	2,92,48,181
2011-12	35,77,998	40,74,671	76,52,669	22,72,0031	9,77,031	32,49,034	1,09,01,703
2012-13	25,27,131	42,23,872	67,51,003	227,81,574	20,00,427	247,82,001	315,33,004
2013-14	30,83,103	49,49,281	80,32,384	277,67,341	24,09,448	301,76,789	382,09,173
2014-15	41,07,215	82,91,766	123,98,981	39,922,663	32,82,552	43,205,215	55,604,196
2015-16	45,57,113	78,28,606	1,23,85,719	4,02,73,884	33,43,670	4,36,18,168	56,003,887
2016-17	43,35,940	1,11,29,587	15,465,527	40,623,905	34,39,240	44,063,145	59,528,672
2017-18	48,10,454	1,55,97,519	20,407,973	41,084,558	35,87,457	44672015	65,079,988

Source: www.nse.com

Table 3.1 shows statistics of growth of financial derivatives in India. As per turnover, stock futures are the major contributor to the total turnover of financial derivatives in NSE. While considering futures and options, futures segment is the highest contributor of Derivatives segments.

3.11. Growth of Futures Market in NSE

This section deals with growth of single stock futures and index futures in terms of number of contract traded in stock market.

Table 3.3

Growth of Futures in NSE

Year	Stock Futures		Index Futures	
	No. of Contracts Traded (No.)	Trading Value (Cr.)	No. of Contracts Traded (No.)	Trading Value (Cr.)
2000-01	-		90,580	2,365
2001-02	19,57,856	51,515	10,25,588	21,483
2002-03	1,06,76,843	2,86,533	21,26,763	43,952
2003-04	3,23,68,842	13,05,939	1,71,91,668	5,54,446
2004-05	4,70,43,066	14,84,056	2,16,35,449	7,72,147
2005-06	8,09,05,493	27,91,697	5,85,37,886	15,13,755
2006-07	10,49,55,401	38,30,967	8,14,87,424	25,39,574
2007-08	20,35,87,952	75,48,563	15,65,98,579	38,20,667
2008-09	22,15,77,980	34,79,642	21,04,28,103	35,70,111
2009-10	14,55,91,240	51,95,247	17,83,06,889	39,34,389
2010-11	18,60,41,459	54,95,757	16,50,23,653	43,56,755
2011-12	15,83,44,617	40,74,671	14,61,88,740	35,77,998
2012-13	14,77,11,691	42,23,872	9,61,00,385	25,27,131
2013-14	17,04,14,186	49,49,281	10,52,52,983	30,83,103
2014-15	23,76,04,741	82,91,766	12,93,03,044	41,07,215
2015-16	23,42,43,967	78,28,606	14,05,38,674	45,57,113
2016-17	17,38,60,130	1,11,29,587	6,65,35,070	43,35,940
2017-18	21,47,58,366	1,55,97,519	5,76,74,584	48,10,454

Source: www.nse.com

Table 3.2 indicate that stock futures are higher than index futures in terms of trading volume and number of contracts traded in NSE.

3.12. Role of Futures Markets

The development and sustenance of competitiveness of our industry and trade critically depend on their ability to make accurate price forecasts and transfer the risks related to movement in prices of input/outputs. The efficient price forecasts help the trade and industry to plan their inventory production and commitments for sale at a future date. Availability of an efficient formal mechanism to transfer price risk reduces price uncertainty and hence they can concentrate on their core activity, namely, trading or manufacturing. Here lies the significance of a developed futures market.

- An efficient futures market seeks to create an efficient forecast of price, which takes into account all the price-sensitive information about the underlying assets that is available at a point of time.
- Futures provide a very effective hedging option.
- It is a smart investment choice.
- The futures market provides efficient price signals which enable the producers to plan their production strategy and the occurrences of glut or scarcity can be avoided.
- A major factor contributing to inefficiencies in trade and industry is the rigidities involved in dealing with the physical commodity and the absence of a system for establishing and enforcing standards in respect of quality, grades and certification. The 'Warehouse Receipt System" evolved along with futures markets can remove these hurdles effectively. Some of the important function of future as follows.

3.13. Price Risk Management through Hedging

Price risk management refers to minimizing the risk of price volatility involved in security trading. Through futures contracts, the risk may be shifted to speculators or traders who are willing to assume the risk. A hedger would try to minimize risk by taking opposite positions in the futures and cash markets. The protective feature of hedging assumes that trends in cash and futures prices are sufficiently similar, so

that losses incurred in the purchase or sale of cash segment of securities can be offset by gains from opposite transactions in the futures markets. Hedge may be either 'long' or 'short'. Long hedge' is a transaction where a position in the cash market is hedged by going long in the futures market. 'Short hedge', on the other hand, is the hedge that is accomplished by going short in the futures market. When futures contract on a stock is not available, market participants generally look forward to another stock traded in the futures market. They may trade in the futures of such stock to minimize the loss from dealing in the stock of their interest. This is called "Cross hedge".

3.14. Price Discovery

Price discovery refers to the process of determining the price level of a security based on demand and supply factors. Every trader in a stock exchange has specific market information like demand, supply and inflation rates. When trade between buyers and sellers are executed, the market price of a stock is discovered. Futures markets are expected to generate prices that express the markets view of subsequent cash prices and transmit that information quickly to the marketing system. According to Powers and Vogel, "Futures markets provide a mechanism, by which diverse and scattered opinions of the futures are coalesced into one readily discernible number which provides a consensus of knowledgeable thinking. Thus, futures prices provide an expression to agreement of today's expectations about a specified future time. Further, price discovery function of the futures market also leads to the inter-temporal inventory allocation function. In other words, the traders can compare the spot and futures prices and will be able to decide the optimum allocation of the quantity of underlying asset between the immediate sale and future sale.

3.15. Liquidity

Futures contracts can easily be converted into cash, i.e., they are liquid. By buying or selling the contract to make profits, speculators provide the capital required for ensuring liquidity in the market.

3.16. Price Stabilization (Reducing Volatility)

Another important function of the futures market is to keep a stabilizing influence on spot prices by reducing the amplitude of short term fluctuations. In other words, futures market reduces both the heights of the peaks and the depth of the troughs. The major causative factors responsible for such price stabilizing influence are speculation, price discovery, tendency to panic etc.

3.17. Bringing Transparency

Futures markets allow speculative trade in a more controlled environment where monitoring and surveillance of the participants is possible. Hence, futures ensure transparency. The transparency benefits the traders as well, by spreading awareness about prices in the open market.

3.18. Participants / Traders in Futures market

Mainly three types of traders are participating in derivative market. They are hedgers, speculators and arbitragers

3.18.1. Hedgers

Hedgers are traders; they enter into the derivatives market for reducing or eliminating the risk due to the fluctuations in the market. Thus, hedger takes a position in the derivatives market that is opposite to the one he is entered in the spot market. Hedgers are risk averse traders who want to reduce the risks. Purpose of hedging is to reduce risk but not to make profit. The returns on hedge position will be less than the unhedged position. In this manner, derivatives help traders to offset potential losses in the spot market.

3.18.2. Speculators

A speculator may be defined as an investor who is willing to take risk by taking futures position in the market with the expectation of making profit. In other words, speculators are risk takers, not risk averse. Speculators use futures and options contracts to get extra leverage in betting on future movements in the price of an

asset. Speculators forecast the future economic conditions and decide which position to be taken that will yield a profit if the forecast is realized... They buy and sell the securities with a motive to make profit. If their prediction turns true, they get profit and vice versa. They are traders who are willing to assume risk. Speculators want to buy an asset at low price in the future, when the actual spot price of that asset is high and want to sell an asset at high price when the actual spot market price of that asset is low. Role of speculators are also essential for the active functioning of the market.

3.18.3. Arbitragers

Arbitragers are traders who wish to make profit by taking advantages of price differences in various markets. In other words, they attempt to make profits by locking in a riskless trading of simultaneously entering into transactions in two or more markets. They are risk neutral traders who exploit any mispricing in the markets. They focus to earn riskless profit from discrepancies between spot and futures prices and among different futures prices. They will be careful watchers of the market movements and if they see future price is getting out of line with the cash price, they will take offsetting positions in two markets and lock their profit.

3.19. Future Price Terminologies

Futures are useful to participants as it reflects the price information of the underlying. Futures prices are reported in newspapers and dailies in a standard format. There will be different values like open price, high price, low price and settle price.

Expiration Day

The date at which period of contract is over. Expiry cycle of every contract is given by the exchange during which the contract is traded. Expiry date will be last Thursday of expiry month.

Open price

Open price refers to the price at which the first contract of the day was transacted. Thus, it is the price for the day‘s first trade which occurs during the selected time

period.

High price

It is the highest price of the contract noted during the day

Low price

It is the lowest price of the contract noted during the day.

Settle

The settle refers to the settlement price. It is the price determined daily to settle and adjust all investors margin account for the daily change in future prices.

Change

This column shows the change in previous day‘s settlement price and today’s settlement price. The change can be either positive or negative

Lifetime high and low

This column refers to the highest and lowest futures price quoted during the entire life of the contract.

Open interest

This refers to the total number of contract outstanding at the close of the previous day‘s trading.

3.20. Various Futures Prices

Futures prices possess some important features which help them to perform their basic economic functions.

Basis

Basis is the difference between spot prices and the futures price of an asset at a specified location. Mathematical equation of basis as follows.

Basis = Current cash price – futures price

On the expiration date of the futures contract, if the futures price and spot price is same, the basis will be Zero. In the real sense, there may be slight difference due to transaction cost. This difference of the basis is known as convergence. Thus, as the delivery month of a futures contract is approached, the futures price converges to spot price of the asset and at the delivery period futures price will be very close to the spot price. Basis narrows near to the maturity of contract. This is mainly due to the arbitrage opportunity available to market participants.

Spread

Spread refers to the difference between two different futures prices of an asset. A spread position is started by the immediate purchase and sale of futures contracts on the same asset but with different delivery months or by immediate purchase and sale of futures on different commodities for delivery in the same or different months.

Types of spreads

- Intra Commodity spread: This is the variance in prices between two futures contracts of different maturity dates, on the identical commodity. A spread between diverse contract months on the same commodity is called intra commodity spread.
- Inter commodity spreads: This refers to a spread between the futures prices of two different but related commodities. In this case, the commodities will have some economic relationship to each other. For example, Soybean and its two-product soya oil and soya meals.
- Inter market spreads: This is related with different markets for inter-related commodities. Here the spread is disturbed with different markets and if the spread exceeds the cost of carrying an arbitrage opportunity may arise for traders.

3.21. Pricing of Futures

'Cash' and 'futures' prices usually have a well-defined relationship to each other. There are many theories which try to explain the relationship between spot and futures prices. The most important among such theories are 'the cost-of-carry approach' and 'the expectations approach 'as follows.

3.22. The Cost-of-Carry Approach

According to Keynes and Hicks, "Futures prices essentially reflect the carrying cost of the underlying assets. In other words, the inter-relationship between spot and futures prices reflects the carrying cost, i.e., the amount to be spent for storing the asset from the present time to the futures maturity date. The Cost of Carry Model adopts that markets have a tendency to be perfectly efficient. This means there are no changes in the cash and futures price. This, thereby, eliminates any opportunity for arbitrage (the phenomenon where traders take advantage of price differences in two or more markets). When there is no opportunity for arbitrage, investors are indifferent to the spot and futures market prices while they trade in the underlying asset. This is because their final earnings are eventually the same. The model also assumes, for simplicity sake, that the contract is held till maturity, so that a fair price can be arrived at. In short, the price of a futures contract (FP) will be equal to the spot price (SP) plus the net cost incurred in carrying the asset till the maturity date of the futures contract.

FP = SP + (Carry Cost – Carry Return)

Here, Carry Cost refers to the cost of holding the asset till the futures contract matures. This could include storage cost, interest paid to acquire and hold the asset, financing costs etc. Carry Return refers to any income derived from the asset while holding it like dividends, bonuses etc. While calculating the futures price of an index, the Carry Return refers to the average returns given by the index during the holding period in the cash market. A net of these two is called the net cost of carry.

3.23. The Expectation Approach

The supporters of this approach argue that the futures price is the market expectation of the spot price at a future date. Many traders, especially those using futures market to hedge, would like to study how today's futures prices are related to market expectations about futures prices. Any major deviation of the futures prices from the expected price will be corrected by speculative activity. This approach is also known as "hypothesis of unbiased futures pricing" because it regards the futures price as an unbiased predictor of the future spot price and expects that, on an average, the futures price will forecast the future spot price correctly. Expectancy Model of futures pricing states that the futures price of an asset is basically what the spot price of the asset is expected to be in the future. This means, if the overall market sentiment leans towards a higher price for an asset in the future, the futures price of the asset will be positive. In the exact same way, a rise in bearish sentiments in the market would lead to a fall in the futures price of the asset. Unlike the Cost of Carry model, this model believes that there is no relationship between the present spot price of the asset and its futures price. What matters is only what the future spot price of the asset is expected to be. This is also why many stock market participants look to the trends in futures prices to anticipate the price fluctuation in the cash segment.

3.24. Theory of Normal Backwardation

Backwardation refers to a market in which the futures price is less than the cash or spot price. Here the basis is positive, cash price minus futures price. If the futures price is higher than the cash price it refers to a contango market and the basis is negative. Normal backwardation is used to refer to a market where futures prices are below expected futures spot prices. In many futures markets, the volume of short hedge exceeds the volume of long hedge. Keynes postulated that, in order to induce long speculators to take up the net short hedge volume, the hedgers have to pay a risk premium to the speculators. Thus, according to Keynes, the futures price would generally be less than the expected price by the amount of risk premium.

3.25. Margin Money

Margins are deposits kept by the traders with a clearing house usually in the form of cash. The aim of margin money is to minimize the risk of nonpayment by either counter party. Different types of margins collect by exchanges from the market participants are special margin, volatility margin, delivery margin etc. Initial margin and mark-to-market margins are more important.

Initial Margin is the amount to be placed by the traders in his margin account with clearing house before he enters into a futures contract. This must be kept throughout the time of his position is open and is returnable at delivery, exercise, expiry or closing out.

Mark-to-Market Margins (MTM) are payable based on closing prices at the end of each trading day. These margins will be paid by the buyer if the price declines and by the seller if the price rises. This margin is worked out on difference between the day's closing rate and the previous day's clearing rate. The exchange collects these margins from buyers if the prices decline and pays to the sellers and vice versa. Collecting MTM margins on a daily basis reduces the possibility of accumulation of loss, particularly when futures price moves only in one direction.

3.26. TRADING MECHANISM

The Futures and Options Trading System provides a fully automated trading environment for screen-based, floor-less trading on a nationwide basis and an online monitoring and surveillance mechanism. The system supports an order driven market and provides complete transparency of trading operations. Orders, as and when they are received, are first time stamped and then immediately processed for potential match. If a match is not found, then the orders are stored in different 'books'. Orders are stored in price-time priority in various books in the following sequence:

- Best Price
- Within Price, by time priority.

Order Matching Rules

The best buy order will match with the best sell order. An order may match partially with another order resulting in multiple trades. For order matching, the best buy order is the one with highest price and the best sell order is the one with lowest price. This is because the computer views all buy orders available from the point of view of a seller and all sell orders from the point of view of the buyers in the market. So, of all buy orders available in the market at any point of time, a seller would obviously like to sell at the highest possible buy price that is offered. Hence, the best buy order is the order with highest price and vice-versa.

Members can pro-actively enter orders in the system which will be displayed in the system till the full quantity is matched by one or more of counter-orders and result into trade(s). Alternatively members may be reactive and put in orders that match with existing orders in the system. Orders lying unmatched in the system are 'passive' orders and orders that come in to match the existing orders are called 'active' orders. Orders are always matched at the passive order price. This ensures that the earlier orders get priority over the orders that come in later.

Order Conditions

A Trading Member can enter various types of orders depending upon his/her requirements. These conditions are broadly classified into 2 categories: time related conditions and price-related conditions.

Time Conditions

Day– A- Day order, as the name suggests, is an order which is valid for the day on which it is entered. If the order is not matched during the day, the order gets cancelled automatically at the end of the trading day.

IOC - an Immediate or Cancel (IOC) order allows a trading member to buy or sell a security as soon as the order is released into the market, failing which the order will be removed from the market. Partial match is possible for the order, and the unmatched portion of the order is cancelled immediately.

Price Conditions

Limit Price/Order: It is an order to buy or sell a contract at a specified price. The user has to specify this limit price while placing the order and the order gets executed only at this specified limit price or at a better price than that (lower in case of buy order and higher in case of a sell order).

Market Price/Order: A market order is an order to buy or sell a contract at the bid or offer price currently available in the market. Price is not specified at the time of placing this order. The price will be the currently available price in the market i.e., a buy market order will get executed at a price at which the seller is ready to sell and a sell market order will get executed at a price at which the buyer is ready to buy.

Stop Loss (SL) Price/Order: A stop loss is an order to buy (or sell) a security once the price of the security climbed above (or dropped below) a trigger price. The stop-loss order gets activated when the trigger price is reached/crossed and enters the market as a market order or as a limit order, as defined at the time of placing this stop-loss order.

A sell order in the Stop Loss book gets triggered when the last traded price in the normal market reaches or falls below the trigger price of the order. A buy order in the Stop Loss book gets triggered when the last traded price in the normal market reaches or exceeds the trigger price of the order.

E.g. If for stop loss buy order, the trigger is 93.00, the limit price is 95.00 and the market (last traded) price is 90.00, then this order is released into the system once the market price reaches or exceeds 93.00. This order is added to the regular lot book with time of triggering as the time stamp, as a limit order of 95.00

3.27. Option Pricing – Terminology

An option is a particular type of a contract between two parties where one person gives the other person the right to buy or sell a specific asset at a specified price within a specific time period.

Parties of the option contract

There are two parties to an option contract; the buyer who is the holder of the option and the writer who sells the option. The writer grants the buyer a right to buy or sell a particular asset in exchange for a certain some of money for the obligation taken by him in option contract.

Exercise price

The price at which the underlying asset may be sold or purchased by the option buyer from the option writer is called as exercise or strike price.

Expiration date

The date at which an option contract expires is called as expiration date. The option can be exercised at any time before the expiration date.

Exercise date

Exercise date is the date upon which the option is actually exercised.

Option premium

The price at which option holder buys the right from option writer is called option Premium. This is the consideration paid by the buyer to the seller and it remained with Seller whether the option is exercised or not. This premium is fixed and paid at the time of Formation or writing an option deal.

Option' in', 'out'and 'at-the money'

A call option will be in-the-money, when the underlying futures price is greater than the exercise price. If the futures price is less than the exercise price it is called 'out-of the money'call option. If the futures price is equal to exercise price it is 'at- the-money'call option. The reverse is the case of put option.

3.28. Trading System

The Trading system of BSE is called Derivatives Trading & Settlement System (DTSS) and that of NSE is called NEAT-F&O trading system. Both these trading systems provide a fully automated screen-based trading for index futures, index

options, stock futures and stock options. These trading systems support an order driven market and simultaneously provide complete transparency of trading operations. Derivative trading is similar to that of trading of equities in the cash market segment. Both the exchanges have developed software for the F&O market to facilitate efficient and transparent trading in futures and options instruments.

Entities in the trading system

Broadly there are four entities in the trading system

- Trading Members
- Trading cum Clearing Members
- Professional Clearing Members and
- Participants

Trading Members: They are members of Stock Exchanges. They can trade either on behalf of their clients or on their own account. The exchange assigns a trading member ID to each of its trading member. A trading member can have more than one user. The number of users allowed for each trading member is decided by the exchange from time to time. A user must be registered with the exchange where he is assigned a unique user ID. The unique trading member ID is common for all the users of a particular trading member. Therefore, it functions as a reference for all user of a particular trading member. Trading member is responsible to maintain adequate control over persons having access to the firm's User IDs.

Trading cum Clearing Members: They are member of Stock exchanges. They can trade and clear their own trades as well as clear the trades of their associate trading members.

Professional Clearing Member: Professional clearing member clears the trades of his associate Trading Member and institutional clients. He need not be a member of an exchange. He is a member of Clearing Houses/Clearing Corporations who facilitate settlement of trades done on stock exchanges. They could be a broker or custodian registered with SEBI. They carry out risk management activities and confirmation/inquiry of trades through the trading system.

Participants: Participant is a client of trading members like financial institutions. They may trade through various trading member but settle through a single clearing member.

3.29. Clearing and Settlement System

Clearing Corporation/ Clearing House is responsible for clearing and settlement of all trades executed on the F&O Segment of the Exchange. Clearing Corporation acts as a legal counterparty to all trades on this segment and also guarantees their financial settlement. The Clearing and Settlement process comprises of three main activities, viz., Clearing, Settlement and Risk Management. Clearing and settlement activities in the F&O segment are undertaken by Clearing Corporation with the help of the following entities: Clearing Members and Clearing Banks.

3.29.1. Clearing Members

Broadly speaking there are three types of clearing members

1. Self-clearing member: They clear and settle trades executed by them only, either on their own account or on account of their clients.
2. Trading member–cum–clearing member: They clear and settle their own trades as well as trades of other trading members.
3. Professional clearing member: They clear and settle trades executed by trading members.

Both trading-cum-clearing member and professional clearing member are required to bring in additional security deposits in respect of every trading member whose trades they undertake to clear and settle.

3.29.2. Clearing Banks

Funds settlement takes place through clearing banks. For the purpose of settlement all clearing members are required to open a separate bank account with Clearing Corporation designated clearing bank for F&O segment.

3.29.3. Clearing Member Eligibility Norms

Net worth of at least ₹ 300 lakhs. The net worth requirement for a Clearing Member who clears and settles only deals executed by him is ₹ 100 lakhs. Deposit of ₹ 50 lakhs to clearing corporation which forms part of the security deposit of the Clearing Member. Additional incremental deposits of ₹ 10 lakhs to clearing corporation for each additional TM, in case the Clearing Member undertakes to clear and settle deals for other TMs.

3.29.4. Clearing Mechanism

The first step in clearing process is calculating open positions and obligations of clearing members. The open positions of a CM is arrived at by aggregating the open positions of all the trading members (TMs) and all custodial participants (CPs) clearing though him, in the contracts which they have traded. The open position of a TM is arrived at by adding up his proprietary open position and clients' open positions, in the contracts which they have traded. While entering orders on the trading system, TMs identify orders as either proprietary (Pro) or client (Cli). Proprietary positions are calculated on net basis (buy-sell) for each contract and that of clients are arrived at by summing together net positions of each individual client. A TM's open position is the sum of proprietary open position, client open long position and client open short position.

3.29.5. Settlement Mechanism

In India, SEBI has given the stock exchanges the flexibility to offer:

a) Cash settlement (settlement by payment of differences) for both stock options and stock futures; or

b) Physical settlement (settlement by delivery of underlying stock) for both stock options and stock futures; or

c) Cash settlement for stock options and physical settlement for stock futures; or

d) Physical settlement for stock options and cash settlement for stock futures.

A Stock Exchange may introduce physical settlement in a phased manner. On introduction, however, physical settlement for all stock options and/or all stock futures, as the case may be, must be completed within six months. The settlement mechanism shall be decided by the Stock Exchanges in consultation with the Depositories.

On expiry / exercise of physically settled stock derivatives, the risk management framework (i.e., margins and default) of the cash segment shall be applicable. Settlements of cash and equity derivative segments shall continue to remain separate.

The Stock Exchanges interested to introduce physical settlement should:

a. Put in place proper systems and procedures for smooth implementation of physical settlement.
b. Make necessary amendments to the relevant bye-laws, rules and regulations for implementation of physical settlement.
c. Bring the provisions of this circular to the notice of all categories of market participants, including the public, and also to disseminate the same on their websites.

The Stock Exchanges interested to offer physical settlement should submit to SEBI for approval, a detailed framework for implementation of physical settlement of stock derivatives. After opting for a particular mode of settlement for stock derivatives, a Stock Exchange may change to another mode of settlement after seeking prior approval of SEBI.

At present, derivative contracts on both individual stocks and on stock indices are cash settled on NSE but on BSE, derivative contracts on stock indices are cash settled while those on individual stocks are delivery based.

3.29.6. Settlement Schedule

The settlement of trades is on T+1 working day basis. Members with a funds pay-in obligation are required to have clear funds in their primary clearing account on or

before 10.30 a.m. on the settlement day. The payout of funds is credited to the primary clearing account of the members thereafter.

3.29.7. Settlement of Futures Contracts on Index or Individual Securities

In Futures contracts, both the parties to the contract have to deposit margin money which is called as initial margin. Futures contract have two types of settlements, the MTM settlement which happens on a continuous basis at the end of each day, and the final settlement which happens on the last trading day of the futures contract

3.30. Derivatives Trading on NSE

The F&O segment on NSE provides trading facilities for the following derivative instruments:

- Nifty 50 Index
- Nifty IT Index
- Nifty Bank Index
- Nifty Midcap 50 Index
- Nifty Infrastructure Index
- Nifty PSE Index
- Individual Securities
- Nifty CPSE

Nifty 50 Index

NSE inaugurated trading in index futures on June 12, 2000. The index futures contracts are based on the popular market benchmark Nifty 50 index. The underlying index is Nifty. The Nifty 50 is a well diversified 50 stock index accounting for 12 sectors of the economy. It is used for a variety of purposes such as benchmarking fund portfolios, index based derivatives and index funds. Nifty 50 is owned and managed by NSE Indices Limited. The Nifty 50 Index represents about 62.9% of the free float market capitalization of the stocks listed on NSE as on March 31, 2017.

Nifty IT Index

Nifty IT futures contract launched by NSE in August 2003 is based on the Nifty IT index. In order to have a good benchmark of the Indian IT Sector, IISL has developed the IT sector index. Companies in this index are those that have more than 50% of their turnover from IT related activities like IT Infrastructure , IT Education and Software Training , Telecommunication Services and Networking Infrastructure, Software Development, Hardware Manufacturer‘s, Vending, Support and Maintenance. The IT index is computed using free float market capitalization method. The index is computed with ten companies with effect from 29th May 2015. The Nifty IT index represents about 12.15% of the free float market capitalization of the stocks listed on NSE and 91.9% of the free float market capitalization of the stocks forming part of the IT sector as on March 31, 2016.

Nifty Bank Index

Bank Nifty futures contract announced in June 2005 are based on the Bank Nifty index. The Indian banking Industry has experienced major changes, reproducing a number of essential developments. In order to have a good benchmark of the Indian banking sector, IISL has developed the Bank index. Bank index is an index included the most liquid and large capitalized Indian Banking Stocks. The index has 12 stocks from the banking sector which trade on the National Stock Exchange. Bank index is computed using free float market capitalization method. The Nifty Bank index represent about 15.6% of the free float market capitalization of the stocks listed on NSE and 93.3% of the free float market capitalization of the stocks forming part of the banking sector as on March 31, 2016.

Nifty Midcap 50

Nifty Midcap 50 futures contracts were introduced on October 2007. They are based on the Nifty Midcap 50 index. The primary objective of the Nifty Midcap 50 index is to capture the movement of the midcap segment of the market. Nifty Midcap 50 is computed using free float market capitalization weighted method. The Nifty Midcap 50 index has a base date of Jan 1, 2004 and a base value of 1000. The Nifty Midcap

50 index represents about 5.8% of the free float market capitalization of the stocks listed on NSE as on March 31, 2017. Nifty Midcap 50 index was computed using market capitalization weighted method from the launch date till February 25, 2010. Selection of the index set is based on the following criteria: Stocks with average market capitalization ranging from 1000 Crore to 5000 Crore at the time of selection. Stocks which are not part of the derivatives segment are excluded. Stocks which are forming part of the NIFTY index are excluded.

Nifty Infrastructure Index

Nifty Infrastructure futures contracts launched by NSE in November 2011 are based on the Nifty Infrastructure index. NSE Indices has developed Nifty Infrastructure Index to capture the performance of the companies in the infrastructure sector. Nifty Infrastructure index include companies belonging to Telecom, Power, Port, Air, Roads, Railways, shipping and other Utility Services providers. The Nifty Infrastructure index represents about 7.7% of the free float market capitalization of the stocks listed on NSE and 89.3% of the free float market capitalization of the stocks forming part of the infrastructure sector universe as on March 31, 2016.

Nifty PSE Index

Nifty PSE futures contracts launched in November 2011 is based on the Nifty PSE index. As part of its schedule to restructuring the Public Sector Enterprises, the Government has selectively been disinvesting its holdings in public sector enterprises since 1991. With a view to provide regulators, investors and market intermediaries with an suitable benchmark that captures the performance of this segment of the market, as well as to make available an appropriate basis for pricing upcoming issues of PSEs, NSE Indices has developed the Nifty PSE index, including of 20 PSE stocks. The index is computed using free float market capitalization method having a base period of December, 1994 indexed to a base value of 1000 wherein the level of the index reflects total free float market value of all the stocks in the index relative to a particular base market capitalization value. The Nifty PSE index represents about 6.6% of the free float market capitalization of the stocks listed on NSE as on March 31, 2016. The Nifty PSE index was computed

using market capitalization weighted method from the launch date till October 8, 2010.

Individual Securities

NSE began trading in futures on individual securities on November 9, 2001. The futures contracts are available on 175 securities stipulated by the Securities & Exchange Board of India (SEBI).

Nifty CPSE

Nifty CPSE Index is created in order to simplify Government of India's initiative to dis-invest some of its stake in selected CPSEs. The government selected for ETF route for disinvestment. The ETF shall track the performance of the Nifty CPSE index. The Nifty CPSE Index represent about 3.5% of the free float market capitalization of the stocks listed on NSE as on March 31, 2016.

3.31. Conclusion

This chapter examined the theoretical background of derivatives and futures, different concepts and theories, growth of derivatives over the years and general trading mechanism followed in Indian stock market. NSE is the major contributor to derivatives trading in India. Stock futures segment is the best performer in derivative segment of India.

Next chapter analyses hedge effectiveness of stock and index futures and helps to understand the extent of hedge efficiency and effectiveness exhibited by Indian future market.

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Chapter IV

Futures Trading in Kerala

4.1 Introduction

Traders are the backbone of stock market. They are making market. Banking sector is the second highest sector in the volume of trade in NSE as compared to other sectors. So, traders of banking sector futures are very important. In India, most of the traders are looking at this platform as a profession and a way of earning income. Such types of traders are very serious about trading. Their money, valuable time and efforts are used for trading or being traded. The present study considers their attitude towards banking futures, hedging habit with banking futures and their reactions to various information in the market for understanding traders' behaviour in the market. For the study purpose, data was collected from 360 traders throughout Kerala. This chapter analyses the behaviour of traders through the responses of sample respondents.

This chapter covers three objectives of the study related to primary data. It examines traders' attitude, traders' hedging habit and traders' reaction to various informations related to stock market.

4.2 Demographic Profile of Respondents

Demographic variables are inevitable part of every social science research. This study has included 7 demographic variables that are region, gender, age, educational qualifications, income and occupation. Demographic profile of the sample traders is given in detail in the following table.

Table 4.1

Traders' Demographic Profile

Demographic variables		Number of respondent	Percentage
Region	South Region	120	33.3
	Central Region	120	33.3
	North Region	120	33.3
	Total	**360**	**100**
Gender	Male	330	91.7
	Female	30	8.3
	Total	**360**	**100**
Age	Up to 30 years	117	32.5
	31 – 40 years	130	36.1
	41 – 50 years	57	15.8
	51 – 60 years	28	7.8
	Above 60 years	28	7.8
	Total	**360**	**100**
Educational qualifications	HSE	40	11.1
	Degree	188	52.2
	PG	99	27.5
	Professional	33	9.2
	Total	**360**	**100**
Monthly income of family	₹ 25000 & below	137	38.1
	₹ 25001 - 50000	134	37.2
	₹ 50001 - 75000	34	9.4
	₹ 75001 - 100000	23	6.4
	Above ₹ 100000	32	8.9
	Total	**360**	**100**
Occupation	Govt. employee	50	13.8
	Professional	45	12.5
	Private sector	181	50.2
	Business	84	23.3
	Total	**360**	**100**

Source: Survey data

Region is one of the demographic variables used in this study for comparison. Geographical part of Kerala is divided into three regions that are south region, central region and north region. The researcher equally divided total sample size into three regions. So, number of respondents from each region are 120

Gender of the respondent is an important demographic variable while studying stock market traders. From the above table, it is observed that 91.7 percent of respondents are male. Female representation is only 8.3 percent. From this figure we can say that female participation in derivative segment is very low.

Age difference always shows difference in opinion, attitude, behaviour etc. so it is a very important variable in this study. For the study purpose the researcher divided age into five categories, that is up to thirty years, thirty-one to forty years, forty-one to fifty years, fifty-one to sixty years and above sixty years. The above table shows that 32.5 percent of traders fall under the age category of up to 30 years, 36.1 percent is in between thirty-one to forty years of age, 15.8 percent of respondents are forty-one to fifty years of age, 7.8 percent of traders are included in the category of fifty-one to sixty years of age and another 7.8 percent are under above sixty years of age.

The fourth demographic variable included in this study is educational qualifications. Regarding educational qualification, about 52.2 percent of respondents have Bachelor Degree, 27.5 percent Post Graduates, and 11.1 percent HSE and 9.2 percent of the respondents have Professional qualifications.

Income is very closely related to investment because it determines the level of savings and investment. Table 5.1 discloses that 38.1 percent of traders have marked their income level as ₹ 25,000 & below. 37.2 percent of traders have their income level between ₹ 25,001–50,000, 9.4 percent of traders come under the income category of ₹ 50,001–75,000, 6.4 percent of traders have their income level between ₹ 75,001 – 100,000 and 8.9 percent of traders have marked their income level as more than ₹ 100,000.

The study divided occupation level of respondent into four categories that are Government, professional, private sector and business. 50.2 percent of traders are working in private sector. 23.3 percent traders are doing business of their own, 13.8 percent traders are government employees and rest of the 12.5 percent are professionals.

4.3. Experience of Derivative Traders

Experience has great influence on traders' behaviour and attitude. Experience creates successful traders. In other words, traders having more experience in the field are supposed to understand the technicalities of trading and earn better returns and vice-versa. Experience of traders is divided into two sections that are experience in stock market trading and experience in derivative trading. It is explained in the table 4.2 and 4.3

4.4. Stock Market Experience

Majority of traders start with stock market instruments like stocks and indices. If traders are interested and satisfied with trading, they will be exploring more options in the market. It will lead the traders to derivative instrument. Stock market experience creates good traders. Years of experience in stock market give outlook about stocks and its derivative instruments. That's why stock market experience is important in this study.

Table 4.2

Years of Experience in Stock Market

Experience in Years	No. of respondents	Percent
Less than 3 years	85	23.6
3-5 years	89	24.7
5-10 years	95	26.4
Above 10 years	91	25.3
Total	360	100

Source: Survey data

Table 4.2 depicts the information related to the trader's years of experience in stock market. Out of 360 respondents, 95 (26.4 percent) people have the experience of 5 - 10 years. 91 (25.3 percent) traders claimed that they have experience of above 10 years. 89 (24.7 percent) people have experience in between 3 – 5 years and 85 (23.6 percent) respondents have below 3-year experience only.

4.5 Experiences in Derivative Trading

Experience always influence attitude of traders. In the words of psychologist, attitude is formed through experience. So, experience in derivative market is an important variable in this study.

Table 4.3

Years of Experience in Derivative Market

Experience in Year	No. of respondents	Percent
Less than 1 year	69	19.2
1-3 year	93	25.8
3-5 year	67	18.6
Above 5 years	131	36.4
Total	360	100.0

Source: Survey data

The above table 4.3 shows that majority of respondents (36.4 percent) have more than 5-year experience in derivative market. 25.8 percent respondents have experience of one to three year. 19.2 percent respondents have experience of below one year. 18.6 percent respondents have experience of three to five year.

4.6 Region wise Comparison of Experience in Derivative Trading

In this session, the study compared experience of traders from derivative market with their region. The comparisons are showed in Table 4.4 below.

Table 4.4

Experience in Derivative Market – Region wise comparison

Region	Experience in Derivative Market				Total
	less than 1 year	1-3 years	3-5 years	Above 5 years	
South	30 (25%)	35 (29.2%)	21 (17.5%)	34 (28.3%)	120 (100%)
Central	22 (18.3%)	16 (13.3%)	15 (12.5%)	67 (55.9%)	120 (100%)
North	17 (14.2%)	42 (35%)	31 (25.8%)	30 (25%)	120 (100%)
Total	69	93	67	131	360
$\chi 2$= 40.153; **df = 6; P value = .000					

** Significant at 0.05 levels Source: Survey data

From the table 4.4, it is observed that from southern region 30 (25 percent) respondents out of 120 respondents have experience of less than one year, 35 (29.2 percent) respondents have one to three-year experience, 21 (17.5 percent) respondents have three to five-year experience and 34 (28.3 percent) respondents have above five-year experience. Regarding central region, out of 120 traders 67 (55.9 percent) traders have experience of more than five year, only 15 (12.5 percent) traders fall under the category of three to five-year experience, 16 (13.3 percent) traders come under the category of one to three year and 22 (18.3 percent) traders come under the category of less than one-year experience. In the case of northern region, 42 (35 percent) respondents have experience of one to three year, 31 (25.8 percent) traders have experience of three to five year, 30 (25 percent) traders have experience of more than five year and 17 (14.2 percent) respondents have only less than one-year experience.

Ho *=There is no association between Experience in Derivative market and Region of traders*

As per the test result, the p value is less than 0.05. So, the hypothesis is rejected, it means there is a relation between region and experience in derivative market. Well experienced traders are more in central region.

4.7. Experience in Derivative Market: A Comparison with Educational Qualification

The experiences of traders are compared with their educational qualifications. Educational qualification and experience are two important variables while analysing traders' attitude and behaviour.

Table 4.5

Educational Qualification and Experience in Derivative Market

Educational Qualification	Experience in Derivative Market				Total
	Less than 1 year	1-3 year	3-5 year	Above 5 years	
HSE & Below	11 (27.5%)	12 (30%)	11 (27.5%)	6 (15%)	40 (100%)
Degree	33 (17.6%)	42 (22.3%)	33 (17.6%)	80 (42.6%)	188 (100%)
PG	22 (22.2%)	33 (33.3%)	17 (17.2%)	27 (27.3%)	99 (100%)
Professional	3 (9.1%)	6 (18.2%)	6 (18.2%)	18 (54.5%)	33 (100%)
Total	69	93	67	131	360
$\chi 2 = 22.162$; **df = 6; P value = .008					

** Significant at 0.05 levels Source: Survey data

Table 4.5 shows the relation between educational qualifications and experience in Derivative market. Out of 360 traders, 40 respondents come under HSE and below category. Out of these 40 traders, 11 (27.5 percent) respondents have only less than one-year experience. Majority of respondents 12 (30 percent) come under one to three-year experience, 11 (27.5 percent) respondents have three to five-year experience and only 6 traders (15 percent) have above five-year experience. Out of

188 Degree holders 80 (42.6 percent) respondents come under the category of above 5-year experience, 33 (17.6 percent) respondents come under the category of three to five-year experience, 42 (22.3 percent) respondents come under the category of one to three-year experience and 33 (17.6 percent) respondents come under the category of less than one-year experience. Among 99 PG holders, 22 (22.2 percent) respondents have less than one-year experience, 33 (33.3 percent) respondents have one to three-year experience, 17 (17.2 percent) respondents have three to five-year experience and 27 (27.3 percent) respondents have more than five-year experience. Out of 33 professionals, 18 (54.5 percent) respondents have more than five-year experience, 6 (18.2 percent) respondents have three to five-year experience, 6 (18.2 percent) respondents have one to three-year experience and only 3 (9.1 percent) respondents have less than one-year experience.

Ho *=There is no association between Experience in Derivative Market and Educational qualification of trades*

As the result shows p value (.008)> 0.05, so the hypothesis is accepted. The study concludes that there is no relation between experience in Derivative market and educational qualification of trades.

4.8. Occupation Wise Comparison of Experience in Derivative Market

Nature of occupation determines traders' capacity to spend amount in future market and experience depends on the success in the market. So, this section deals with comparison of occupation and experience in derivative market.

Table 4.6

Occupation and Experience in Derivative Market

Occupation	Experience in Derivative Market				Total
	less than 1 year	1-3 years	3-5 years	Above 5 years	
Govt. employee	7 (10.1%)	9 (9.7%)	18 (26.9%)	16 (12.2%)	50 (13.9%)
Professional	6 (8.7%)	16 (17.2%)	7 (10.4%)	16 (12.2%)	45 (12.5%)
Private sector	42 (60.9%)	50 (53.8%)	30 (44.8%)	59 (45%)	181 (50.3%)
Business	14 (20.3%)	18 (19.4%)	12 (17.9%)	40 (30.5%)	84 (23.3%)
Total	69 (100%)	93 (100%)	67 (100%)	131 (100%)	360 (100%)
$\chi 2 = 20.495$ df = 9 P value =.015					

** Significant at 0.05 levels Source: Survey data

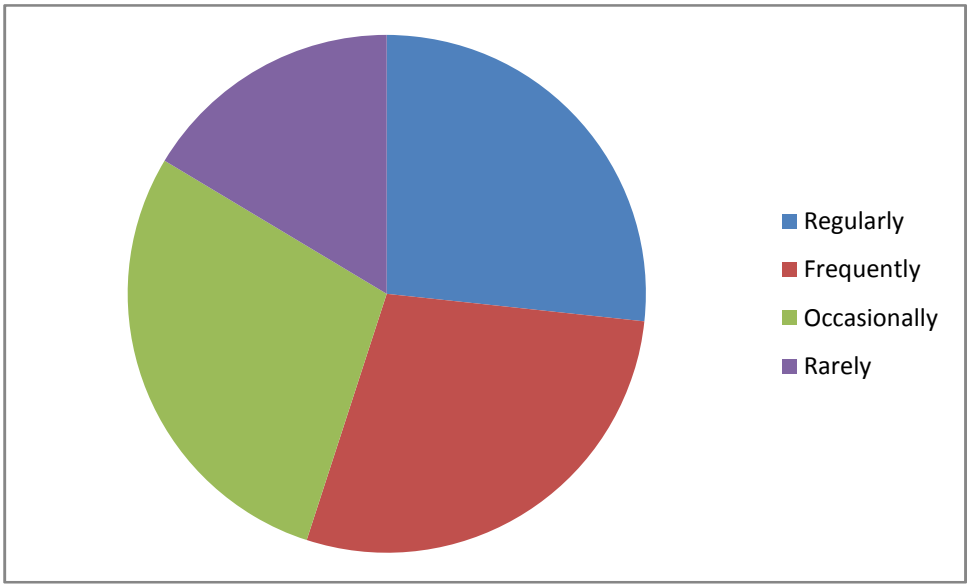
Table 4.6 shows the relationship between occupation and experience in derivative market. Out of 50 government employees, 18 traders have experience in between 3 to 5 years. 16 traders have above 5-year experience, 9 traders have experience of 1 to 3 years and 7 traders have only less than one-year experience. Among 45 professionals, 16 traders have more than 5-year experience, another 16 traders have experience of 1 to 3 year, 7 traders have 3 to 5-year experience and 6 traders have below one year experience. More number of traders (181) is from private sector. Among these 181 traders, 59 traders have above 5-year experience, 50 traders have 1 to 3-year experience, 42 traders come under less than one-year experience and 30 traders have 3 to 5-year experience. Out of 84 businessmen, 40 traders have above 5-year experience, 18 traders have 1 to 3-year experience, 14 traders have less than one-year experience and 12 traders have 3 to 5-year experience.

4.9. Frequency of Derivative Trading

Frequency of trading is a way to know traders interest in derivative trading. The study categorised frequency into four that are regularly, frequently, occasionally and rarely.

Figure 4.1

Frequency Per cent of Derivative Trading



Source: Survey data

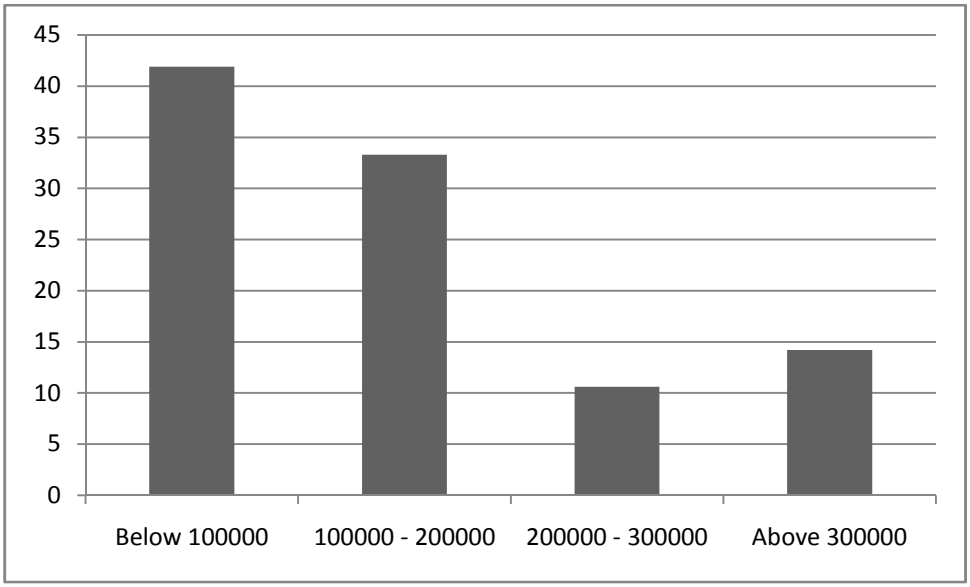
Figure 4.1 shows the trading frequency of derivative traders. 28.6 percent of respondents are trading occasionally, 28.3 percent of respondents are trading frequently, 16.4 percent of respondents are trading rarely, and regular traders are 26.7 percent

4.10. Amount Used for Buying Stock Futures

The researcher asked the traders about the present value in rupees of stock futures kept by them. Amount used for buying stock futures reveals traders' trust in futures. This is also closely related to traders' attitude.

Figure 4.2

Amount of Investment in Stock Futures



Source: Survey data

Figure 4.2 represents amount of investment in stock futures. The study divided it into four categories that are below ₹ 100,000, ₹ 100,000 – 200,000, ₹ 200,000 – 300,000 and above 300,000. Majority (41.9 %) of respondents use an amount below 100,000 for buying stock futures. 33.3 percent of respondent invest between ₹ 100,000 to 200,000. 14.2 percent of respondents are using more than ₹ 300,000. 10.6 percent of traders use the amount of ₹ 200,000 to 300,000.

4.11. Awareness on Derivatives

In this session the study evaluated whether derivative traders are aware of derivative products. Awareness is an important variable that depends on the attitude of traders. The study used two parts for measuring awareness, which are awareness about Derivatives and awareness about futures. Awareness about derivative instruments is shown in table below.

Table 4.7

Awareness on Derivative Instruments

Derivative Instruments	Mean	Std. Deviation
Awareness about Futures	4.1750	.85750
Awareness about Options	4.0694	.90073
Awareness about Swaps	2.2389	1.41958

Source: Survey data

Table 4.7 describes awareness about derivative products like Futures, Options and Swaps. Mean score of awareness towards futures is 4.1750, awareness towards options is 4.0694 and awareness towards swaps is 2.2389. Awareness about futures and options are very high, but in the case of SWAPS awareness is low.

4.11.1. Awareness: Comparison with Demographic Variable by Using One-Way ANOVA

In this section ANOVA is used to compare awareness with various demographic variables. Relation of demographic profile and awareness about derivatives are compared by using six demographic variables. The following hypotheses are settled for comparison.

***Ho**: There is no significant difference between awareness of traders towards Derivative products and Region of traders.*

***Ho**: There is no significant difference between awareness of traders towards Derivative products and Age of traders.*

***Ho**: There is no significant difference between awareness of traders towards Derivative products and Educational qualifications of traders.*

***Ho**: There is no significant difference between awareness of traders towards Derivative products and Monthly income of family.*

***Ho**: There is no significant difference between awareness of traders towards Derivative products and Occupation.*

***Ho**: There is no significant difference between awareness of traders towards Derivative products and Years of experience in derivative market.*

Table 4.8

Demographic profile and Awareness on Derivatives

Demographic variable		N	Mean	Std deviation	F	P value
Region	South	120	10.8500	2.69344	6.122	.002
	Central	120	10.7667	2.50288		
	North	120	9.8333	2.28379		
	Total	360	10.4833	2.53439		
Age	Up to 30 years	117	10.6581	2.67221	2.497	.043
	31 – 40 years	130	10.6692	2.10716		
	41 – 50 years	57	10.6316	3.00970		
	51 – 60 years	28	9.7857	2.14920		
	Above 60 years	28	9.2857	2.78697		
	Total	360	10.4833	2.53439		
Educational Qualification	Up to HSE	40	9.8750	2.32255	4.041	.008
	Up to Degree	188	10.3351	2.28444		
	PG	99	10.5758	2.64996		
	Professional	33	11.7879	3.33314		
	Total	360	10.4833	2.53439		
Monthly Income of Family	Up to 25000	137	10.5620	2.63701	.572	.683
	25001 – 50000	134	10.3134	2.33772		
	50001 – 75000	34	10.9118	2.51502		
	75001 – 100000	23	10.1304	2.59903		
	Above 100000	32	10.6563	2.90283		
	Total	360	10.4833	2.53439		
Occupation	Govt. employee	50	9.6200	2.09849	5.684	.001
	Professional	45	11.1111	2.90158		
	Private sector	181	10.8343	2.36998		
	Business	84	9.9048	2.69591		
	Total	360	10.4833	2.53439		
Years of Experience in Derivative Market	less than 1 year	69	9.5507	2.42861	7.891	.000
	1-2 years	93	10.0860	2.06764		
	3-5 years	67	10.5821	2.55337		
	Above 5 years	131	11.2061	2.68534		
	Total	360	10.4833	2.53439		

Source: Survey data

Table 4.8 shows the result of hypothesis testing. While comparing awareness of traders and region of traders, p value is less than 0.05. So the null hypothesis is rejected. It means awareness of respondents towards derivative products is different in three regions.

In the case of awareness and age, the test result shows that p value is less than 0.05. So the null hypothesis is rejected. It means awareness of respondents towards derivative products varies according to age group.

When awareness is compared to educational qualifications, the p value is greater than 0.05, so the null hypothesis is accepted. The study concluded that awareness of traders towards Derivative products and Educational qualifications of traders have no relation.

The p value (.683) in the case of monthly income of family is greater than 0.05. So the null hypothesis is accepted. It means there is no relation between awareness and monthly income.

In the case of occupation, the test result shows that p value (.001) is less than 0.05. So the null hypothesis is rejected. It points out that awareness of respondents towards derivative products is related to occupation of traders.

Years of experience are an important independent variable in this study. The p value (.000) is less than 0.05, so the hypothesis is rejected. It shows that there is a relation between awareness of traders towards Derivative products and Years of experience in derivative market.

4.13. Traders' Awareness on Futures

Focus of the study is banking sector futures. So, awareness of futures is important in traders' attitude and behaviour. In standardised stock market two equity related future instruments are available that are stock futures and index futures. Table 5.9 shows the mean score of awareness about futures.

Table 4.9

Awareness on Futures

Derivative instrument	Mean	Std. Deviation
Awareness about stock futures	4.2444	.82524
Awareness about index futures	4.2444	.82524

Source: Survey data

From the table 4.9, it is observed that mean score of awareness towards stock futures and awareness towards index futures is 4.2444. Traders are highly aware of stock futures and index futures.

4.14. Comparison of Awareness about Futures with Demographic Variables

This study compares demographic profile and traders' awareness about futures. Futures are most traded derivative instruments in NSE. Trading volume is high in stock futures segment as compared to index futures. While considering statistics of trading volume and others, futures are important instrument in the derivative market. In this section the researcher tries to analyse traders' awareness. For comparing awareness with six demographic variables, six hypotheses are formulated as follows.

***Ho**: There is no significant difference between Awareness of traders towards Futures and region of traders.*

***Ho**: There is no significant difference between Awareness of traders towards Futures and Age of traders.*

***Ho**: There is no significant difference between Awareness of traders towards Futures and Educational qualifications of traders.*

***Ho**: There is no significant difference between Awareness of traders towards Futures and Monthly income of family.*

***Ho**: There is no significant difference between Awareness of traders towards Futures and Occupation.*

***Ho**: There is no significant difference between Awareness of traders towards Futures and Years of experience in derivative market.*

Table 4.10

Demographic Profile and Awareness about Futures - One-way ANOVA

Sl No.	Demographic variable		N	Mean	Std deviation	F	P value
1	Region	South	120	8.2250	1.88074	2.648	.072
		Central	120	8.6917	1.62851		
		North	120	8.3333	1.38621		
		Total	360	8.4167	1.65179		
2	Age	Upto 30 years	117	8.3077	1.78336	2.863	.023
		31 – 40 years	130	8.7154	1.35392		
		41 – 50 years	57	8.4912	1.85282		
		51 – 60 years	28	8.0000	1.76383		
		Above 60 years	28	7.7500	1.57821		
		Total	360	8.4167	1.65179		
3	Educational Qualification	Upto HSE	40	8.5000	1.32045	.071	.976
		Upto Degree	188	8.3883	1.61652		
		PG	99	8.4141	1.68432		
		Professional	33	8.4848	2.12311		
		Total	360	8.4167	1.65179		
4	Monthly Income of Family	Up to ₹ 25000	137	8.3504	1.74302	2.723	.029
		₹ 25001 – 50000	134	8.7090	1.49095		
		₹ 50001 – 75000	34	8.2059	1.78851		
		₹75001 – 100000	23	7.6087	1.43777		
		Above ₹ 100000	32	8.2813	1.70832		
		Total	360	8.4167	1.65179		
5	Occupation	Govt. employee	50	8.0200	1.60979	1.807	.145
		Professional	45	8.5333	1.63207		
		Private sector	181	8.5691	1.54630		
		Business	84	8.2619	1.86999		
		Total	360	8.4167	1.65179		
6	Years of Experience in Derivative Market	less than 1 year	69	7.7971	1.99691	12.266	.000
		1-2 years	93	7.9892	1.37125		
		3-5 years	67	8.4627	1.48046		
		Above 5 years	131	9.0229	1.51640		
		Total	360	8.4167	1.65179		

** Significant at 0.05 levels Source: Survey data

While comparing region with awareness of futures, the p value is greater than 0.05, so the hypothesis is accepted. There is no regional difference in awareness. It means traders from three regions are highly aware about stock futures and index futures.

Age difference showed difference in awareness. The p value is less than 0.05, so the hypothesis rejected. The statistical test concludes that educational qualification is not depended on awareness. The p value is greater than 0.05, so the hypothesis accepted.

When awareness is compared with monthly income, test result showed that the p value is less than 0.05, so the hypothesis rejected. It means that awareness of traders towards Futures and Monthly income of family are related.

The p value of comparison of occupation with awareness about future is .145 greater than .05. So, the null hypothesis is accepted. It means occupation and awareness about futures are not related.

Awareness and years of experience is closely related. The p value is less than 0.05, so the null hypothesis is rejected.

4.15. Attitude of Traders

Attitude is the way a person tends to view something. Here attitude is checked through two stages that are investor attitude towards derivatives and investor attitude towards banking futures. For checking attitude of traders, related things of derivatives and banking futures were included and they were asked to mark their agreement or disagreement. The variables are selected with the help of various literatures and experts' opinion. Five-point scales are used. 3 is the middle value which denotes they have no opinion. 5 and 4 denotes strongly agree and agree respectively. Disagree and strongly disagree is denoted by the value of 2 and 1.

14.16. Attitude towards Derivatives

In this session, the researcher tried to check out the traders' attitude towards derivative instruments. Overall attitude of traders are analysed by using one sample t- test. The result is shown in the table below.

Table 4.11

Investor Attitude towards Derivatives - One-Sample t Test

	Mean	Std. Deviation	t	P value	Test value
Attitude towards derivative	79.1139	12.85015	19.363	.000	66

** Significant at 0.05 levels Source: Survey data

Following hypothesis is formulated for checking overall attitude of traders towards derivatives.

Ho: There is no significant difference between test value and mean score of investor attitude towards derivatives.

Test result shows that investors' attitude is high. The p value (.000) is less than .05, so the test is significant. Mean value (79.1139) is more than the test value, so investors have positive attitude towards derivatives.

4.17. Comparison of Traders' Attitude towards Derivatives with Demographic Variables

Previous literatures reported that attitude of a person influences various factors like region, educational qualification, age, gender, income, experience etc. On the basis of responses of traders, this study presents the result of comparison of traders' attitude towards derivatives and demographic profile in table 4.12.For comparing seven demographic variables with traders' attitude towards derivatives, one-way ANOVA is used. Following hypotheses are formulated for comparison.

***Ho**: There is no significant difference between Region of traders and Attitude of traders towards derivatives.*

***Ho**: There is no significant difference between Age of traders and Attitude towards derivatives*

***Ho**: There is no significant difference between Educational qualification and Attitude of traders towards derivatives*

***Ho**: There is no significant difference between Occupation and Attitude of traders towards derivatives*

***Ho**: There is no significant difference between Monthly income of traders and Attitude of traders towards derivatives*

***Ho**: There is no significant difference between Years of experience in derivative market and Attitude of traders towards derivatives*

Table 4.12

One Way ANOVA - Demographic Profile and Traders' Attitude towards Derivatives

Demographic variable		N	Mean	Std deviation	F	P value
Region	South	120	78.3750	11.93896	.365	.694
	Central	120	79.7917	11.89018		
	North	120	79.1750	14.60210		
	Total	360	79.1139	12.85015		
Age	Upto 30 years	117	80.1368	12.80619	.486	.746
	31 – 40 years	130	78.6692	11.29203		
	41 – 50 years	57	79.6667	14.74707		
	51 – 60 years	28	77.2857	15.79699		
	Above 60 years	28	77.6071	13.00809		
	Total	360	79.1139	12.85015		
Educational Qualification	Upto HSE	40	86.2500	11.72276	6.943	.000
	Upto Degree	188	77.2926	12.66071		
	PG	99	78.3232	11.83632		
	Professional	33	83.2121	14.72616		
	Total	360	79.1139	14.72616		
Monthly Income of Family	Upto 25000	137	79.7883	13.17162	2.435	.047
	25001 – 50000	134	80.7687	11.50673		
	50001 – 75000	34	74.8235	12.90166		
	75001 - 100000	23	75.4783	9.07479		
	Above 100000	32	76.4688	17.21587		
	Total	360	79.1139	12.85015		

Demographic variable		N	Mean	Std deviation	F	P value
Occupation	Govt. employee	50	78.0000	12.50469	.264	.933
	Professional	45	78.1111	16.20216		
	Private sector	181	79.6022	11.41329		
	Business	84	79.2619	14.08590		
	Total	360	79.1139	12.85015		
Years of Experience in Derivative Market	less than 1 year	69	77.9275	13.29785	3.684	.012
	1-2 years	93	76.5269	13.52983		
	3-5 years	67	78.4328	12.54715		
	Above 5 years	131	81.9237	11.84491		
	Total	360	79.1139	12.85015		

** Significant at 0.05 levels Source: Survey data

While comparing region with traders' attitude towards derivatives, the p value is greater than 0.05, so the hypothesis accepted. It is concluded that there is no regional difference in investor's attitude towards derivatives.

In the case of age, the p value is greater than 0.05, so the hypothesis accepted. It means age of traders is not an influential factor of attitude towards derivatives

Educational qualification always influences attitude of persons. Here the study compared the educational qualifications of traders' and their attitude towards derivatives. The test result shows that the p value is less than 0.05, so the hypothesis rejected. Education level of traders always influences their attitude.

Result of comparison of traders' occupation and their attitude towards derivatives showed that the p value is greater than 0.05, so the hypothesis accepted. The statistical test concludes that the occupation of traders is not influencing their attitude towards derivatives.

In the case of comparing monthly income of traders and attitude towards derivatives, the p value is less than 0.05, so the hypothesis rejected. Monthly income also showed a relation to traders' attitude.

Experience is an important factor in creating attitude of an individual. Analysis of traders' years of experience in derivative market and their attitude towards derivatives reports that the p value is less than 0.05, so the hypothesis is rejected. Years of experience in derivative market influences traders' attitude.

4.18. Preference of Traders towards Different Sectors in NSE

Main focused area of the study is stock futures of banks. So, to know investors preference towards various sectors are very important. The researcher asked traders to rank different sectors according to their preference.

Table 4.13

Traders' Preference towards Different Sectors

Different Sectors	Mean	Std, Deviation	Rank
Banking	10.6472	2.51026	1
Pharma	8.3000	2.77253	2
IT	7.9472	3.05475	3
Auto2,3, &4	7.1972	2.93713	4
Finance, Finance housing& Financial institutions	7.0083	3.06157	5
Gas, Metal & Oil	6.2500	2.99837	6
Construction & Diversified	5.6333	3.18580	7
Refineries, Steel, Aluminium & Textiles	5.6056	3.51835	8
Telecom	5.3028	3.19209	9
Electrical & Engineering	5.0722	2.58673	10
Power &Mining	4.6389	2.96265	11
Cement & Cigarettes	4.3972	2.92439	12

Source: Survey data

The study converted all sectors in NSE into 12 sectors for checking traders' preference towards banking sector. According to mean score, researcher allotted rank from one to twelve. Most of the traders gave first preference to Banking sector. Second and third preference is Pharma and IT respectively.

4.19. Investment in Futures of Banks

Researcher asked two questions related to their investment in futures related to percentage of investment and amount of investment in futures of banks. It is presented in table 4.14 and fig. 4.3.

Table 4.14

Percentage of Investment in Futures of Banks

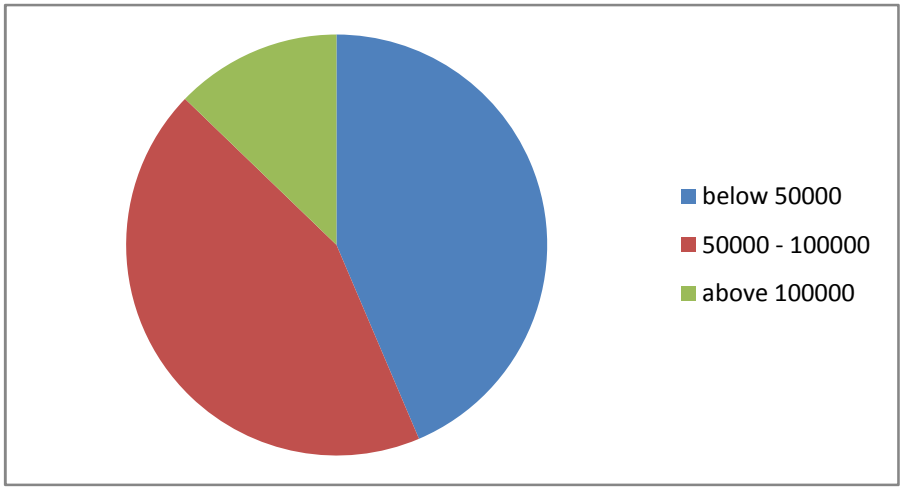
Percent of Investment in Futures of Banks	No. of respondents	Percent
below 5 %	92	25.6
5 - 10 %	97	26.9
10 -15 %	70	19.4
15 - 20 %	33	9.2
Above 20 %	68	18.9
Total	360	100.0

Source: Survey data

Out of 360 respondents, 97 traders invest 10 to 15 percent, 92 traders invest below 5 percent, 70 traders invest 10 to 15 percent, 68 traders invest above 20 percent and 33 traders invest 15 to 20 percent of their investment for trading in futures of banks. Details of amount used for investing in futures are shown in figure below.

Figure 4.3

Amount of Investment in Futures of Banks



Source: Survey data

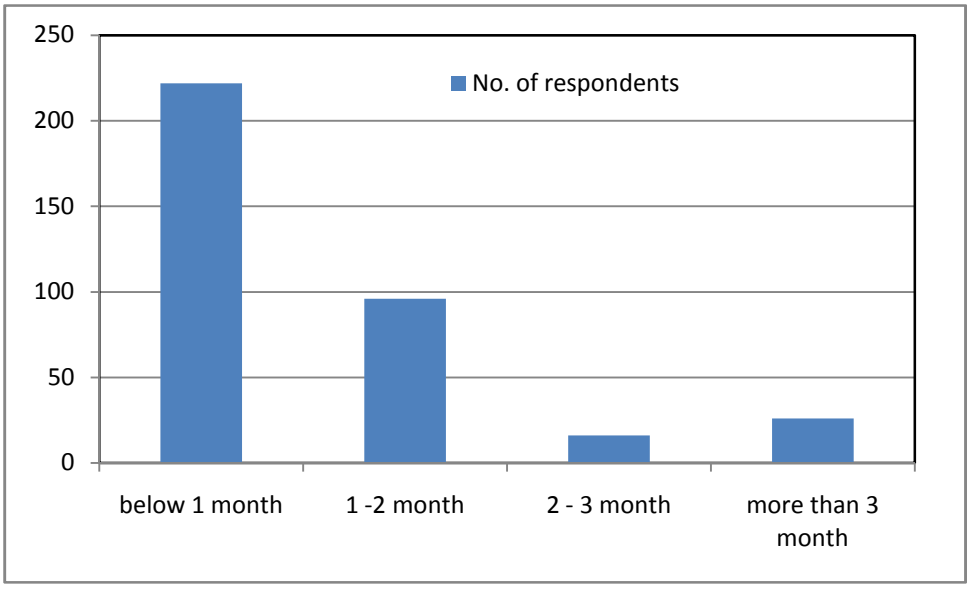
The researcher asked about traders' amount of investment in futures of banks. 43.6 percent of traders use an amount less than ₹ 50,000 and another 43.6 percent uses amount in between ₹ 50,000 and 100,000. Only 12.8 percent uses amount more than ₹ 100,000.

4.20. Duration of Holding Bank Futures

Duration of holding bank futures categorised into below one month, 1-2-month, and 2-3 month and more than 3 months. Traders' responses are presented in the chart below.

Figure 4.4

Duration of Holding of Banking Futures



Source: Survey data

Fig. 4.4 depicts information related to duration of holding banking futures. 61.7 percent of traders hold futures for less than one month. 26.7 percent of respondents hold bank futures for one to two months. 7.2 percent of traders are holding it for more than 3 month and 4.4 percent of traders hold for two to three months.

4.21. Purpose of Using Bank Futures

Available literature categorised the purpose of futures into three that are speculation, hedging and arbitrage. So this study made attempt to know most preferred purpose

of futures. Traders' responses are shown in the tables below. Following hypotheses are formulated for comparing purpose of using bank futures with region and years of experience in derivative market.

Ho: There is no association between the Purpose of using bank futures and Region.

Ho: There is no association between the Purpose of using bank futures and Years of experience in derivative market.

Table 4.15

Purpose of Using Bank Futures

Purpose	No. of respondents	Percent
speculation	231	64.2
hedging	107	29.7
arbitrage	22	6.1
Total	360	100.0

Source: Survey data

Most of the respondents (64.2 percent) are using futures for speculation. 29.7 percent of traders use it for hedging and very less people (6.1 percent) are using it for arbitrage.

Table 4.16

Region and Purpose of Using Bank Futures - Cross tabulation

Region	Purpose of using Bank Futures			Total
	Speculation	Hedging	Arbitrage	
South	78 (65 percent)	37 (30.8 percent)	5 (4.2 percent)	120 (100 percent)
Central	80 (66.7 percent)	34 (28.3 percent)	6 (5.0 percent)	120 (100 percent)
North	73 (60.8 percent)	36 (30 percent)	11 (9.2 percent)	120 (100 percent)
Total	231 (64.2 percent)	107 (29.7 percent)	22 (6.1 percent)	360 (100 percent)
$\chi 2$= 3.287; **df = 4; P value = .511				

** Significant at 0.05 levels Source: Survey data

Table 4.16 shows the relation between region and purpose of using bank futures. In the south region 78 (65 percent) traders used it for speculation, 37 (30.8 percent) traders used for hedging and only 5 (4.2 percent) traders used it for arbitrage. In the central region 80 (66.7 percent) traders are using it for speculation, 34 (28.3 percent) traders are use it for hedging and only 6 (5 percent) traders are using for arbitrage. In the north region, 73 (60.8 percent) traders use futures of banks for speculation, 36 (30 percent) traders use it for hedging and 11(9.2 percent) traders are using it for arbitrage.

Ho *=There is no association between the Purpose of using bank futures and Region*

To test whether there exist any significant difference between region and purpose of using bank futures, Pearson chi-square test was conducted. The result shows that p value .511>0.05 and thus the hypothesis were accepted. Hence it is concluded that there is no association between the region and purpose of using bank futures.

Table 4.17

Experience in Derivative Market and Purpose of Using Bank Futures

Experience in Derivative market	**Purpose of using Bank Futures**			**Total**
	Speculation	**Hedging**	**Arbitrage**	
less than 1 year	43 (62.3 percent)	24 (34.8 percent)	2 (2.9 percent)	69 (100 percent)
1-3 years	58 (62.4 percent)	33 (35.5 percent)	2 (2.2 percent)	93 (100 percent)
3-5 years	50 (74.6 percent)	11 (16.4 percent)	6 (9 percent)	67 (100 percent)
Above 5 years	80 (61.1 percent)	39 (29.8 percent)	12 (9.2 percent)	131 (100 percent)
Total	231 (64.2 percent)	107 (29.7 percent)	22 (6.1 percent)	360 (100 percent)
$\chi 2$= 13.478; **df = 6; P value = .036				

** Significant at 0.05 levels Source: Survey data

From Table 4.17, out of 69 traders who have the experience of less than one year, 62.3 per cent are using bank futures for speculation, 34.8 per cent of the traders are using bank futures for hedging, and 2.9 per cent are using bank futures for arbitrage. In the case of 93 traders, who have the experience of one to three years, about 62.4 per cent are using bank futures for speculation, 35.5 per cent are using bank futures for hedging and 2.2 per cent are using bank futures for arbitrage. Out of 67 traders who have the experience of 3 - 5 year, 74.6 per cent are using bank futures for speculation, 16.4 per cent of the traders are using bank futures for hedging, and 9 per cent are using bank futures for arbitrage. In case of 131 traders, who have the experience of above 5 years, about 61.1 per cent are using bank futures for speculation, 29.8 per cent are using bank futures for hedging and 9.2 per cent are using bank futures for arbitrage.

Ho *=There is no association between the Purpose of using bank futures and Experience in derivative market.*

The result shows that p value is .036<0.05 and the hypothesis rejected. Hence the study concludes that there is an association between the purpose of using bank futures and experience in derivative market.

4.22. Attitude towards Banking Futures

Among various sectors, the study focuses futures of banks only. Banks are related to every person's life. So traders in futures are very familiar with names of banks and it inspires traders to select bank futures for trading. So this session is analysing traders' attitude towards bank futures. For comparing attitude of traders with various demographic variables, following hypotheses are formulated.

Ho: There is no significant difference between Region of traders and Traders' attitude towards banking futures.

Ho: There is no significant difference between Age of traders and Traders' attitude towards banking futures.

Ho: There is no significant difference between Educational qualification of traders and Traders' attitude towards banking futures.

Ho: There is no significant difference between Monthly income of traders and Traders' attitude towards banking futures.

Ho: There is no significant difference between Occupation of traders and Traders' attitude towards banking futures.

Ho: There is no significant difference between Years of experience in derivative market and Traders' attitude towards banking futures.

Table 4.18

Attitude towards Banking Futures - One-Sample t Test

	Mean	**Std. Deviation**	**t**	**P value**	**Test value**
Attitude towards banking	61.9250	8.44925	24.533	.000	51

** Significant at 0.05 levels Source: Survey data

Generally, investor's attitude is high. Mean value (61.9250) is more than the test value (51), so traders have positive attitude towards banking futures.

Table 4.19

One Way Anova- Demographic Profile and Traders' Attitude towards Banking Futures

Demographic variable		**N**	**Mean**	**Std deviation**	**F**	**P value**
Region	South	120	60.9917	7.77033	5.633	.004
	Central	120	64.0083	8.60574		
	North	120	60.7750	8.62229		
	Total	360	61.9250	8.44925		
Age	Upto 30 years	117	63.7863	8.34062	3.591	.007
	31 – 40 years	130	61.4769	7.89585		
	41 – 50 years	57	62.2105	8.76017		
	51 – 60 years	28	59.1786	10.43162		
	Above 60 years	28	58.3929	6.89788		
	Total	360	61.9250	8.44925		

Demographic variable		N	Mean	Std deviation	F	P value
Educational Qualification	Upto HSE	40	64.7000	9.01907	2.479	.061
	Upto Degree	188	61.4521	8.63972		
	PG	99	61.1010	6.83702		
	Professional	33	63.7273	10.29646		
	Total	360	61.9250	8.44925		
Monthly Income of Family	Upto 25000	137	63.6934	7.82489	3.962	.004
	25001 – 50000	134	61.6642	8.42655		
	50001 – 75000	34	61.3235	7.99515		
	75001 – 100000	23	59.0435	8.53058		
	Above 100000	32	58.1563	9.92263		
	Total	360	61.9250	8.44925		
Occupation	Govt. employee	50	60.2400	9.01826	1.265	.286
	Professional	45	61.3556	9.78207		
	Private sector	181	62.6851	7.86449		
	Business	84	61.5952	8.52370		
	Total	360	61.9250	8.44925		
Years of Experience in Derivative Market	less than 1 year	69	62.7101	8.05879	5.510	.001
	1-2 years	93	60.8925	8.53950		
	3-5 years	67	59.0149	8.19736		
	Above 5 years	131	63.7328	8.28885		
	Total	360	61.9250	8.44925		

** Significant at 0.05 levels Source: Survey data

For comparing traders' attitude with various variables, the study selected six variables and set six hypotheses. Results of hypothesis testing are described below.

While comparing region with attitude towards banks' futures, the computed p value .004 is less than 0.05. So the hypothesis is rejected. It is concluded that there is regional difference in traders' attitude towards banking futures.

In the case of age of traders, the p value (.007) is less than 0.05, so the hypothesis is rejected. It means age of traders is an influential factor of attitude towards banking futures.

The p value in the comparison of educational qualification with attitude is.061 which is greater than 0.05, so the hypothesis accepted. Educational qualification does not influence attitude of traders towards banking futures.

Monthly income also influences attitude of traders. The p value .004 is less than 0.05, so the hypothesis is rejected.

The statistical test concludes that occupation of traders does not depend on attitude towards derivatives. The p value .286 is greater than 0.05, so the hypothesis is accepted.

Years of experiences have most influential role in attitude of traders. The p value .001 is less than 0.05, so the hypothesis is rejected.

4.23. Reason for Selecting Banking Futures

Goals of trading with bank futures are varying among different traders. The study listed five variables to know the most preferred reason for selecting futures of banks. Following table presented the result.

Table 4.20

Reason for Selecting Banking Futures

Reason	Mean	Std, Deviation	Rank
Hedging	2.8472	1.38696	2
Speculation	2.1111	1.35132	1
High rate of return	2.9667	1.26623	3
Investment Leverage	3.5083	1.17302	4
Risk diversification	3.5694	1.37857	5

Source: Survey data

From the table 4.20, it is observed that main reason for selecting bank futures is speculation. Traders marked second rank for hedging, third rank for high rate of return, forth rank for investment leverage and fifth rank for risk diversification. Traders give least preference to risk diversification.

Table 4.21

Region and Reason of Selecting Banking Futures

Reason of selecting Banking Futures	Region					
	South		Central		North	
	Mean	Rank	Mean	Rank	Mean	Rank
Hedging	3.3583	2	3.1667	2	2.9333	3
Speculation	3.6083	1	3.9583	1	4.1000	1
High Rate of Return	3.1167	3	2.9500	3	3.0333	2
Investment Leverage	2.6000	4	2.4417	5	2.4333	5
Risk Diversification	2.3083	5	2.4833	4	2.5000	4

Source: Survey data

From the table 4.21, it is observed that region wise traders' preferences of various reason for selecting bank futures. In the south region, most of the traders give first rank for speculation and second for hedging. Traders from central region give first preference for speculation and second for hedging. In the north region, traders give first rank to speculation, second rank to high rate of return and third rank to hedging. While comparing rank of reason for selecting bank futures with region, traders from three regions give first preference for speculation. But the traders from north region give second preference to high rate of return. Third preference of traders from south and central is same, third preference of traders from north region is speculation. Fourth and fifth rank given by traders from central and north are same. So, we can conclude that preference of reason for selecting bank futures is different in different region.

Table 4.22

Experience in Derivative Market and Reason of Selecting Banking Futures

Reason of Selecting Banking Futures	Experience in Derivative Market							
	Less than 1 year		1-3 years		3-5 years		Above 5 years	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Hedging	3.3768	2	3.3441	2	2.4030	4	3.2824	2
Speculation	3.7246	1	3.5914	1	4.1940	1	4.0305	1
High Rate of Return	2.8261	3	2.8925	3	3.6418	2	2.9313	3
Investment Leverage	2.6232	4	2.5591	5	2.5522	3	2.3435	5
Risk Diversification	2.4348	5	2.6129	4	2.2090	5	2.4122	4

Source: Survey data

Above table compares reason for selecting bank futures with experience of traders in derivative market. Traders from all category of experience are given first preference for speculation. Except three to five years' experience category of traders, others give second rank for hedging and third rank for high rate of return. Three to five years' experience category of traders marked second and third rank for high rate of return and investment leverage.

4.24. Traders' Reactions to Various Information

Here, traders' reaction means their decision of buying or selling while getting information related to capital market. This section analysed various sources of information, preference of various information, usage of technical and fundamental analysis for taking decision, role of intermediaries in providing information and traders' decisions related to various information.

Table 4.23

Sources of Information

Source	Mean	Std, Deviation	Rank
Seminar / Workshop	3.7889	1.28410	1
Friends/ Relatives	3.5722	1.28644	2
Press/ Media	2.7083	1.50058	3
Stock broker	2.6556	1.17458	4
Expert opinion	2.2528	1.17542	5

Source: Survey data

While asking traders to give rank for various sources of information, most of the traders give first rank for seminar/ workshop, second rank for friends / relatives, third rank for press/ media, fourth rank for stock broker and fifth rank for expert opinion.

Table 4.24

Region and Sources of Information

Sources of Information	Region					
	South		Central		North	
	Mean	Rank	Mean	Rank	Mean	Rank
Press	3.4333	2	3.0750	3	3.3667	2
Friends	2.4417	4	2.1583	5	2.6833	4
Expert opinion	3.6833	1	3.9750	1	3.5833	1
Stock brokers	3.3083	3	3.5083	2	3.2167	3
Seminar	2.1500	5	2.3333	4	2.1500	5

Source: Survey data

Table 4.24 shows region wise traders ranking of sources of information. Traders from three regions give first rank to expert opinion. Traders from south and north give second rank to press, but traders from central give second rank to stock brokers and they give third rank to press. South and north traders give third rank to stock

brokers, fourth rank to friends and fifth rank to seminar. Traders from central region give fourth rank to seminar and fifth rank to friends.

Table 4.25

Experience in Derivative Market and Sources of Information

Sources of Information	Experience in Derivative Market							
	Less than 1 year		1-3 years		3-5 years		Above 5 years	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Press	3.4638	2	3.1183	3	2.9552	3	3.4962	2
Friends	2.4493	4	2.6667	4	2.7313	4	2.0916	5
Experts opinion	3.6812	1	3.4516	2	3.9254	1	3.9008	1
Stock brokers	3.1594	3	3.5161	1	3.2985	2	3.3435	3
Seminar	2.2754	5	2.2473	5	2.0896	5	2.2137	4

Source: Survey data

Above table compares sources of information with experience of traders in derivative market. Except one to three years' experience category of traders, others give first rank for expert opinion. 1-3 years category of experienced traders gives first rank to stock brokers and second rank to expert opinion. Less than one year and above five years category of traders give second and third rank to press and stock brokers respectively. Three to five years category of people gives second rank to stock brokers and third rank to press. Third rank given to press by 1-3 years and 3-5 years category of traders. Except above 5 years category of traders, remaining three category gives forth rank to press and fifth rank to seminar. Above five years category of traders give fourth rank to seminar and fifth rank to friends.

4.25. Usage of Technical Analysis and Fundamental Analysis

Technical analysis and fundamental analysis are two important tools for analysing equities and taking important decisions. This section tries to analyse traders' opinion

about usage of this analysis. Usage is categorised into five that is very high, high, no use, very low and low.

Table 4.26

Technical Analysis

Usage	Frequency	Percent
Very high	136	37.8
High	165	45.8
No use	15	4.2
Very low	24	6.7
Low	20	5.6
Total	360	100.0

Source: Survey data

Table 4.26 checks frequency of usage of technical analysis. From this table we can understand that most of the traders (45.8 percent) rated the usage of technical analysis is high and 37.8 percent of traders rated as very high.

Table 4.27

Fundamental Analysis

Usage	Frequency	Percent
Very high	106	29.4
High	197	54.7
No use	33	9.2
Very low	14	3.9
Low	10	2.8
Total	360	100.0

Source: Survey data

Table 4.27 observed that usage of fundamental analysis. 54.7 per cent of respondents rated usage of fundamental analysis as high and 29.4 per cent rated as very high.

Table 4.28

Usage of Technical Analysis – Region wise comparison

Region	Use of Technical analysis					Total
	very high	high	no use	very low	low	
South	50 (41.7%)	67 (55.8%)	1 (0.8%)	1 (0.8%)	1 (0.8%)	120 (100.0%)
Central	53 (44.2%)	33 (27.5%)	6 (5.0%)	13 (10.8%)	15 (12.5%)	120 (100.0%)
North	33 (27.5%)	65 (54.2%)	8 (6.7%)	10 (8.3%)	4 (3.3%)	120 (100.0%)
Total	136 (37.8%)	165 (45.8%)	15 (4.2%)	24 (6.7%)	20 (5.6%)	360 (100.0%)
$\chi 2$= 49.619; **df = 8; P value = .000						

** Significant at 0.05 levels Source: Survey data

Table 4.28 compares usage of technical analysis with region. More than half of the traders from south (55.8 percent) and north (54.2 percent) are rated as high about usage of technical analysis. Traders from the central, 44.2 percent of respondents rated use of technical analysis as very high and 27.5 percent of respondents rated as high. 41.7 percent of traders from south and 27.5 percent of traders from north rated use of technical analysis as high.

For testing association between region and use of technical analysis, the researcher fixed following hypothesis.

Ho: There is no association between Region and use of Technical analysis.

As the result shows p value (.000) < 0.05, so the hypothesis is rejected. The study is concluded that there is an association between region and use of technical analysis.

Table 4.29

Usage of Fundamental Analysis – Region wise comparison

Region	Use of Fundamental analysis					Total
	very high	high	no use	very low	low	
South	44 (36.7%)	64 (53.3%)	6 (5.0%)	4 (3.3%)	2 (1.7%)	120 (100.0%)
Central	47 (39.2%)	57 (47.5%)	6 (5.0%)	4 (3.3%)	6 (5.0%)	120 (100.0%)
North	15 (12.5%)	76 (63.3%)	21 (17.5%)	6 (5.0%)	2 (1.7%)	120 (100.0%)
Total	106 (29.4%)	197 (54.7%)	33 (9.2%)	14 (3.9%)	10 (2.8%)	360 (100.0%)
$\chi 2$= 37.899; **df = 8; P value = .000						

** Significant at 0.05 levels Source: Survey data

Table 4.29 shows usage of fundamental analysis among traders in different region. As considered south region, 53.3 percent of trader's usage of fundamental analysis is high and 36.7 percent of traders use it as in very high manner. 47.5 percent of trader's usage is high, and 39.2 percent of trader's usage is very high in central region. 63.3 percent of traders use it as high manner and 17.5 percent of traders not used in north region. Following hypothesis is helped to test association between regions and use of fundamental analysis.

Ho: There is no association between Region and use of Fundamental analysis

The p value (.000) is < .05, so the null hypothesis is rejected. From this test we can say there is an association between region and use of fundamental analysis.

Table 4.30

Experience in Derivative Market and Use of Technical Analysis

Experience in Derivative Market	Use of Technical analysis					Total
	very high	high	no use	very low	low	
Less than 1 year	23 (33.3%)	40 (58.0%)	5 (7.2%)	0 (0.0%)	1 (1.4%)	69 (100.0%)
1-3 years	36 (38.7%)	47 (50.5%)	2 (2.2%)	2 (2.2%)	6 (6.5%)	93 (100.0%)
3-5 years	20 (29.9%)	26 (38.8%)	5 (7.5%)	15 (22.4%)	1 (1.5%)	67 (100.0%)
Above 5 years	57 (43.5%)	52 (39.7%)	3 (2.3%)	7 (5.3%)	12 (9.2%)	131 (100.0%)
Total	136 (37.8%)	165 (45.8%)	15 (4.2%)	24 (6.7%)	20 (5.6%)	360 (100.0%)
$\chi 2$= 52.347; **df = 12; P value = .000						

** Significant at 0.05 levels Source: Survey data

Table 4.30 compares usage of technical analysis with experience. Usage of 58 percent of traders is high and 33.3 percent of traders are very high among traders those who have experience of less than one year. Usages of 50.5 percent of traders are high and 38.7 percent of traders' usage is very high by traders with experience of one to three-year experience. Traders with experience in between three to five years, usage is high among 38.8 percent and very high among 29.9 percent of traders. Usage of traders those who have experiences of above 5 years are very high among 43.5 percent and high among 39.7 percent.

Ho: There is no association between experience of traders and use of technical analysis.

The p value (.000) is < .05, so the null hypothesis is rejected. From this test we can say there is an association between experience and use of technical analysis.

Table 4.31

Experience in Derivative Market and Use of Fundamental Analysis

Experience in Derivative Market	Use of Fundamental analysis					Total
	very high	high	no use	very low	low	
Less than 1 year	18 (26.1%)	34 (49.3%)	13 (18.8%)	4 (5.8%)	0 0.0%	69 100.0%
1-3 years	28 (30.1%)	52 (55.9%)	10 (10.8%)	0 (0.0%)	3 3.2%	93 100.0%
3-5 years	11 (16.4%)	39 (58.2%)	6 (9.0%)	9 (13.4%)	2 3.0%	67 100.0%
Above 5 years	49 (37.4%)	72 (55.0%)	4 (3.1%)	1 (0.8%)	5 3.8%	131 100.0%
Total	106 (29.4%)	197 (54.7%)	33 (9.2%)	14 (3.9%)	10 2.8%	360 100.0%
$\chi 2$= 45.900; **df = 12; P value = .000						

** Significant at 0.05 levels Source: Survey data

From the table 4.31, it is observed that majority of traders (54.7 percent) from all categories of experience rated as high. Second majority (29.4 percent) from all categories of traders rated usage of fundamental analysis as very high. From this table, we can conclude that usage of fundamental analysis is high among most of the traders.

Ho: There is no association between experience of traders and use of Fundamental analysis.

The p value (.000) is < .05, so the null hypothesis is rejected. From this test we can say there is an association between experience and use of fundamental analysis.

4.26. Information Related to Stock Market and Traders' Preference

Here, the study listed various information that are affecting the movement of stock market and has analysed the preference given by traders in their trading decision.

Table 4.32

Traders' Preference of Various Information

Sl. No.	Information	Mean	Std. Deviation	Rank
1	Financial Result	11.3389	2.53590	1
2	RBI Announcement	10.6167	2.58078	2
3	Economic News	9.1694	2.66446	3
4	Political News	7.6083	2.83815	4
5	Mergers and Acquisition	7.5889	2.98518	5
6	Dividend Announcement	7.1583	3.27988	6
7	Right Issue and Bonus Issue	7.0583	2.97425	7
8	Expert Opinion	6.6611	3.14490	8
9	Past Performance of Market	6.2694	3.01476	9
10	Stock Brokers Tips and Opinion	5.2806	3.63313	10
11	Insider Information	5.0000	3.04378	11
12	Advertisement	3.6278	2.86955	12
13	Intuition	3.6222	2.85227	13

Source: Survey data

Table 4.32 gives an overview about traders' preferences of various information in the stock market. Traders give first preference to financial result, second to RBI announcement, third to economic news, forth to political news and fifth to mergers and acquisition. Six to ten ranks are given by traders to dividend announcement, right issue and bonus issue, expert opinion, past performance of market and stock brokers' tips and opinion respectively. From 11 to 13 ranks given to insider information, advertisement and intuition respectively.

4.27. Traders' Reactions to Different Futures Market Information

Here, traders' reaction means traders buying or selling decision according various information related to market. Their trading decisions are categorised into four that are immediately react, do not react, wait for sometimes before reacting and react after careful study.

Table 4.33

Traders' Reactions to Various Information

Information	Reaction to information			
	Immediately react	**Do not react**	**Wait for sometimes before reacting**	**React after careful study**
Financial Result	6 (1.7%)	42 (11.7%)	78 (21.7%)	234 (65%)
Dividend Announcement	84 (23.3%)	93 (25.8%)	66 (18.3%)	117 (32.5%)
Right Issue and Bonus Issue	58 (16.1%)	106 (29.4%)	84 (23.3%)	112 (31.1%)
Mergers and Acquisition	51 (14.2%)	77 (21.4%)	104 (28.9%)	128 (35.6%)
RBI Announcement	13 (3.6%)	58 (16.1%)	54 (15%)	235 (65.3%0
Political News	62(17.2%)	73 (20.3%)	63 (17.5%)	162 (45%)
Economic News	42 (17.5%)	70 (19.4%)	66 (18.3%)	182 (50.6%)
Insider Information	63 (17.5%)	131 (36.4%)	107 (29.7%)	59 (16.4%)
Expert Opinion	115 (31.9%)	73 (20.3%)	118 (32.8%)	54 (15 %)
Past Performance of Market	58 (16.1%)	107 (29.7%)	128 (35.6%)	67 (18.6%)
Intuition	131 (36.4%)	70 (19.4%)	101 (28.1%)	58 (16.1%)
Advertisement	156 (43.3%)	58 (16.1%)	121 (33.6%)	25 (6.9%)
Stock Brokers Tips and Opinion	64 (17.8%)	64 (17.8%)	109 (30.3%)	123 (34.2%)

Source: Survey data

Table 4.33 depicts frequency of reactions of traders to various information related to stock market. 65 per cent of traders react after careful study in the case of financial

result. While corporate announces its dividend, right and bonus issue and mergers and acquisition, majority of respondents react after careful study. Majority of traders also react after careful study in the case of RBI announcement, political news and economic news. Majority of traders do not react to insider information. Traders wait for sometimes in the case of expert opinion and past performance of market. Majority take immediate decision according to their intuition and advertisement. While getting stock brokers tips and opinion to traders, majority of them take decision after careful study.

4.28. Traders' Reactions: A Comparison with Region and Different Market Information

This session is comparing region with traders' reaction to various information. For comparing these some hypotheses are fixed. The following Hypotheses are settled for checking regional differences in traders' reactions.

Ho: There is no significant difference between Region of traders and Traders' reaction to financial result.

Ho: There is no significant difference between Region of traders and Traders' reaction to dividend announcement.

Ho: There is no significant difference between Region of traders and Traders' reaction to right issue and bonus issue.

Ho: There is no significant difference between Region of traders and Traders' reaction to mergers and acquisition.

Ho: There is no significant difference between Region of traders and Traders' reaction to RBI announcement.

Ho: There is no significant difference between Region of traders and Traders' reaction to political news.

Ho: There is no significant difference between Region of traders and Traders' reaction to economic news.

Ho: There is no significant difference between Region of traders and Traders' reaction to insider information.

Ho: There is no significant difference between Region of traders and Traders' reaction to expert opinion.

Ho: There is no significant difference between Region of traders and Traders' reaction to past performance of market.

Ho: There is no significant difference between Region of traders and Traders' reaction to intuition.

Ho: There is no significant difference between Region of traders and Traders' reaction to advertisement.

Ho: There is no significant difference between Region of traders and Traders' reaction to stock broker's tips and opinion.

Table 4.34

Region wise Traders' Reactions to Various Information

Information	Region	Mean	Std. Deviation	F	P value
Financial Result	South	3.5083	.81988	.448	.774
	Central	3.4750	.66056		
	North	3.5167	.80943		
	Total	3.5000	.76483		
Dividend Announcement	South	2.6917	1.15806	.383	.820
	Central	2.4500	1.14385		
	North	2.6583	1.19168		
	Total	2.6000	1.16638		
Right Issue and Bonus Issue	South	2.9250	1.06244	2.230	.065
	Central	2.7250	1.03682		
	North	2.4333	1.08258		
	Total	2.6944	1.07697		
Mergers and Acquisition	South	2.9500	1.10651	5.852	.000
	Central	3.0750	.92729		
	North	2.5500	1.06787		
	Total	2.8583	1.05790		

Information	Region	Mean	Std. Deviation	F	P value
RBI Announcement	South	3.5500	.87783	4.824	.001
	Central	3.5917	.65460		
	North	3.1167	1.01405		
	Total	3.4194	.88576		
Political News	South	2.8500	1.25457	1.838	.121
	Central	2.8583	1.13978		
	North	3.0000	1.06904		
	Total	2.9028	1.15582		
Economic News	South	3.1500	1.07414	4.029	.003
	Central	3.2167	.94543		
	North	2.8667	1.18061		
	Total	3.0778	1.07882		
Insider Information	South	2.6500	1.06629	2.347	.054
	Central	2.3167	.78840		
	North	2.3833	.98887		
	Total	2.4500	.96325		
Expert Opinion	South	2.3667	1.19476	2.624	.035
	Central	2.2750	1.02048		
	North	2.2833	1.00573		
	Total	2.3083	1.07488		
Past Performance of Market	South	2.5583	1.05158	1.029	.392
	Central	2.6500	.80597		
	North	2.4917	1.03709		
	Total	2.5667	.97089		
Intuition	South	2.0333	1.13710	1.857	.118
	Central	2.4667	1.06063		
	North	2.2167	1.10144		
	Total	2.2389	1.11142		
Advertisement	South	2.0333	1.11471	1.912	.108
	Central	2.0667	.96783		
	North	2.0250	.99124		
	Total	2.0417	1.02391		
Stock Brokers Tips and Opinion	South	2.5500	1.15845	.376	.825
	Central	3.0667	1.00196		
	North	2.8083	1.06350		
	Total	2.8083	1.09414		

**Significant at 0.05 levels Source: Survey data

Table 4.34 shows the results of one-way ANOVA for comparing region with traders' reaction to various information and its results are as described below.

There is no regional difference in trader's reaction to financial result, dividend announcement, right issue and bonus issue, political news, past performance of market, intuition, advertisement and stock brokers' tips and opinion. The p values of all these variables are greater than 0.05, so the null hypotheses are accepted.

Regional difference showed in the traders' reactions to mergers and acquisition, RBI announcement, economic news, insider information and experts' opinion. The p value of all these variables are less than 0.05, so the null hypotheses are rejected.

4.29. Traders' Reactions: A Comparison with Years of Experience in the Market and Different Market Information

This session is comparing years of experience with traders' reaction to various information. For comparing these some hypotheses are fixed. The following Hypotheses are settled for checking significant difference of years of experience and traders' reactions.

Ho: There is no significant difference between years of experience and Traders' reaction to financial result.

Ho: There is no significant difference between years of experience and Traders' reaction to dividend announcement.

Ho: There is no significant difference between years of experience and Traders' reaction to right issue and bonus issue.

Ho: There is no significant difference between years of experience and Traders' reaction to mergers and acquisition.

Ho: There is no significant difference between years of experience and Traders' reaction to RBI announcement.

Ho: There is no significant difference between years of experience and Traders' reaction to political news.

Ho: There is no significant difference between years of experience and Traders' reaction to economic news.

Ho: There is no significant difference between years of experience and Traders' reaction to insider information.

Ho: There is no significant difference between years of experience and Traders' reaction to expert opinion.

Ho: There is no significant difference between years of experience and Traders' reaction to past performance of market.

Ho: There is no significant difference between years of experience and Traders' reaction to intuition.

Ho: There is no significant difference between years of experience and Traders' reaction to advertisement.

Ho: There is no significant difference between years of experience and Traders' reaction to stock broker's tips and opinion.

Table 4.35

Years of Experience and Traders' Reactions to Various Information

Information	Years of Experience	Mean	Std. Deviation	F	P value
Financial Result	less than 1 year	3.5072	.77882	1.263	.287
	1-2 years	3.3763	.91976		
	3-5 years	3.5970	.71900		
	Above 5 years	3.5344	.64805		
	Total	3.5000	.76483		
Dividend Announcement	less than 1 year	2.6957	1.12856	1.911	.127
	1-2 years	2.4301	1.11704		
	3-5 years	2.4478	1.2587		
	Above 5 years	2.7481	1.2587		
	Total	2.6000	1.15920		

Information	Years of Experience	Mean	Std. Deviation	F	P value
Right Issue and Bonus Issue	less than 1 year	2.7971	1.16638	2.000	.114
	1-2 years	2.5054	1.07894		
	3-5 years	2.5970	1.19440		
	Above 5 years	2.8244	1.01593		
	Total	2.6944	1.00369		
Mergers and Acquisition	less than 1 year	3.0435	1.0769	2.791	.040
	1-2 years	2.6774	1.11718		
	3-5 years	2.6866	1.07503		
	Above 5 years	2.9771	1.13096		
	Total	2.8583	.94840		
RBI Announcement	less than 1 year	3.3478	1.05790	7.257	.000
	1-2 years	3.0968	.92077		
	3-5 years	3.6119	1.03277		
	Above 5 years	3.5878	.75789		
	Total	3.4194	.74287		
Political News	less than 1 year	2.6522	.88576	3.971	.008
	1-2 years	2.7742	1.22265		
	3-5 years	2.8209	1.2169		
	Above 5 years	3.1679	1.00883		
	Total	2.9028	1.15582		
Economic News	less than 1 year	2.9710	1.12421	1.663	.175
	1-2 years	2.9247	1.15379		
	3-5 years	3.2537	1.00519		
	Above 5 years	3.1527	1.02637		
	Total	3.0778	1.07882		
Insider Information	less than 1 year	2.5217	.99423	.857	.464
	1-2 years	2.5484	1.00559		
	3-5 years	2.3433	.94632		
	Above 5 years	2.3969	.9255		
	Total	2.4500	.96325		
Expert Opinion	less than 1 year	2.4348	1.18170	2.484	.061
	1-2 years	2.3118	1.06300		
	3-5 years	2.0000	1.01504		
	Above 5 years	2.3969	1.03537		
	Total	2.3083	1.07488		

Information	Years of Experience	Mean	Std. Deviation	F	P value
Past Performance of Market	less than 1 year	2.5652	1.11775	2.958	.032
	1-2 years	2.3226	.97981		
	3-5 years	2.6567	.97782		
	Above 5 years	2.6947	.84937		
	Total	2.5667	.97089		
Intuition	less than 1 year	2.1304	1.28238	.961	.411
	1-2 years	2.1613	1.07633		
	3-5 years	2.2090	1.10833		
	Above 5 years	2.3664	1.03928		
	Total	2.2389	1.11142		
Advertisement	less than 1 year	1.7101	1.03044	6.907	.000
	1-2 years	1.8495	.98848		
	3-5 years	2.1343	1.04295		
	Above 5 years	2.3053	.96789		
	Total	2.0417	1.02391		
Stock Brokers Tips and Opinion	less than 1 year	2.5507	1.09190	2.601	.052
	1-2 years	2.7097	1.10906		
	3-5 years	2.9701	.96876		
	Above 5 years	2.9313	1.12449		
	Total	2.8083	1.09414		

** Significant at 0.05 levels Source: Survey data

Table 4.35 showed the results of one-way ANOVA for comparing years of experience with traders' reaction to various information and its results are as described below.

There is no difference in years of experience and trader's reaction to financial result, dividend announcement, right issue and bonus issue, economic news, insider information, expert opinion and intuition. The p values of all these variables are greater than 0.05, so the null hypotheses accepted.

Years of experience showed differences in the traders' reactions in the cases of mergers and acquisition, RBI announcement, political news, past performances of

the market, advertisement and stock broker's tips and opinion. The p values of all these variables are less than 0.05, so the null hypotheses rejected.

4.30. Hedging Habit of Traders

One of the objectives of this study is to evaluate the hedging habit of traders. The previous chapter discussed about hedge ratio and hedging effectiveness. Through the previous analysis, it found that banking futures are suitable for hedging. In this context, analysis of hedging habit of traders is very important. This section deals with extend of hedging by using banking futures. Out of 360 traders, 326 traders are used banking futures for hedging.

4.31. Risk Coverage through Hedging

It is an important variable for analysing hedging habit of traders with bank futures. Hedging is the process of reducing risk. In this section we discuss about traders' opinion of risk coverage through hedging with bank futures.

Table 4.36

Percent of Risk Coverage

Risk Coverage	Frequency	Percent
0-25 %	92	28.2
26 – 50%	128	39.3
51 - 75 %	80	24.6
76 – 100%	26	7.9
Total	326	100

Source: Survey data

Table 4.36 indicates opinions of traders about risk coverage through hedging. 39.3 percent of traders marked the column of 26 – 50 percent, 28.2 percent of traders marked the column of 0-25 percent, 24.6 percent of traders marked the column of 51 - 75 percent and 7.9 percent of traders marked the column of 76 – 100 percent.

Major portion of sample respondents are opined that hedging with bank futures help to reduce risk of 26 to 50 percent of total risk.

4.32. Type of Contract Used for Hedging

Mainly three types of contracts are available in the market that is current month contract, near month contract and far month contract. Traders can use more than one contract of same futures. While analysing extend of hedging with bank futures, it is important to find out which is most used contract for hedging. Usage of different contract is described in below table.

Table 4.37

Usage of Different Future Contracts of Banks

Type of Contract	Frequency	Percent
Current Month Contract	172	52.7
Near Month Contract	106	32.5
Far Month Contract	10	3.1
Combination of Different Contract	38	11.7
Total	326	100

Source: Survey data

More than half of respondents (52.7 percent) use current month contract for hedging. 32.5 percent use near month contract, 11.7 percent use combination of different contract and only 3.1 percent use far month contract. From this table 5.35, we can conclude that current month contract is more used for hedging.

4.33. Frequency of Usage of Bank Futures

Frequency of usage of bank futures for hedging is important factor while studying extends of hedging. The researcher divided frequency into four categories that are always, frequently, occasionally and rarely. On the basis of these categories, traders' responses are described below.

Table 4.38

Frequency of Usage of Bank Future

Frequency of usage	Frequency	Percent
Always	36	11.04
Frequently	128	39.26
Occasionally	106	32.52
Rarely	56	17.18
Total	326	100

Source: Survey data

From the table 4.38 it is observed that out of 326 hedgers, 128 hedgers frequently used bank futures for hedging. 106 traders used bank futures only occasionally for hedging and 56 hedgers used rarely. Only 36 traders used bank futures always for hedging.

4.44. Satisfaction from Hedging

While analysing extends of hedging, satisfaction is also a very important variable. Traders' satisfaction level closely depends on attitude of traders and their usage level. In this section, the researcher made attempt to check satisfaction level of six different factors related to hedging. The results are described below. The following hypothesis is settled for testing satisfaction from trading.

Ho = there is no significant difference between test value and mean score of traders' satisfaction from hedging.

Table 4.39

Satisfaction from Hedging- One-Sample t Test

Hedging Factors	Mean	Std. deviation	t value	P value	Test value
Capacity of minimising loss and maximising profit	3.9110	1.00830	16.314	.000	3
Lot size of Futures	3.3804	1.03006	6.667	.000	3

Hedging Factors	Mean	Std. deviation	t value	P value	Test value
Availability of buyers and sellers	3.8620	.93609	16.626	.000	3
Variety of contract	3.6196	.95569	11.707	.000	3
Duration of contract	3.8221	.89388	16.605	.000	3
Stock brokers advice on hedging	3.2086	1.14733	3.283	.001	3
Overall satisfaction from hedging	22.1250	3.59331	21.781	.000	18

** Significant at 0.05 levels Source: Survey data

Table 4.39 described traders' satisfaction from hedging. For measuring this, five-point scales are used. The average value is 3. Below 3 means traders are dissatisfied, 3 means neither satisfied nor dissatisfied and above 3 means satisfied. Mean score of all six factors are in between 3 and 4. It means traders are satisfied but not highly satisfied. Mean score of overall satisfaction from hedging is 22.1250. Test value is 18. Actual mean value is more than test value but less than maximum value of 30. So, it can be concluded that traders are satisfied. The p value is less than .05, so hypothesis is rejected.

4.45. Satisfaction from Hedging – Comparison with Different Aspects

In the above section we can see that traders are satisfied. In this analysis, we compare demographic profile, years of experience, frequency of hedging, percentage of risk coverage and type of contract used for hedging with satisfaction. One-way ANOVA used for various factors with satisfaction from hedging. Following hypotheses are settled for comparison.

Ho: There is no significant difference in satisfaction from hedging and traders' region.

Ho: There is no significant difference in satisfaction from hedging and traders' age.

Ho: There is no significant difference in satisfaction from hedging and traders' educational qualification.

Ho: There is no significant difference in satisfaction from hedging and traders' monthly income of family.

Ho: There is no significant difference in satisfaction from hedging and traders' occupation.

Ho: There is no significant difference in satisfaction from hedging and traders' Years of experience in derivative market

Ho: There is no significant difference in satisfaction from hedging and percentage of risk coverage through hedging.

Ho: There is no significant difference in satisfaction from hedging of traders and type of contract use for hedging.

Ho: There is no significant difference in satisfaction from hedging of traders and frequency of hedging

Table 4.40

Satisfaction from Hedging – A Comparison with One-way ANOVA

Variable		Mean	Std deviation	F	P value
Region	South	22.1696	3.21003	1.598	.204
	Central	21.9364	4.00064		
	North	21.2692	4.20871		
	Total	21.8037	3.82680		
Age	Upto 30 years	22.2453	3.50187	1.325	.261
	31 – 40 years	21.8661	3.50818		
	41 – 50 years	21.6200	4.32784		
	51 – 60 years	20.3913	5.71870		
	Above 60 years	21.1500	3.29713		
	Total	21.8037	3.82680		
Educational Qualification	Upto HSE	23.0556	4.86353	4.176	.006
	Upto Degree	21.5329	3.58340		
	PG	21.2333	3.44149		
	Professional	23.3636	4.21173		
	Total	21.8037	3.82680		

Variable		Mean	Std deviation	F	P value
Monthly Income of Family	Upto 25000	22.2258	3.65780	1.909	.109
	25001 – 50000	21.9500	4.15832		
	50001 – 75000	21.6774	3.21856		
	75001 – 100000	20.4762	2.94311		
	Above 100000	20.5333	3.98907		
	Total	21.8037	3.82680		
Occupation	Govt. employee	20.8537	4.86601	1.209	.307
	Professional	22.3556	3.56215		
	Private sector	21.9152	3.36120		
	Business	21.7467	4.26834		
	Total	21.8037	3.82680		
Years of Experience in Derivative Market	less than 1 year	22.0000	3.37488	9.827	.000
	1-2 years	21.3000	3.83787		
	3-5 years	19.7925	4.28485		
	Above 5 years	22.9431	3.41477		
	Total	21.8037	3.82680		
Percentage of Risk Coverage through Hedging	0-25 percent	21.9891	4.39404	.719	.541
	26 – 50 percent	21.4609	3.16203		
	51 - 75 percent	22.2000	4.14118		
	76 - 100 percent	21.6154	3.72104		
	Total	21.8037	3.82680		
Type of Contract Use for Hedging	Current month contract	22.1919	4.02381	4.458	.004
	Near month contract	21.4623	3.74719		
	Far month contract	24.4000	2.22111		
	Combination of different contract	20.3158	2.76176		
	Total	21.8037	3.82680		
Frequency of Hedging	Always	21.8611	5.48844	4.940	.002
	Frequently	22.6328	3.36230		
	Occasionally	20.7358	3.15716		
	Rarely	21.8929	4.29240		
	Total	21.8037	3.82680		

** Significant at 0.05 levels Source: Survey data

Table 4.40 compares satisfaction from hedging of bank futures with nine variables (region, age, educational qualification, monthly income of family, occupation, years of experience in derivative market, percentage of risk coverage through hedging, type of contract use for hedging and frequency of hedging). The p value (.204) of region and satisfaction from hedging is greater than .05. So, there is no significant difference in satisfaction of hedging. Traders from three regions are satisfied. The p value of age (.261), Educational qualifications (.006), Monthly income of family (.109) and occupation (.307) and satisfaction from hedging is greater than .05. So, the null hypotheses are accepted. It can be concluded that traders' satisfaction from hedging do not show significant difference among different age group, educational qualifications, monthly income and occupation. While comparing Years of experience in derivative market and satisfaction from hedging, the p value (.000) is less than .05. So, the null hypothesis is rejected. It means years' of experience has influence on satisfaction from hedging. Percentage of Risk coverage through hedging is not related to satisfaction from hedging because the p value (.541) is greater than .05 and the null hypothesis is accepted. Type of contract used for hedging and frequency of hedging is related to satisfaction from hedging. The p value (.004 and .002) of both Variables are less than .05 and null hypotheses rejected.

4.46. Experience of Risk and Return from Banking Futures

In this section, the researcher made attempt to check traders view point on risk and return from bank futures. Risk and return are categorised into three on the basic assumption that when risk is high return also will be high.

Table 4.41

Risk and Return from Bank futures

Risk and Return	Frequency	Percent
High Return High Risk	219	60.8
Average Return Average Risk	124	34.4
Low Return Low Risk	17	4.7
Total	360	100.0

Source: Survey data

Table 4.41 indicate opinion of traders about risk and return from bank futures. Out of 360 traders, experiences of 219 traders are high return and high risk from bank futures. 124 traders have marked their experience as average return and average risk and only 17 traders marked their experience as low return and low risk.

4.47. Satisfaction from Trading

Satisfaction from trading with banking futures is important variable of attitude towards banking futures. Five trading related factors were selected for checking satisfaction level of traders. The researcher assumed test value as 3 and compared test value with mean value. The result of hypothesis testing is presented in the table below.

Table 4.42

Satisfaction from Trading – One sample t- test

Trading aspects	Mean	Std. deviation	t value	P value	Test value
Return from trading	3.7250	1.09922	12.514	.000	3
Coverage of risk	3.5194	.91393	10.784	.000	3
Availability of information	3.5083	.91715	10.516	.000	3
Variety of contract	3.7167	.88488	15.367	.000	3
Timely available buyers and sellers	3.9056	.90924	18.897	.000	3
Broking firms' services	3.7500	1.01177	14.065	.000	3
Overall Satisfaction from Trading	22.1250	3.59331	21.781	.000	18

** Significant at 0.05 levels Source: Survey data

Following hypothesis is fixed for analysing satisfaction from trading.

Ho = There is no significant difference between test value and mean score of traders' satisfaction from trading.

The p value .000 is less than .05, so the test is significant. If the mean value is greater than test value traders are satisfied and if the mean value less than test value, traders are dissatisfied. Here means value is greater than test value, so it can be concluded that traders are satisfied but not highly satisfied.

4.48. Satisfaction from Trading – Comparison by Using One-way ANOVA

In this analysis, we compare demographic profile, years of experience, experience of risk and return, usage of technical analysis and fundamental analysis with satisfaction. One-way ANOVA used for various factors with satisfaction from trading. Following hypotheses are settled for comparison.

Ho: There is no significant difference in satisfaction from trading and traders' region.

Ho: There is no significant difference in satisfaction from trading and traders' age.

Ho: There is no significant difference in satisfaction from trading and traders' educational qualification.

Ho: There is no significant difference in satisfaction from trading and traders' occupation.

Ho: There is no significant difference in satisfaction from trading and traders' Years of experience in derivative market

Ho: There is no significant difference in satisfaction from trading and experience of risk and return

Ho: There is no significant difference in satisfaction from trading and usage of technical analysis

Ho: There is no significant difference in satisfaction from trading and usage of fundamental analysis.

Table 4.43

Satisfaction from Trading – Comparison with Demographic Variables

Variable		Mean	Std deviation	F	P value
Region	South	22.0750	3.59776	.522	.594
	Central	21.9167	4.13345		
	North	22.3833	2.96813		
	Total	22.1250	3.59331		
Age	Upto 30 years	22.4701	3.06980	3.835	.005
	31 – 40 years	22.6538	3.23189		
	41 – 50 years	21.1228	4.22607		
	51 – 60 years	20.3929	3.75489		
	Above 60 years	22.0000	4.79969		
	Total	22.1250	3.59331		
Educational Qualification	Upto HSE	21.8000	3.74303	2.341	.073
	Upto Degree	21.8085	3.82862		
	PG	22.4141	2.87498		
	Professional	23.4545	3.74242		
	Total	22.1250	3.59331		
Occupation	Govt. employee	21.6800	4.57785	2.401	.068
	Professional	22.6667	3.79593		
	Private sector	22.4641	3.05416		
	Business	21.3690	3.80798		
	Total	22.1250	3.59331		
Years of Experience in Derivative Market	less than 1 year	22.0725	3.26442	6.084	.000
	1-2 years	22.0538	3.66347		
	3-5 years	20.6866	3.50415		
	Above 5 years	22.9389	3.55129		
	Total	22.1250	3.59331		
Experience of Risk and Return	High return high risk	22.1553	3.37742	.987	.374
	Average return average risk	22.2339	3.59337		
	Low return low risk	20.9412	5.78220		
	Total	22.1250	3.59331		

Variable		Mean	Std deviation	F	P value
Technical Analysis	very high	22.6103	3.62741	5.722	.000
	high	22.3576	3.24216		
	no use	19.1333	2.55976		
	very low	20.0833	4.89824		
	low	21.6000	3.33088		
	Total	22.1250	3.59331		
Fundamental Analysis	very high	22.8774	3.84882	4.170	.003
	high	21.9898	3.35333		
	no use	21.5152	2.87360		
	very low	22.3571	1.64584		
	low	18.5000	6.39878		
	Total	22.1250	3.59331		

** Significant at 0.05 levels Source: Survey data

The above table depicts result related to satisfaction from trading. Satisfaction from trading has no significant difference with region, educational qualification, occupation and experience of risk and return. Hypotheses related to these variables are accepted because the p value of these variables is greater than .05. Test is significant in the case of remaining four variables like age, years of experience in derivative market, usage of fundamental analysis and technical analysis. Its p value is less than .05, that's why hypotheses rejected.

4.49 Conclusion

This chapter deals with traders of banking futures' attitude and behaviour. It includes demographic variables, years of experience, traders' attitude, hedging habit of hedgers, their reaction to various information and satisfaction level of traders etc. From the analysis we can conclude that traders have positive attitude towards banking futures, they are using fundamental analysis and technical analysis for taking, buying and selling decisions, they are immediately reacting to certain information and they are satisfied with hedging aspects and trading.

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Chapter V

Hedging and Price Discovery of Banking Sector Futures

5.1 Introduction

Due to uncertainty and risk, the financial market has become more complex. In a volatile economy financial risk is very high. It creates uncertainty in return. It also leads to huge losses to traders. So traders are always careful to reduce their losses and increase return. It is in this context that Financial Derivatives are introduced as tools for hedging and price discovery. Main functions of futures contracts are hedging and price discovery.

In this chapter we will discuss risk management of banking sector future prices through hedge ratio, hedging effectiveness and price discovery. The researcher selected the banking sector from 24 sectors in NSE. As compared to other sectors, the banking sector is more popular with traders or investors. The banking industry is one of the major pillars of the modern economy. Demonetisation and digital economy gave a drastic change in the banking industry. It also increased the popularity of banks and popularity of the stocks of the banking companies. So the researcher made attempt to check hedge ratio, hedging effectiveness and price discovery of selected banks' futures prices. Concept-related to hedging and price discovery is as follows.

5.2 Hedging concepts

Hedge means protection. Hedging is the act of protecting oneself against future price loss. In other words, it is transferring of risk from those who want to reduce risk to those who are willing to take the risk. Hedgers are traders who want to reduce risk and speculators are those willing to take the risk. So hedging is the process of transferring risk from hedgers to speculators. In other words, hedging refers to the strategy of offsetting price risk that is inherent in the spot market by taking an equal

but opposite position in the futures market. According to Webster's Dictionary, hedge is "to try to avoid or lessen loss by making counter balancing bets, investments etc."

5.2.1 Different Ways of Hedging

Hedgers can offset their price risk through long hedge, short hedge or cross hedging. Concept of long hedge, short hedge and cross-hedging are as follows.

5.2.1.1 Buying / Long Hedge

When a trader takes a long position in the futures market, it is called a long hedge. The reason behind this hedge is to protect securities against a price increase in the underlying asset before purchasing it from spot market. In simple words, it means buying a futures contract for protecting himself against price rising. Let us consider an investor, who is expecting to receive some money at a future date and his wish is to use this money for purchasing stocks. But the market is in bullish trend, prices of stocks are increasing day by day. In this situation, an investor can buy stock futures or index futures contract for reducing price hike in the future price.

5.2.1.2 Selling / Short Hedge

Selling hedge is also called short hedge. It means selling of a futures contract. If the market is in bearish trend, the investor will expect price fall in the market. In this situation, the investors buys stocks in the spot market and sell a future contract of same stocks for reducing the risk of price falling. It is short hedge.

5.2.1.3 Cross Hedging

Cross hedging is the process of hedging a position of a security in the spot market with another security in the futures market. The situations of using cross hedging are as follows;

- Futures contract not available for spot market security to be hedged.
- The quantity of security in the spot market to be hedged does not match with the lot size of futures contract.

- Date of Hedging needed to the investor does not match with the expiration date of futures contract.

5.2.2 Basis Risk

Basis is an important term related to hedging. The basis is the difference between spot price and futures price. If the spot price is higher than futures price, the basis is positive. If the changes in futures price and spot price are by the same amount, change in basis will be zero. When the changes in spot price and future price are not an equal amount basis may be negative or positive. If the change in spot price is higher than the change in futures price, the basis will be positive and basis risk is less. It is known as the strengthening of basis. If the change in spot price is less than futures price, the basis will be negative and basis risk is high. It is the weakening of basis. In other words, basis risk is the degree of correlation between the spot price and futures price. If the correlation is high, basis risk will be less and if the correlation is low, basis risk will be high.

5.3 Price Discovery

Two major roles of futures are hedging and price discovery. Price discovery which is revealing of information about future cash market prices through the futures prices market. Simply it means futures contract will reflect in the spot market prices. Informative role of future prices helps in reducing the degree of volatility. The main motive behind the price discovery is checking whether futures price leads to spot price or vice versa. Lead-lag relationship between spot market and futures market may be in three ways that are, Futures price leads to spot price, Spot price leads to futures prices and bi directional relationship between futures price and spot prices. Price discovery function of futures prices is closely related to whether the new information firstly reflects in futures price or spot price.

5.4. Optimal Hedge Ratio and Hedging Effectiveness

It is the tool to reduce risk and optimise profit. The hedge ratio is defined as the ratio of the size of the position taken in the futures market to the size of the position in the spot market. If such a ratio minimizes the total risk (variance) of the portfolio, then

it is said to be optimal**.** Hedging effectiveness is defined as the ratio of the variance of the unhedged position minus variance of the hedged position over the variance of unhedged position

5.5. Estimating Hedge Ratio

Before executing hedging, a trader should determine the number of futures contract to be purchased. Hedge ratio estimation helps traders to estimate the quantity of futures contracts suitable for their hedging. As per nature of futures contract, a different method may be used for estimating hedge ratio. Mainly the methods are of two types that is naïve method and regression method. Following are the different method for estimating hedge ratio.

5.5.1 Naive method

It is also known as classical theory of hedging. This hedging method is based on two type of information. First is the information about current market and second is the information about relationship between spot price and futures price in the past. This method is based on the assumption that minimum variance hedge ratio is always equal to one. Traders' belief on the market is that futures markets and spot markets are interrelated and move in the same way with similar degrees. Thus investment risk is eliminated if an equal contract value of the opposite position is invested in the futures market for each unit of value held in the spot price market. In this case, when the hedge ratio equals '1', the strategy is called naive hedging.

5.5.2 Regression Analysis

It is the second method of determining hedge ratio. It is based on the assumption that correlation between futures price and spot price is not perfect in real market situations. So every hedger should require estimation of Optimal Hedge Ratio (OHR). Optimal Hedge Ratio is the optimal amount of futures contract bought or sold expressed as a proportion of the cash position. Regression method is used to construct best linear relationship between spot price and futures price. So it is also called Ordinary Least Square method (OLS). To estimate such a ratio, early works used the slope of an ordinary least squares regression of cash on futures prices.

Thus,

$$s_t = \alpha + \beta f_t + \varepsilon_t$$

Where s_t is spot price return and f_t is future prices return.

The OLS estimator is

$$\hat{\beta} = \frac{\sigma_{sf}}{\sigma^2_f}$$

Where $\hat{\beta}$ is the optimal hedge ratio

5.5.3 Error Correction (ECM) Models

It is the model used to estimate hedge ratio. Estimation of hedge ratio through regression is not time variant, but the joint distribution of spot price and future prices may be time-variant. Vector autoregressive (VAR) models consider the time variability of time series data. VAR model is a general framework to describe the dynamic interrelationship between stationary 1(0) variables. A first order, p = 1, bivariate, k = 2, VAR is

$$\begin{pmatrix} y_{1t} \\ y_{2t} \end{pmatrix} = \begin{pmatrix} \mu_{10} \\ \mu_{20} \end{pmatrix} + \begin{bmatrix} \pi_{11.1} & \pi_{12.1} \\ \pi_{21.1} & \pi_{22.1} \end{bmatrix} \begin{pmatrix} y_{1t} - 1 \\ y_{2t} - 1 \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{pmatrix}$$

Say $y_t = \mu + \pi_1 y_{t-1} + \varepsilon_t$ (1)

Where $\mu' = (\mu_1, \mu_2)$ is the vector of constants usually known as drifts and

$\varepsilon't = (\varepsilon_{1t}, \varepsilon_{2t})$ are innovations relative to the information set $y'_{t-1} = (y_{1t-1}, y_{2t-1})$.

A p^{th} order VAR in k variables is given by

$$y_t = \mu + \pi_1 y_{t-1} + \pi_2 y_{t-2} + \ldots\ldots + \pi_p y_{t-p} + \varepsilon_t$$

If the variables are nonstationary I (1) variables and are not co integrated, the interrelationship between them can be examined using a VAR framework in first differences of the variables; that is,

$\Delta y_{it} = y_{it} - y_{it-1}$ and $\Delta y_t \equiv (\Delta y_{1t}, \Delta y_{2t}, \Delta y_{kt})$ and estimate

$\Delta y_t = \mu^* + \pi_1^* \Delta y_{t-1} + \pi_2^* yt\text{-}2 + ... + \pi_p^* \Delta y_{t-p} + \varepsilon_t^*$. ..... (2)

One unsatisfactory feature of using the variables in first difference is that such a formulation provides no information on the relationship between the levels of the variables in the VAR. A satisfactory alternative arises when the variables in yt are co integrated. Hence a more promising way forward is to formulate models which capture short run responses and long run relationships as represented in the co integrating combinations. Using Engle and Granger (1987), which is part of what is known as Granger Representation Theorem, is of relevance here. It states that if the k x 1 vector of variables y_t is $C_I(1, 1)$ then there exists a error correction representation of the general form:

$\Delta y_t = \pi y_{t-1} + \Gamma_1 \Delta y_{t-1} + \Gamma_2 \Delta y_{t-2} + ... + \Gamma_{p-1} \Delta y_{t-(p-1)} + \varepsilon_t$ (3)

Where $\pi = \propto \beta'$ are the r linear, co integrating combinations among the k variables, with β the k x r matrix of r co integrating vectors.

The error terms in the equations, ε_{St} and ε_{Ft} are independently and identically distributed (i.i.d) random variables. The minimum variance hedge ratios are calculated as:

$$H = \frac{\sigma_{sf}}{\sigma^2 f}$$

Where,

$\sigma^2 s$ = Variance (ε_{st})

σ^2_f = Variance (ε_{ft}) and

σ_{sf} = Covariance ($\varepsilon_{st}\varepsilon_{ft}$)

5.5.4 The ARCH – GARCH Models

This model used for analysing volatility of financial time series data. Autoregressive conditional heteroscedasticity (ARCH) developed by Robert Engel and generalized autoregressive conditional heteroscedasticity (GARCH) developed by Bollerslev are used in this study. Stock prices often exhibit the phenomenon of volatility clustering, that is period in which their prices show wide swings for an extended time period followed by periods in which there is a relative calm (Gujarati, 2015). In this time varying variance situation we use autoregressive conditional heteroscedasticity (ARCH) for modelling such data.

Engle (1982) studied the variance of the prediction errors in highly volatile time series, leading to autoregressive conditional heteroscedasticity (ARCH) models, on which the conditional variance is dependent of the series' past values and modeled through a quadratic form. For an ARCH (1) type model, the variance of 'εt' will be dependent of a constant plus the term εt-1, which is the main characteristic of the ARCH models. Engle considered the error term 'εt' as Gaussian white noise with zero mean and unit variance, independently and identically distributed variable. The ARCH models can be extended through the generalized autoregressive conditional heteroscedasticity (GARCH) approach, which increases the time series' informational set, yielding a more parsimonious formulation, compared with an AR or MA modelling (Bollerslev, 1986). Hence a GARCH (p, q) volatility model features less parameter than an ARCH (p).

Later studies (Baba et. al 1990, Karolyi 1995, and Yang and Allen 2004) showed that a GARCH (1, 1) model having fewer parametric restrictions is preferable for the specification of a financial series.

While applying the model in a real life situation several difficulties might appear which need to be properly addressed. Thus in order to make estimates possible, the number of parameters needs to be reduced without restricting the flexibility to capture the dynamics in the conditional covariance too much. Further, the conditions that make the covariance matrix 'positive definite' at every point in time (as required by definition) and the conditions for the week stationarity of the process

are to be determined. Hence, a number of variations of the original GARCH have been proposed and tested by researchers. But empirical studies do not provide compelling evidence to prefer any particular model. Hence this study uses a Constant Conditional Correlation Multivariate GARCH (CCC-M GARCH) model for the estimation of time variant optimal hedge ratio

5.6 Methodology

Data and statistical methods used for analysing secondary data under this study are described below

5.6.1 Data used

In India two leading stock exchanges are BSE and NSE. NSE is the leading stock exchange in futures segment. So this study considered only NSE's futures segment. Among various sectors in NSE, banking sector has been selected for this study. For estimating hedge ratio, hedging effectiveness and price discovery of banking sector, the researcher used secondary data on spot price and futures price of 8 banks among 24 banks listed in NSE. Under this study, daily closing price of spot prices were selected from various prices like opening, low, high, closing etc. Three types of futures contracts are available in the market like current month, near month and far month. Among these contracts the study selected current month contract to represent futures prices and used daily closing price of current month contracts.

The researcher used data for the period from 1 January, 2011 to 17 July 2017 taken from the official website of NSE. During this period, 5 banks (Axis Bank, Federal Bank, HDFC Bank, Kotak Bank and SBI) announced their stock split or bonus issue. This gave a structural break in time series data. So their total period is divided into two periods (Period 1 and Period II). Period 1 is before the announcement and Period 1I is after the announcement of each bank. Other 3 banks (Canada Bank, OBC and Yes Bank) had no announcements which give structural break to the series of data. The spot price and future price have been transformed in to log form as is customary in time series analysis.

5.6.2 Methodology

For solving methodological issues while using time series data for empirical analysis, four steps should be followed.

- Transform data into log form
- Test the stationarity of data
- Test co integration between data
- Apply the model

First, every spot and future price had been changed into log form, denoted as 'log spot' and 'log future'

First test used in this analysis is Augmented Dickey – Fuller (ADF) test. It is used for testing stationarity of log series. It consists of estimating the following regression.

$\Delta Yt = \beta 1 + \beta_2 t + \delta y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta y_{t-1} + \varepsilon t$

Where εt is a pure white noise error term and where

$\Delta y_{t-1} = (y_{t-1} - y_{t-2})$, $\Delta y_{t-2} = (y_{t-2} - y_{t-3})$ etc.

When the log series is found to be non-stationary, the same test is performed on the differenced log series (d log spot price and d log future price) to determine whether the log series has first difference stationary. The hypothesis for the ADF test is H0: the series contains a unit root (i.e., $\delta = 0$) against H1: the series does not contain a unit root (i.e. $\delta < 0$). The optimal lag length is determined by using minimization of the Schwarz Bayesian Information Criterion (BIC) [EVIEWS automatically calculate the optimum lag length].

Second test under this empirical analysis is Johansen Co integration tests to determine whether the two series are co integrated. It means testing long run relationship. 1(1) indicate the co integration between series, but a linear combination is I (0), denoted as CI (1, 1).

When the series are first difference stationary and co- integrated, we can use Vector Error Correction Model (VECM) to estimate the constant hedge ratio. The parameters of VEC Model are estimated and the residuals are obtained. These residuals are used to calculate hedge ratio and hedging effectiveness.

Return on spot price and futures price are the two variables used in the analysis in equation (3). The optimum lag length is selected using Akaike and Schwarz information criteria.

The residuals (ε_{ty} and ε_{tx}) obtained from the above VECM when applied to the 'spot price returns' and 'futures price returns' series are designated as εst and εft respectively. The optimal hedge ratio is calculated by using the variances and co variances of these residuals.

The Optimal Hedge Ratio $H = \frac{\sigma_{sf}}{\sigma_f^2}$

Where:

σ_{sf} =Cov. (ε_{st}, ε_{ft})

σ_s^2 = Variance (ε_{st})

σ_f^2 = Variance (ε_{ft})

Hedging Effectiveness is calculated as:

$$E = \frac{\text{Var (u)} - \text{Var (H)}}{\text{Var (u)}}$$

Where,

Var (u) = σ^2_s (i.e, Variance of unhedged portfolio)

Var (H) = $\sigma^2_s + H_2 \sigma^2_f - 2H \sigma_{sf}$ (i.e., variance of hedged portfolio)

H = Hedge Ratio, σ_s and σ_f are the standard deviations of spot price and future price returns and σ_{sf} is the covariance.

After the above calculations, the researcher tests the residuals from VECM for ARCH effect. If we found ARCH effect we should estimate conditional variance, covariance and time varying hedge ratios by using GARCH model. Here, residuals obtained from VECM shows ARCH effect in all cases. So the time varying hedge ratio calculated by using constant Conditional Correlation – Multivariate GARCH (CCC-M GARCH) Model.

Errors from VEC Model are obtained and then each error is modelled as univariate GARCH model and covariance is calculated as follows:

$h_{ss,t} = \omega_s + \alpha_s,1\ \varepsilon^2_{s,t-1} + \beta_{s,1}\ h_{ss,t-1}$

$h_{ff,t} = \omega_f + \alpha_{f,1}\ \varepsilon^2_{f,t-1} + \beta_{f,1}\ h_{ff,t-1}$

$h_{sf,t} = \rho(h_{ss,t} \times h_{ff.t})^{1/2}$

Where, $h_{ss,t}$ is the conditional spot price variance at time t, $h_{ff,t}$ is conditional futures prices variance, $h_{sf,t}$ is covariance and ρ is the constant conditional correlation.

Average Time – Varying Hedge Ratio (H_t) = $\frac{h_{sf,t}}{h_{ff,t}}$

Average Time – Varying Hedge Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)}$

The methodology described above is used for estimating optimum Hedge ratio and hedging effectiveness. It is the second part of the methodology for checking price discovery of spot price and futures prices of banking sector. The first two steps are same for estimating hedge ratio and effectiveness. Co integration test used to check long run relationship between spot price and futures price, but this test itself is not suitable for predicting direction of causality. In other words co integration test does not help to predict which type of causality exists among them. If the co integration test proves the long run relation between spot price and futures price, there should exist at least one direction causality. Granger-causality really means only a correlation between the current value of one variable and the past values of others. Granger causality test is most suitable to test direction of causality and it can apply only in stationary data.

5.7. Results and Discussion

5.7.1. Hedging of Banking Sector Futures

I. Optimal Hedge Ratio (OHR) and Hedging Effectiveness of Axis Bank Futures

Stock split announcement of Axis bank gave a structural break in time series data. So the total period is divided into two sub periods. Period one is before stock split and period two is after the stock split.

(A) Period I (1 January 2011 to 28 July 2014)

Spot price and Futures price have transformed to log form and named it as 'log spot price' and 'log futures price'. Both series are tested stationarity at levels and first difference by using Augmented Dickey-Fuller (ADF) test. Below table show the results of test.

Table 5.1

Unit Root Tests of Axis Bank (Period-1)

Variables	Levels	First difference
log spot	-1.432870(0.5672)	-27.08529(0.0000)**
Log future	-1.394470(0.5862)	-26.61003(0.0000)**

Figures in () are p-values. ** indicates significance at 1% level.
Source: Secondary data.

The p value of log spot and log futures at levels is greater than .05. So at levels both series have unit root. But the p value of both series at first difference is less than .05. So both series are stationary at first difference. Graph of first difference of spot price and future prices are presented in Fig. 5.1 and Fig. 5.2.

Figure 5.1

First Difference Spot Prices of Axis Bank (Period 1)

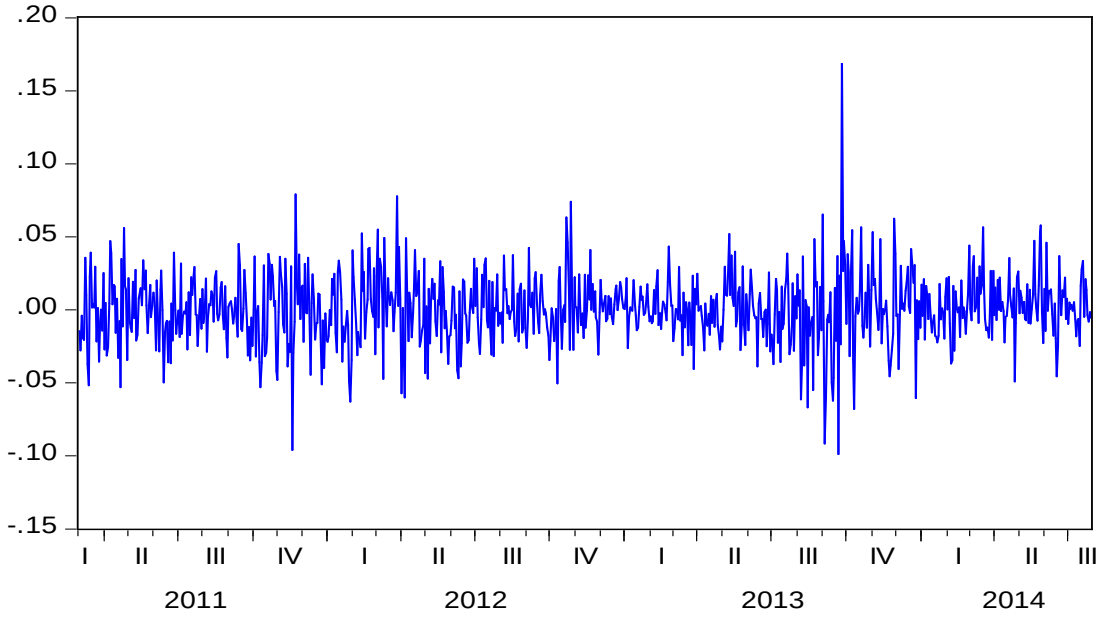


Figure 5.2

First Difference Futures Prices of Axis Bank (Period 1)

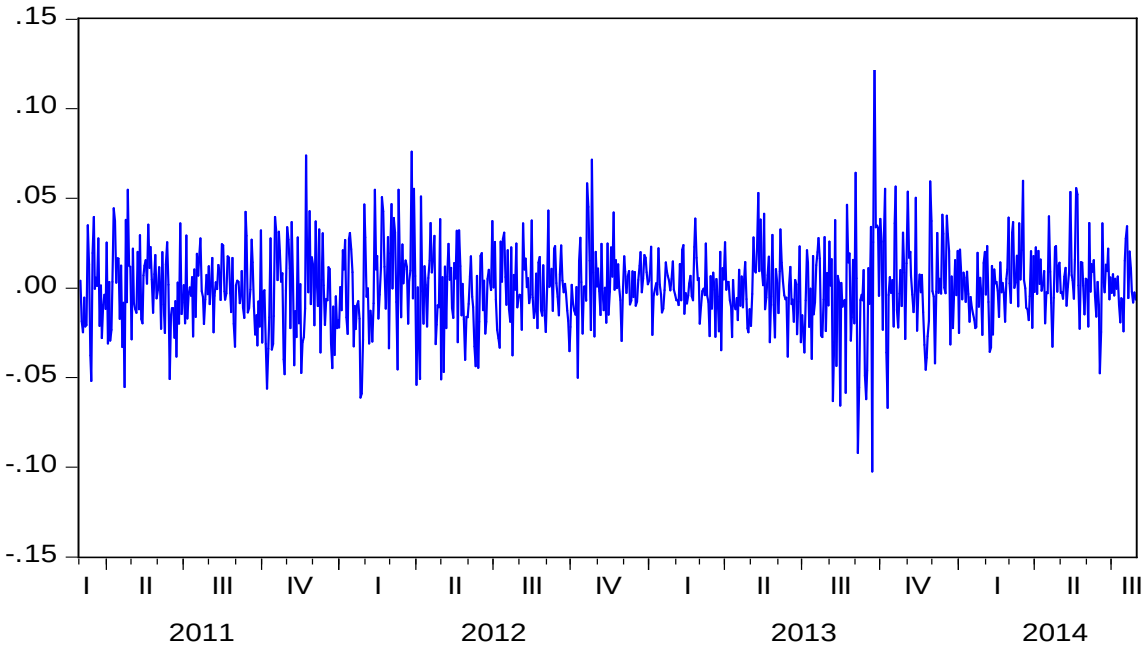


Fig 5.1 and 5.2 shows stationarity of data. Statistical stationarity in time series means that mean, variance, autocorrelation etc of the series are constant over time.

After the test of stationarity, test the co integrating relationship between the spot price and futures price by using Johansen co integration tests (both Trace and Eigen value). The results obtained are showed below.

Table 5.2

Testing Co integration between Spot Price and Futures Prices (Axis Bank Period – I) Using Johansen Co integration Tests

Hypothesized No. of CE(s)	Eigen value	Trace Statistic(λ trace)	Max-EigenStatistic(λ max)
None	0.110125	104.9634(0.0001) *	103.3731(0.0001) *
At most 1	0.001793	1.590366(0.2073)	1.590366(0.2073)

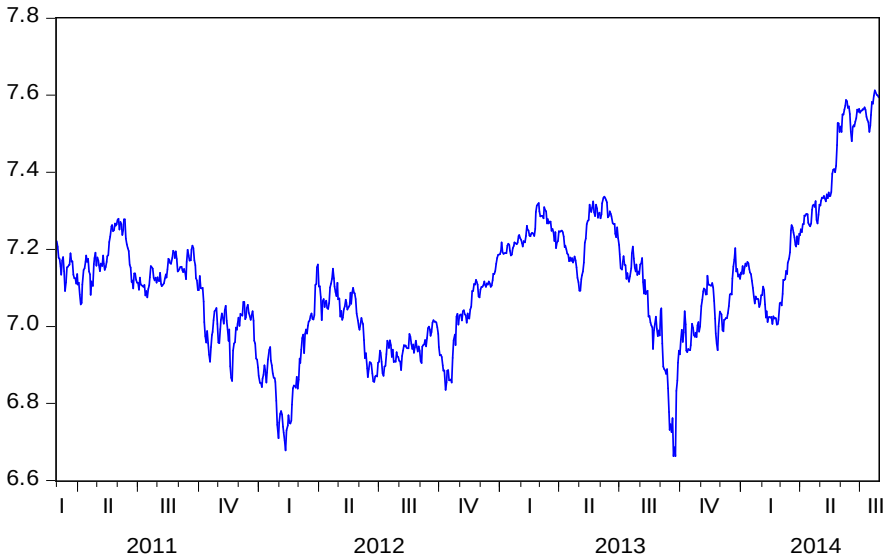
Figures in () are p-values. * denotes rejection of the hypotheses at the 0.05 level.
Source: Secondary data.

Both Trace and Max-Eigen value tests indicate 1 co integrating eqn(s) at the 0.05 level.

The price movement of both spot price and futures prices are indicated by Fig.5.3 and Fig.5.4.

Figure 5.3

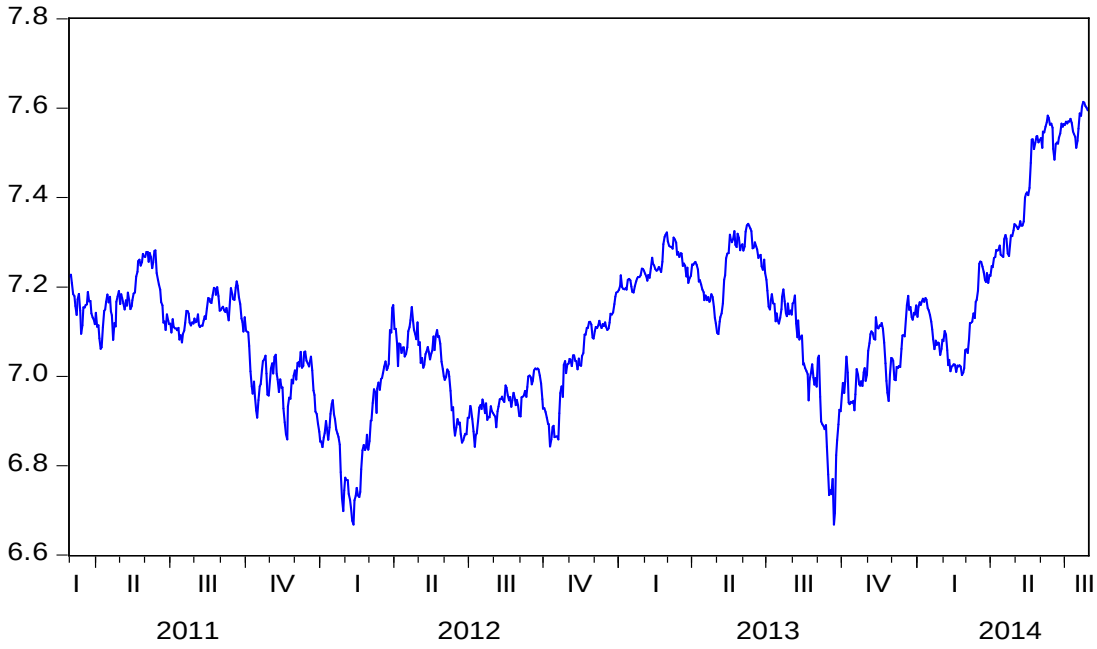
Spot Prices of Axis Bank (Period 1)



From the above graph we can say spot price of Axis bank also shows upward trend in long run.

Figure 5.4

Future Prices of Axis Bank (Period 1)



Above graphs show the future price movement of Axis bank. As on long term basis it shows an upward trend.

Johansen Co integration test proved that co integrating relationship between spot price and futures price of Axis bank. So VECM models are used and residuals are obtained from this model. Fig. 5.5 and Fig. 5.6 depict the residuals of VECM applied to 'spot price' and 'futures price' respectively.

Figure 5.5

Residuals of Spot Prices from VECM (Axis Bank Period 1)

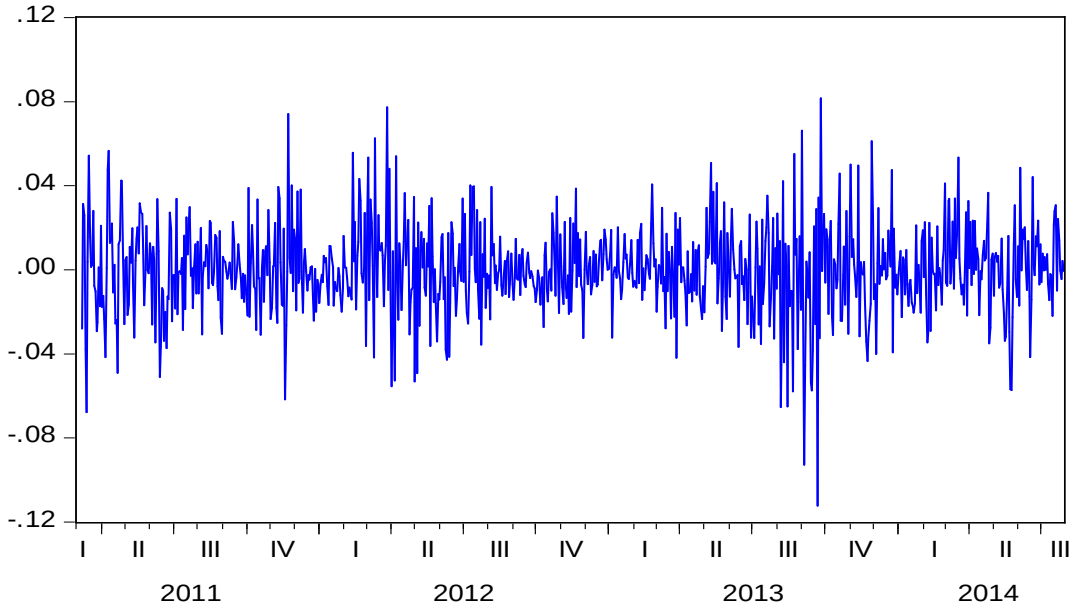
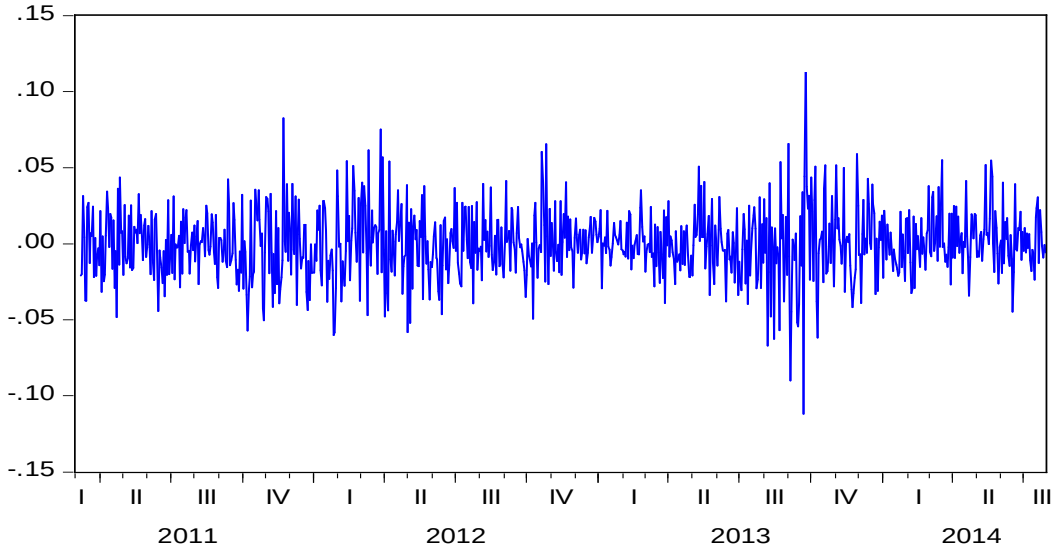


Figure 5.6

Residuals of Future Price from VECM (Axis Bank Period 1)



The descriptive statistics of the residual series from VECM are shown in the table below**.**

Table 5.3

Descriptive Statistics of the Residuals from VECM (Axis Bank Period – 1)

	Residual (Future price) ε_{ft}	**Residual (spot price) ε_{st}**
Mean	3.50E-19	1.18E-18
Median	-0.000895	-0.000506
Std. deviation	0.022728	0.021234

Source: Secondary data.

The Optimal Hedge Ratio (H) $= \frac{\sigma_{sf}}{\sigma_f^2} = 0.70$

Hedging Effectiveness (E) $= \frac{Var(U) - Var(H)}{Var(U)} = .40$

Next is the residual series are tested for ARCH effect using CCC-M GARCH Model. The results obtained are reported below

Table 5.4

Testing Futures Price Residuals for ARCH effect (Axis Bank Period – 1)

Variable	**Coefficient**	**Std. Error**	**Z-Statistic**	**p-Value**
C	0.000436	0.000692	0.630753	0.5282
Variance Equation				
C	8.23E-06	4.27E-06	1.926713	0.0540
RESID(-1)^2	0.065136	0.015590	4.178154	0.0000**
GARCH(-1)	0.918737	0.020088	45.73572	0.0000**

Source: Secondary data.

Above table showed residuals of future prices. Residuals of spot price obtained from obtained from CCC-M GARCH model as shown below

Table 5.5

Testing Spot Prices Residuals for ARCH effect (Axis Bank Period – 1)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	0.000155	0.000591	0.262049	0.7933
Variance Equation				
C	1.17E-05	3.72E-06	3.154160	0.0016
RESID(-1)^2	0.108308	0.020788	5.210072	0.0000**
GARCH(-1)	0.867260	0.021329	40.66188	0.0000**

** Significance at 1% level. Source: Secondary data.

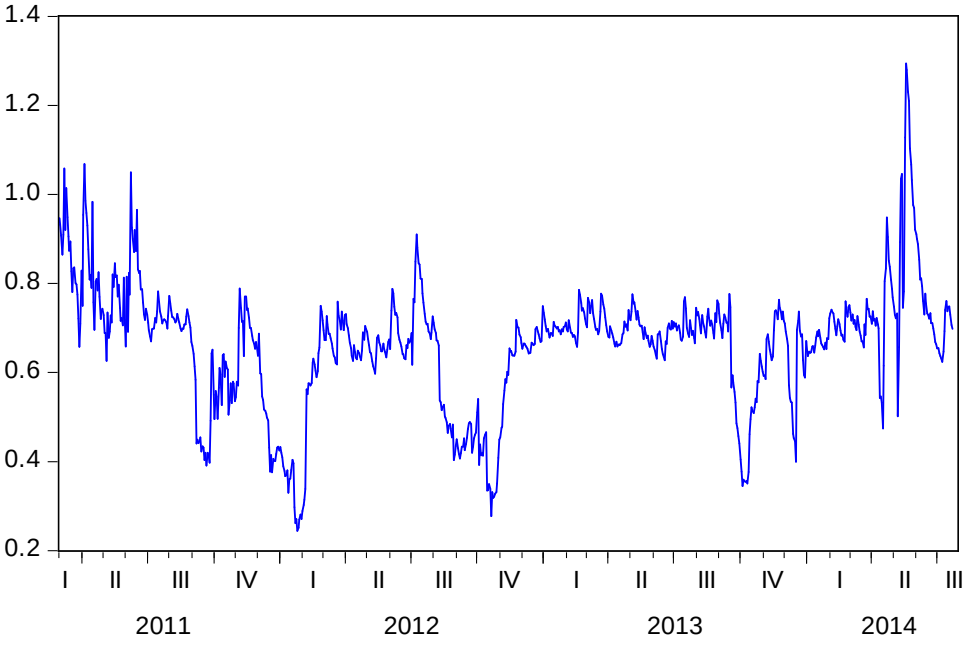
Average Time – Varying Hedge Ratio $(H_t) = \frac{h_{sf,t}}{h_{ff,t}}$ = .66

Average Time Varying Hedging Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)}$ =0.50

Fig. 5.7 – below depicts the time-varying hedge ratios of Axis bank future prices for the first period under study.

Figure 5.7

Time-Varying Hedge Ratios (Axis Bank Period – 1)



(B) Period II (30 July 2014 to 17 July 2017)

Spot price and futures price transformed into log form and tested unit root as described below.

Table 5.6

Unit Root Tests of Axis Bank (Period-1I)

Variables	Levels	First difference
log spot	-2.671398 (0.0795)	-28.09553 (0.0000)**
Log future	-2.530692 (0.1086)	-25.56075 (0.0000)**

Figures in () are p-values. ** indicates significance at 1% level.
Source: Secondary data.

Both 'spot price' and 'futures price' series are non-stationary but are found to be stationary at first difference. Graph of first difference of spot price and futures prices are presented in Fig. 4.8 and Fig. 4.9.

Figure 5.8

First Difference - Spot Prices of Axis Bank (Period 1I)

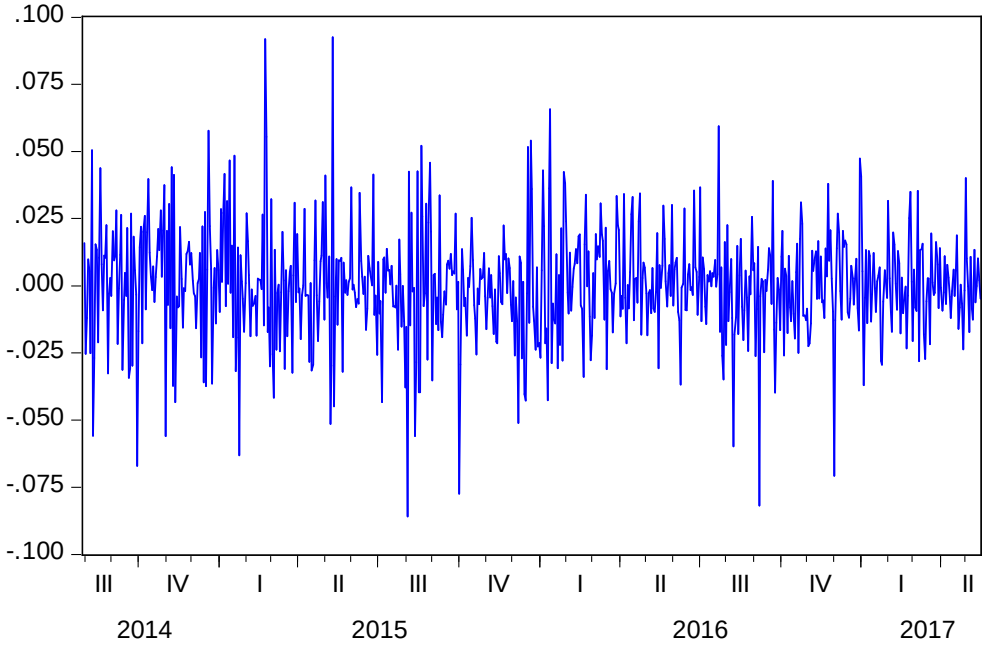
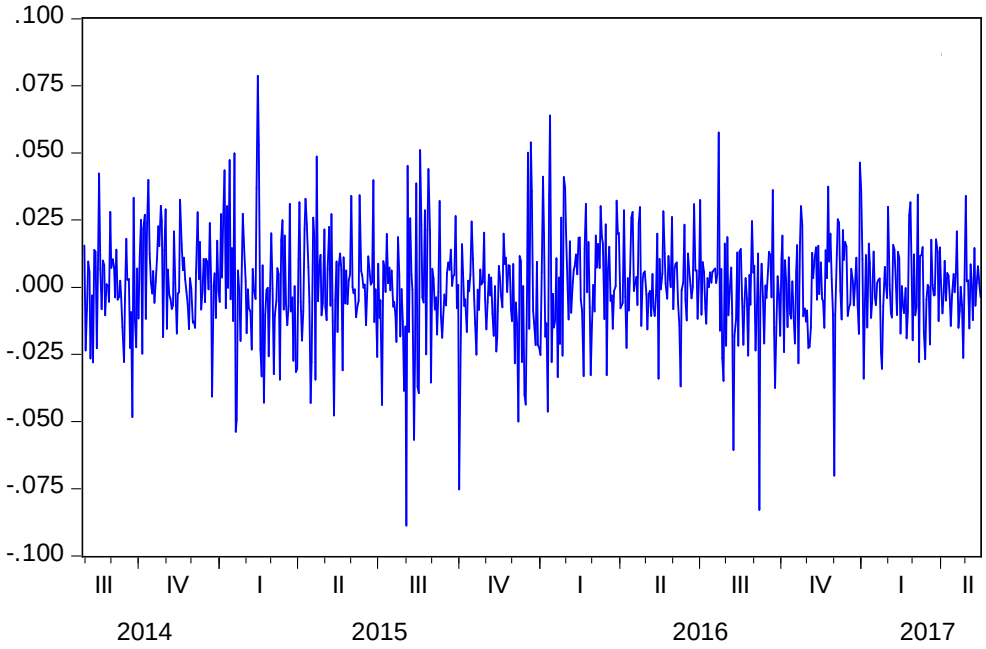


Figure 5.9

First Difference - Futures Prices of Axis Bank (Period 1I)



After the test of stationarity, the co integrating relationship between the spot price and futures price is tested by using Johansen co integration tests (both Trace and Eigen value). The results obtained are shown below.

Table 5.7

Testing Co integration between Spot Price and Futures Price (Axis Bank Period – 1I) Using Johansen Co integration Tests

Hypothesized No. of CE(s)	Eigen value (λ_{trace})	Trace Statistic (λ trace) (λ_{max})	Max-Eigen Statistic (λ max)
None	0.139867	114.9746(0.0000)*	109.2342(0.0000)*
At most 1	0.007887	5.740386(0.2118)	5.740386(0.2118)

Figures in () are p-values. * denotes rejection of the hypotheses at the 0.05 level.
Source: Secondary data

Both Trace and Max-Eigen value tests indicate 1 co integratingeqn (s) at the 0.05 level.

The price movement of both spot price and futures prices are indicated by Fig.5.10 and Fig.5.11.

Figure 5.10

Spot Prices of Axis Bank (Period 1I)

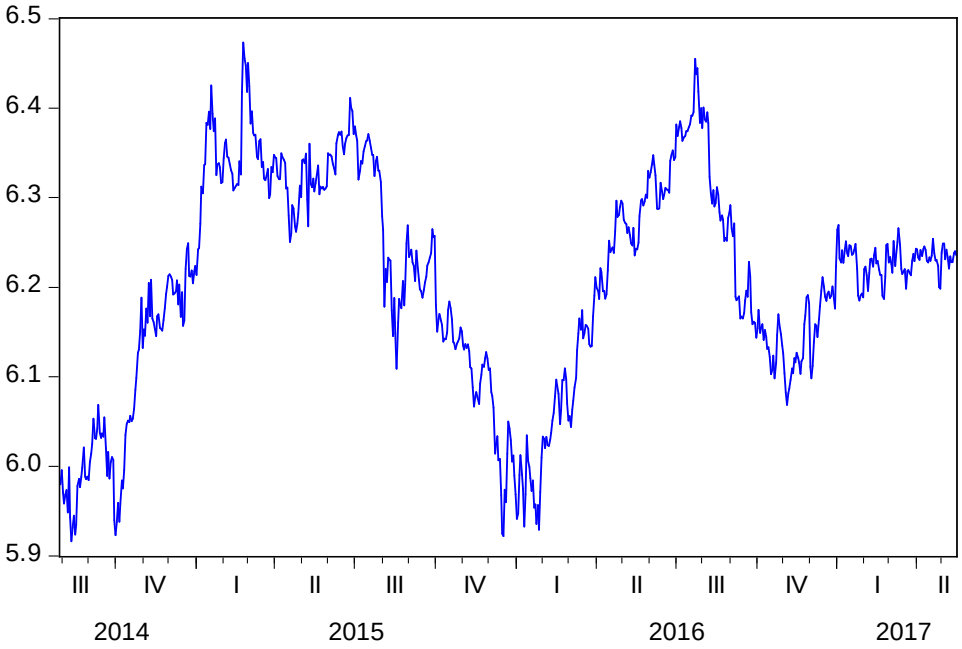
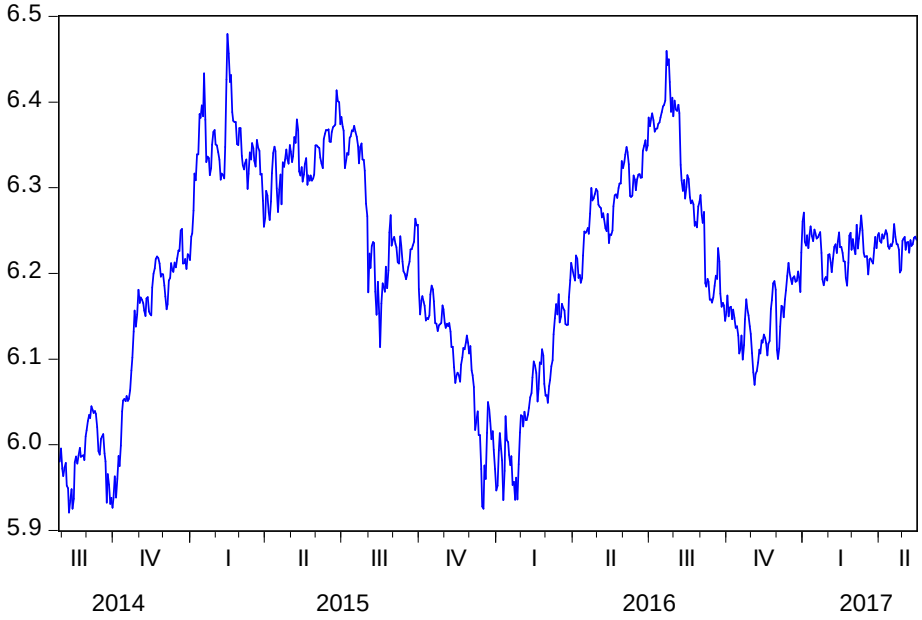


Figure 5.11

Futures Prices of Axis Bank (Period 1I)



Since the series are 1 (1) and are co integrated, we model them using VECM and the residuals are obtained. Fig. 5.12 and Fig. 5.13 present the residuals of Vector Error Correction Model applied to 'spot price' and 'futures price' series of Axis bank for Period – II under study.

Figure 5.12

Residuals of spot price from VECM (Axis Bank Period 1I)

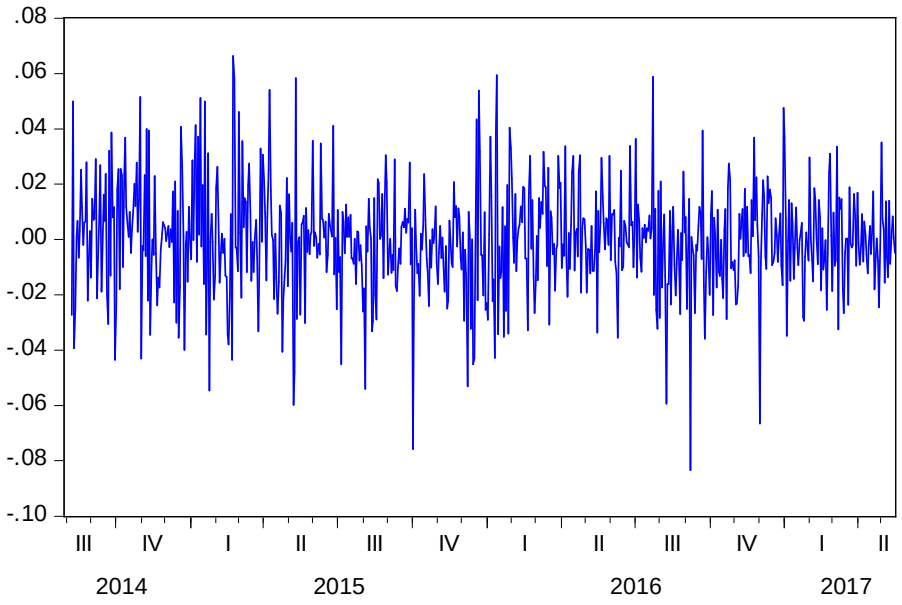
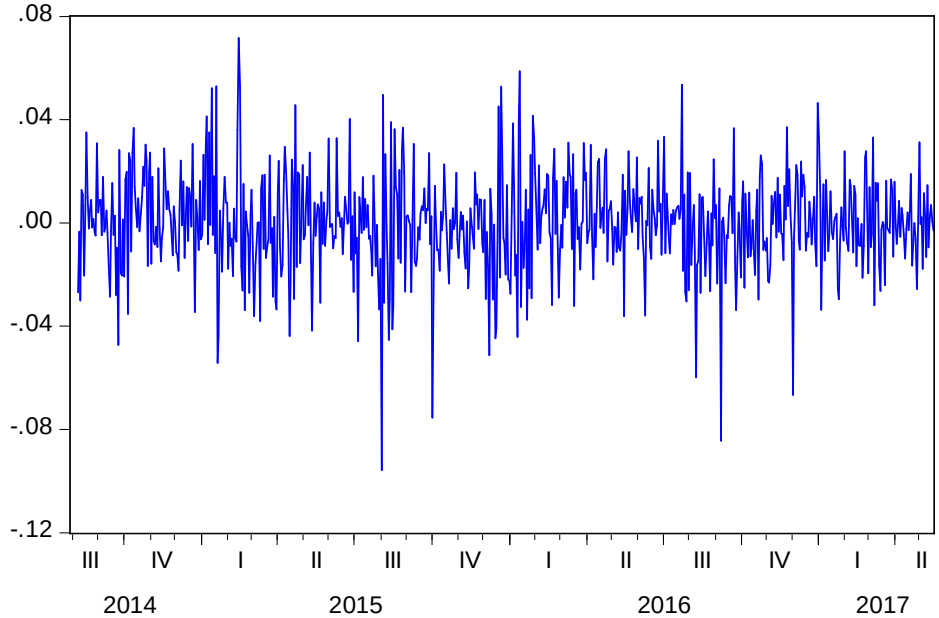


Figure 5.13

Residuals of futures prices from VECM (Axis Bank Period 1I)



The descriptive statistics of the residual series from VECM are reported below

Table 5.8

Descriptive Statistics of the Residuals from VECM (Axis Bank Period – 1I)

	Residual (Future price) ε_{ft}	**Residual (spot price) ε_{st}**
Mean	1.56E-19	-1.90E-18
Median	-0.000157	0.000231
Std. deviation	0.019006	0.019411

Source: Secondary data.

The Optimal Hedge Ratio (H) $= \frac{\sigma_{s,f}}{\sigma_f^2} = 0.71$

Hedging Effectiveness (E) $= \frac{Var(U) - Var(H)}{Var(U)} = 0.44$

The residual series are tested for ARCH effect using CCC-M GARCH model. The results obtained are reported below.

Table 5.9

Testing Futures Prices Residuals for ARCH effect (Axis Bank Period – 1I)

Variable	**Coefficient**	**Std. Error**	**Z-Statistic**	**p-Value**
C	0.000200	0.000709	0.282794	0.7773
Variance Equation				
C	9.03E-05	3.31E-05	2.732307	0.0063
RESID(-1)^2	0.110764	0.033443	3.311992	0.0009**
GARCH(-1)	0.638154	0.115154	5.541760	0.0000**

** Significance at 1% level. Source: Secondary data.

Above table showed residuals of futures prices. Residuals of spot price obtained from CCC-M GARCH model as shown below.

Table 5.10

Testing Spot Price Residuals for ARCH effect (Axis Bank Period – 1I)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	5.15E-05	0.000705	0.073039	0.9418
Variance Equation				
C	0.000100	4.02E-05	2.492295	0.0127
RESID(-1)^2	0.107836	0.037575	2.869876	0.0041**
GARCH(-1)	0.622788	0.133426	4.667680	0.0000**

** Significance at 1% level. Source: Secondary data.

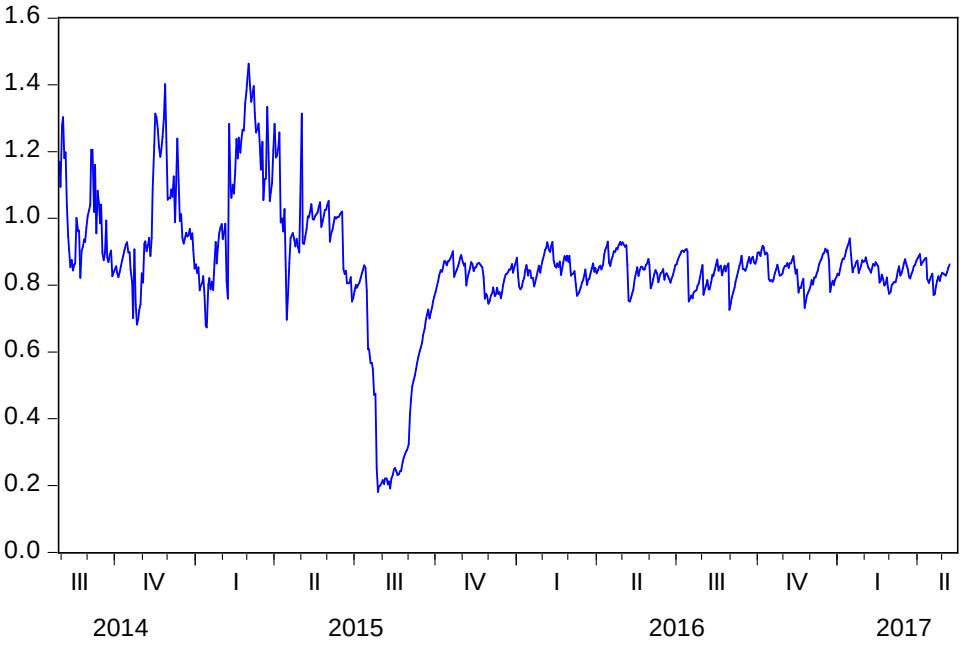
Average Time – Varying Hedge Ratio $(H_t) = \frac{h_{sf,t}}{h_{ff,t}}$ = 0.86

Average Time Varying Hedging Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)}$ =0.70

Fig. 5.14 – below depicts the time-varying hedge ratios of Axis bank future prices for the second period under study.

Figure 5:14

Time – Varying Hedge Ratios of Axis Bank Futures Prices (Period-II)



From the above analysis it can be concluded that the variance of return from hedged portfolio of Axis Bank shall be minimum when a position in spot price market is combined with position in futures market to the extent of 70 percent of the former. Average of first and second period of time varying hedge ratio is 76 percent. Hedging efficiency of Axis Bank futures is approximately 51 percent.

II. Optimal Hedge Ratio (OHR) and Hedging Effectiveness of Federal Bank Futures Prices

Federal Bank announced their stock split on 16th September 2013 and it came into existence on 18th October 2013. So the total period of the study is divided into two, period one and period two

(A) Period I (1 January 2011 to 17 October 2013)

Spot price and Futures price were changed to log form as 'log spot' and 'log futures'. Stationarity of this time series data are tested by using Augmented Dickey-Fuller (ADF) test.

Table 5.11

Unit Root Tests of Federal Bank (Period-1)

Variables	Levels	First difference
log spot	-1.974345(0.2983)	-23.25186(0.0000) **
Log future	-1.945217(0.3115)	-23.70913(0.0000)**

Figures in () are p-values. ** indicates significance at 1% level.
Source: Secondary data.

Both 'spot price' and 'futures price' series have a unit root (i.e., non- stationary) but are stationary at first difference. Fig. 4.22 and Fig. 4.23 represent first difference of spot price and futures prices.

Figure 5.15

First Difference - Futures Prices of Federal Bank (Period 1)

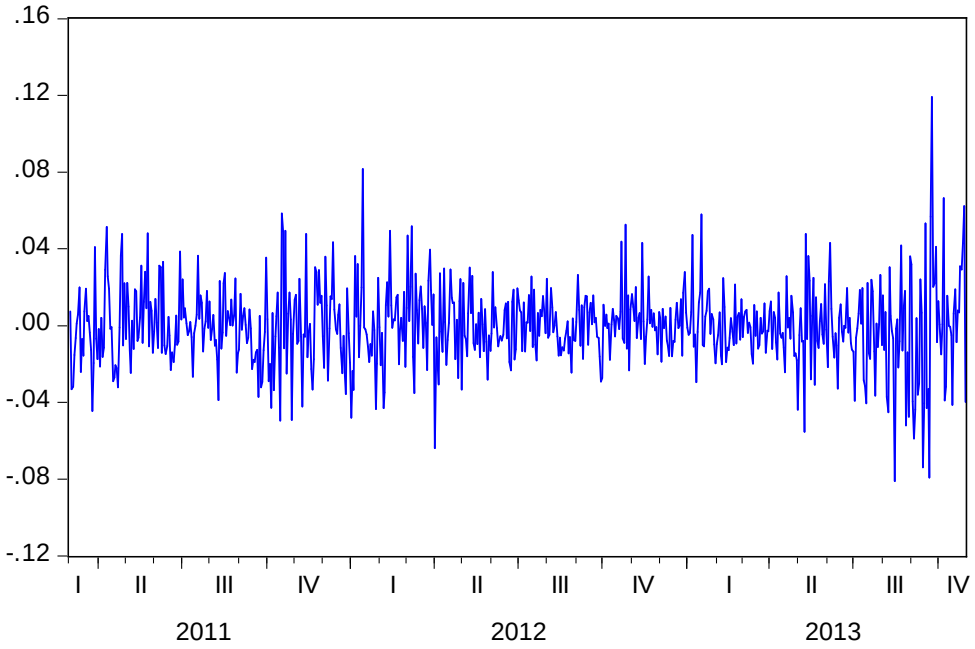
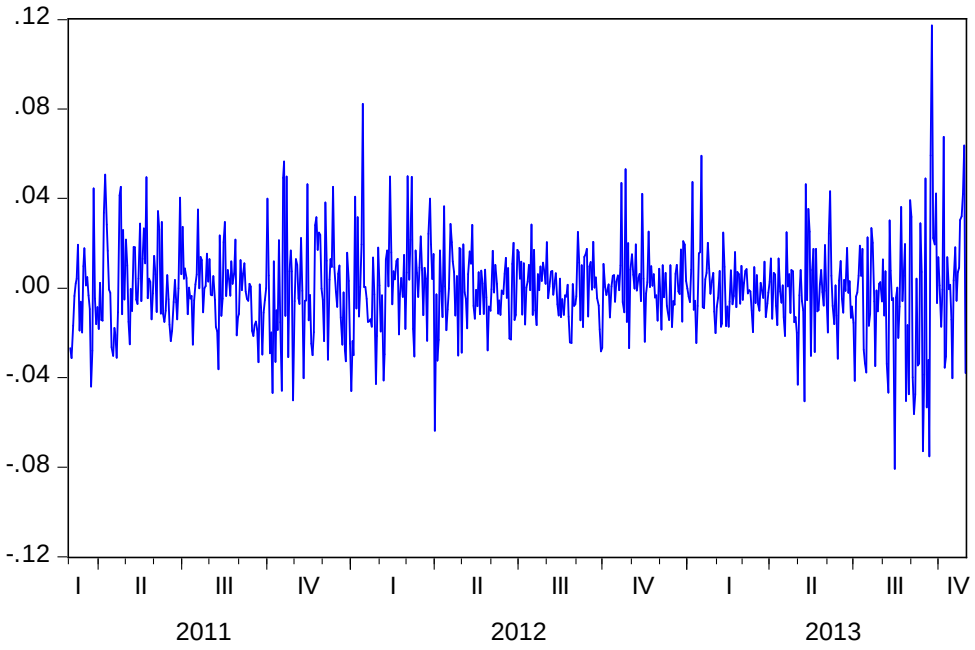


Figure 5.16

First Difference - Spot Price of Federal Bank (Period 1)



After the test of stationarity, the co integrating relationship between spot price and futures price are tested by using Johansen co integration tests (both Trace and Eigen value). The results obtained are shown below.

Table 5.12

Testing Co integration between Spot Price and Futures Price (Federal Bank Period – 1) Using Johansen Co integration Tests

Hypothesized No. of CE(s)	Eigen value	Trace Statistic (λ trace)	Max-Eigen Statistic (λ max)
None	0.134808	104.1863 (0.0001)*	100.3489 (0.0000)*
At most 1	0.005522	3.837450 (0.0501)	3.837450 (0.0501)

Figures in () are p-values. * denotes rejection of the hypotheses at the 0.05 level.
Source: Secondary data.

Both Trace and Max-Eigen value tests indicate 1 co integrating eqn (s) at the 0.05 level.

The price movement of both spot price and futures prices are indicated by Fig. 5.17 and Fig.5.18.

Figure 5.17

Futures Prices of Federal Bank (Period 1)

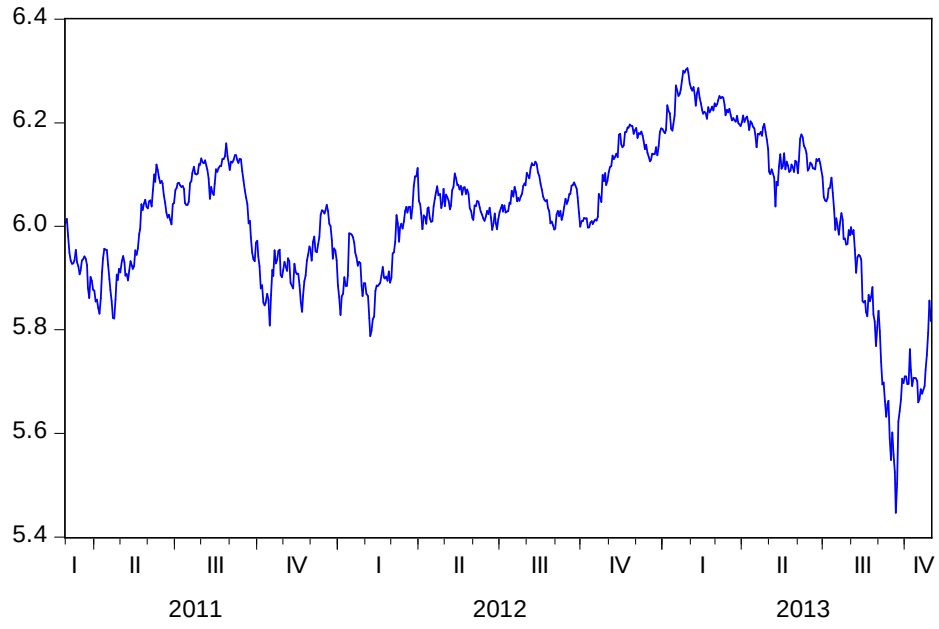
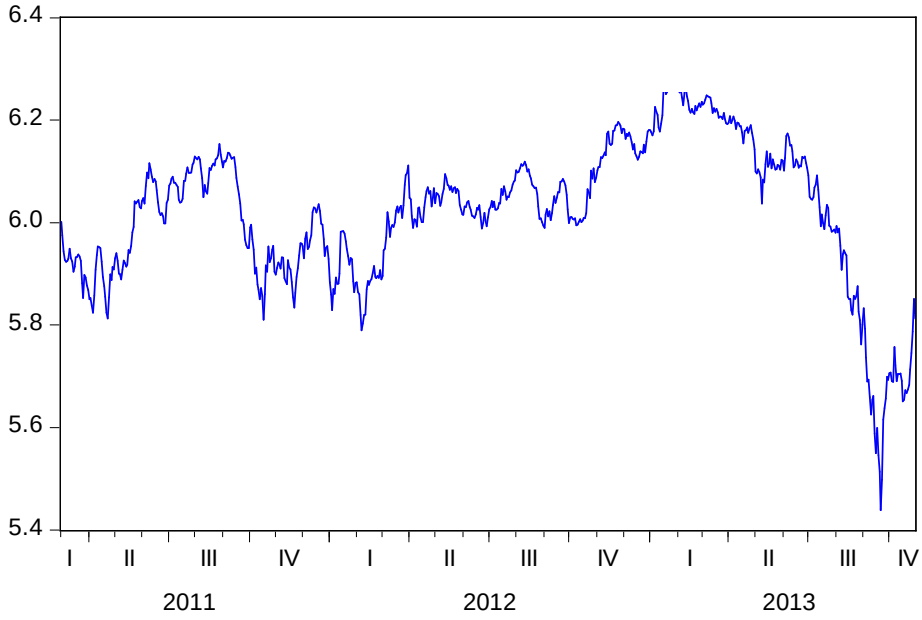


Figure 5.18

Spot Prices of Federal Bank (Period 1)



Since the log series are 1 (1) and are co integrated, we use VECM to model them and the residuals are obtained. These residuals are depicted in the graphs below.

Figure 5.19

Residuals of Spot Price from VECM (Federal Bank Period 1)

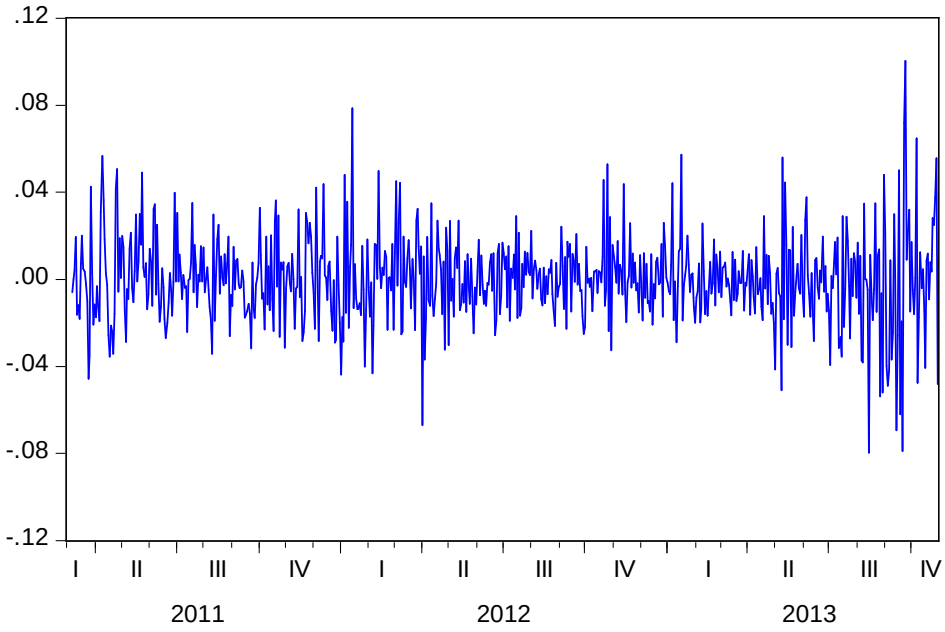
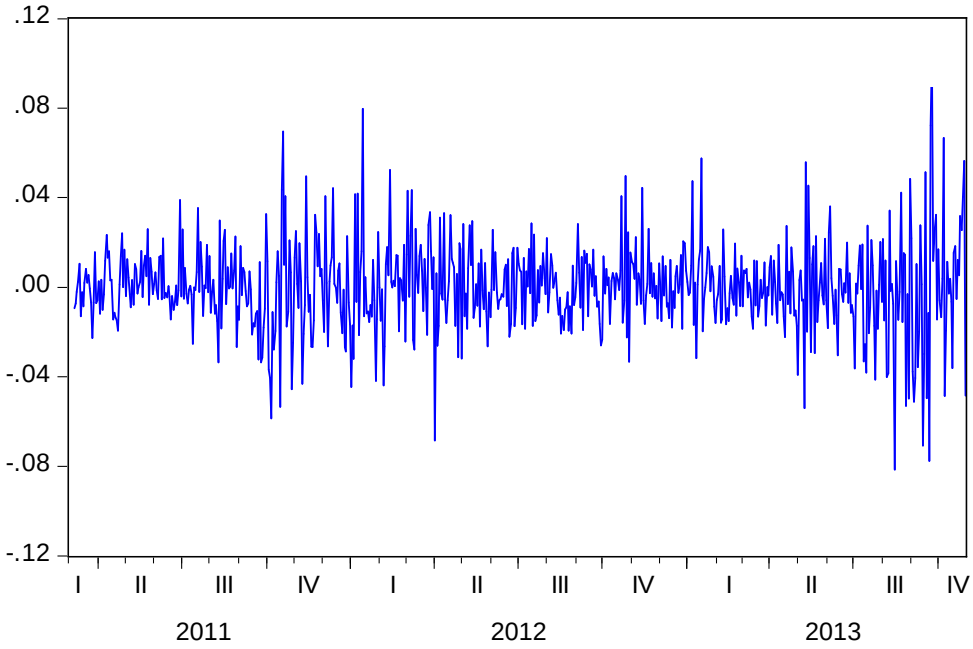


Figure 5.20

Residuals of Futures Prices from VECM (Federal Bank Period 1)



The Following Table (5.13) lists the descriptive statistics of the residual series. Variances and covariance of the residuals used in the calculation of OHR are computed from the standard deviation reported below.

Table 5.13

Descriptive Statistics of the Residuals from VECM (Federal Bank Period – 1)

	Residual (Future price) ε_{ft}	**Residual (spot price) ε_{st}**
Mean	-5.61E-19	-4.81E-19
Median	-0.001031	-0.001053
Std. deviation	0.020213	0.020224

The Optimal Hedge Ratio (H) $= \frac{\sigma_{sf}}{\sigma_f^2} = 0.90$

Hedging Effectiveness (E) $= \frac{Var(U) - Var(H)}{Var(U)} = 0.75$

The residual series are tested for ARCH effect using CCC-M GARCH model and the results are reported below.

Table 5.14

Testing Future Prices Residuals for ARCH effect (Federal Bank Period – 1)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	0.000319	0.000657	0.485490	0.6273
Variance Equation				
C	7.12E-06	3.11E-06	2.286596	0.0222
RESID(-1)^2	0.084040	0.018928	4.439904	0.0000**
GARCH(-1)	0.902296	0.023444	38.48732	0.0000**

** Significance at 1% level. Source: Secondary data.

Above table showed residuals of future prices. Residuals of spot price obtained from obtained from CCC-M GARCH model as shown below.

Table 5.15

Testing Spot price Residuals for ARCH effect (Federal Bank Period – 1)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	0.000128	0.000663	0.192370	0.8475
Variance Equation				
C	1.32E-05	5.12E-06	2.584283	0.0098
RESID(-1)^2	0.101710	0.024215	4.200365	0.0000**
GARCH(-1)	0.869722	0.031220	27.85765	0.0000**

** Significance at 1% level. Source: Secondary data.

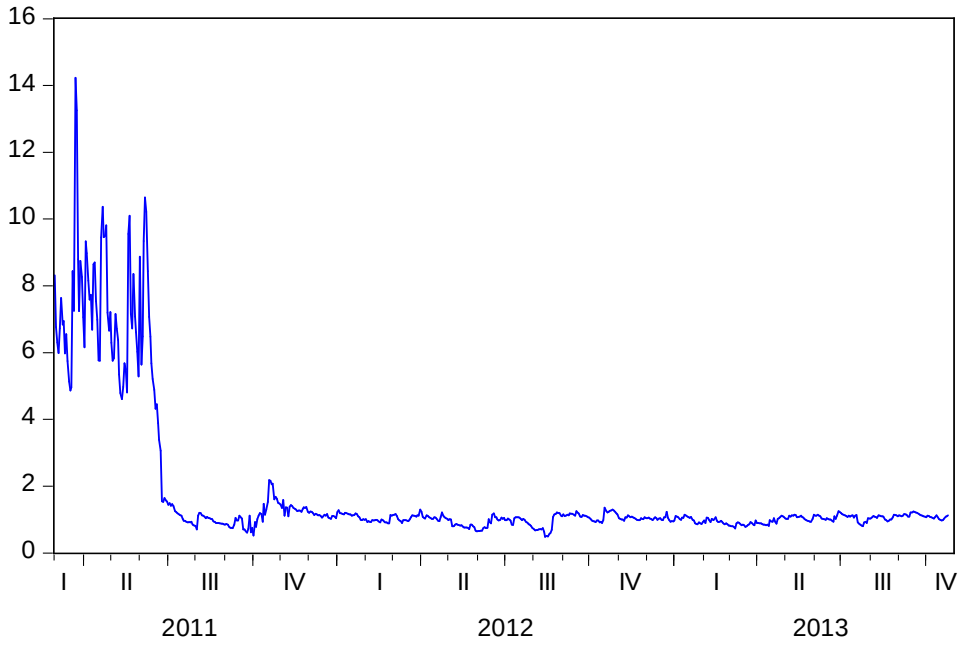
Average Time – Varying Hedge Ratio $(H_t) = \frac{h_{sf,t}}{h_{ff,t}}$ = .86

Average Time Varying Hedging Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)}$ = 0.85

The time-varying hedge ratios of current month Federal Bank futures prices for the first sub-period under study are depicted below.

Figure 5.21

Time Varying Hedge Ratio of Federal Bank (Period – 1)



(B) Period II (18 October 2013 to 17 July 2017)

Spot price and Futures price are changed to log form as 'log spot' and 'log futures'. Stationarity of this time series data are tested by using Augmented Dickey-Fuller (ADF) test. Results are showed in the Table 5.16.

Table 5.16

Unit Root Tests of Federal Bank (Period-1I)

Variables	Levels	First difference
log spot	-1.281927(0.6398)	-28.96204(0.0000)**
Log future	-1.290756 (0.6357)	-29.18400 (0.0000)**

Figures in () are p-values. ** indicates significance at 1% level.

Source: Secondary data.

Both spot price and futures prices are stationary at first differences. Graph of first difference of both series are shown in fig.5.22 and 5.23.

Figure 5.22

First Difference - Futures Prices of Federal Bank (Period 1I)

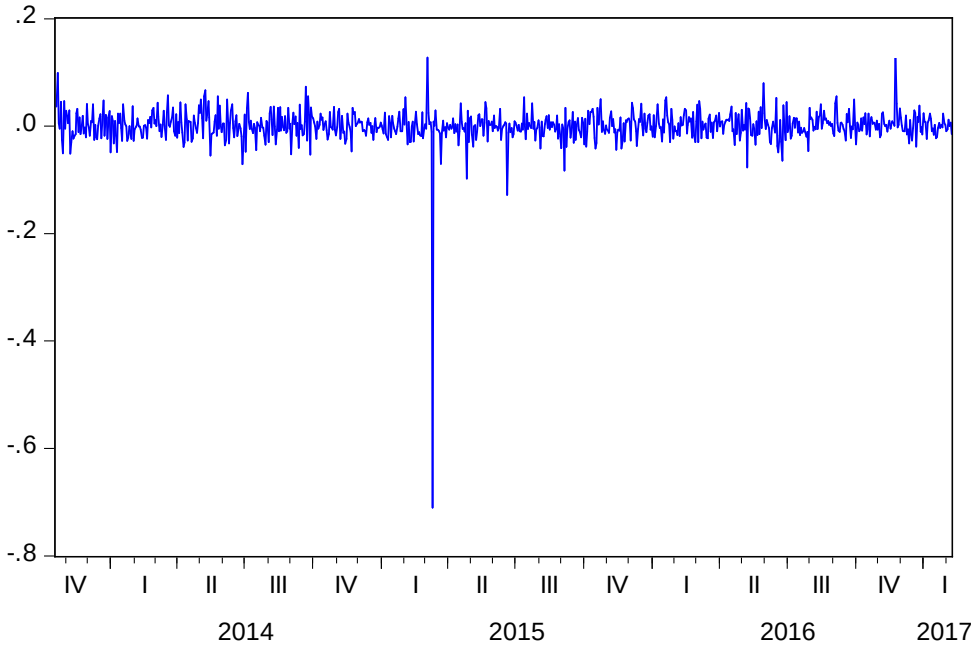
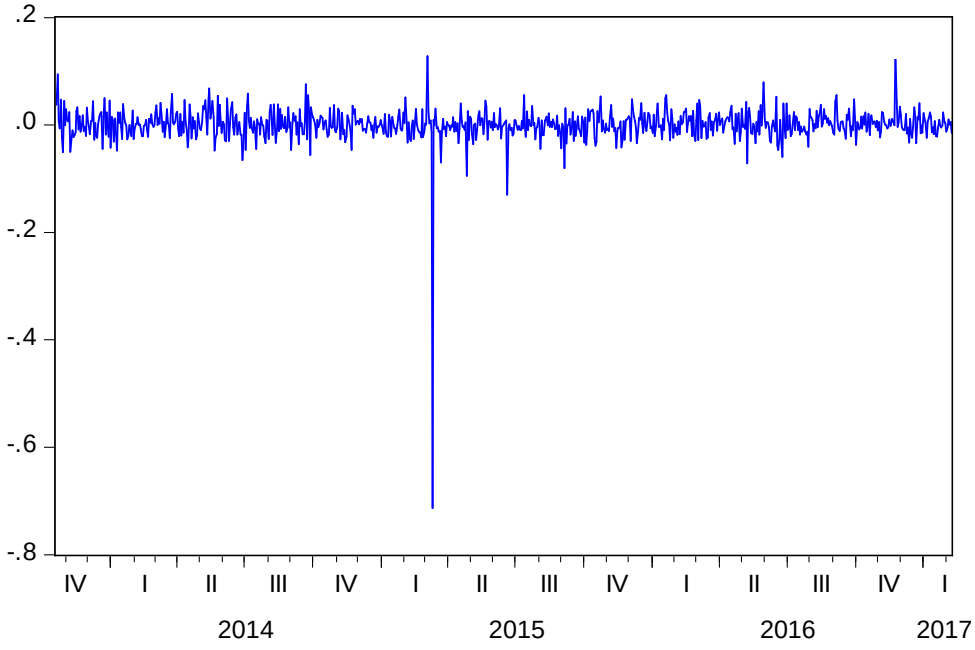


Figure 5.23

First Difference - Spot Prices of Federal Bank (Period 1I)



After the test of stationarity, the co integrating relationship between spot price and futures price are tested by using Johansen co integration tests (both Trace and Eigen value). The results obtained are shown below.

Table 5.17

Testing Co integration between Spot Prices and Futures Prices (Federal Bank Period – 1I) using Johansen Co integration Tests

Hypothesized No. of CE(s)	Eigen value	Trace Statistic (λ trace)	Max-Eigen Statistic (λ max)
None	0.083076	75.43988 (0.0000)*	74.32827 (0.0000)*
At most 1	0.001296	1.111611 (0.2917)	1.111611 (0.2917)

Figures in () are p-values. * denotes rejection of the hypotheses at the 0.05 level.
Source: Secondary data.

Both Trace and Max-Eigen value tests indicate 1 co integrating eqn (s) at the 0.05 level.

The price movement of both spot price and futures prices are indicated by Fig.5.24 and Fig.5.25.

Figure 5.24

Futures Prices of Federal Bank (Period 1I)

Figure 5.25

Spot Prices of Federal Bank (Period 1I)

The presence of co integration is confirmed by the Johansen co integration tests (both Trace and Eigen value). Since the series are 1(1) and are co integrated, they are modelled using VECM and the residuals are obtained. Fig. 5.27 and Fig. 5.28 depict the residuals of VECM applied to 'spot price' and 'futures price' respectively.

Figure 5.27

Residuals of Spot Price from VECM (Federal Bank Period 1I)

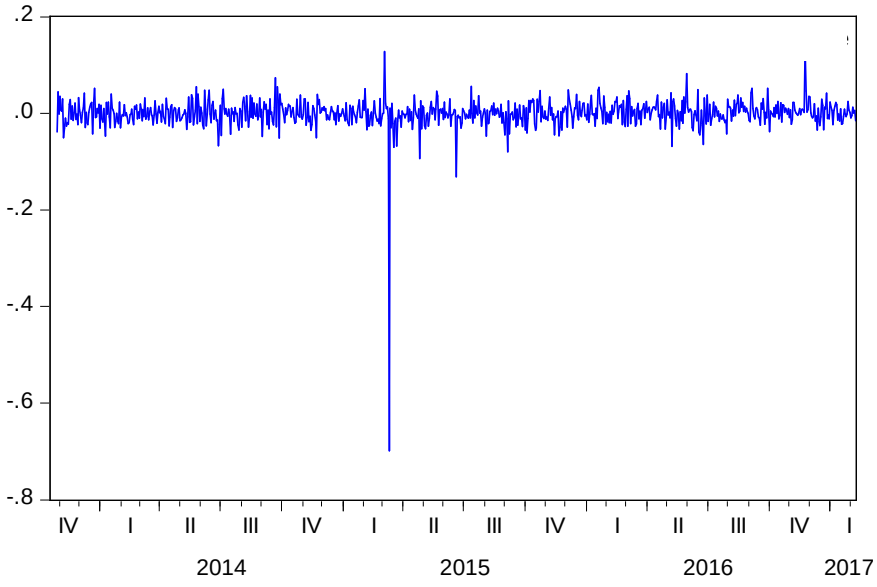


Figure 5.27

Residuals of Futures Price from VECM (Federal Bank Period 1I)

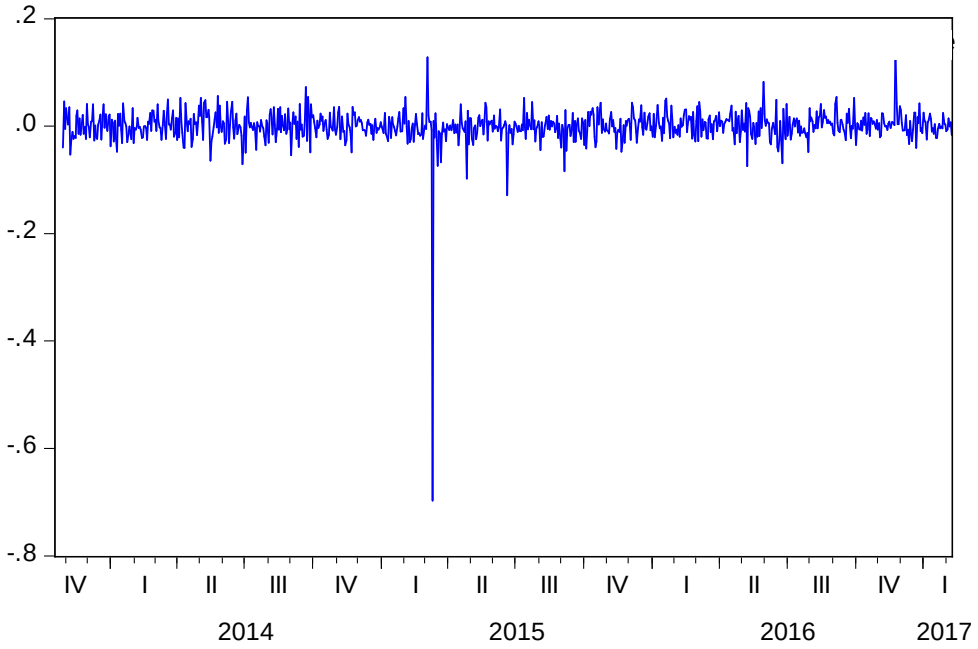


Table 5.18 reported descriptive statistics of residual series. Variances and co variances are calculated by using standard deviation from the below table.

Table 5.18

Descriptive Statistics of the Residuals from VECM (Federal Bank Period –1I)

	Residual (Future price) ε_{ft}	**Residual (spot price) ε_{st}**
Mean	-1.15E-18	-5.57E-19
Median	0.001082	0.000334
Std. deviation	0.033158	0.032569

Source: Secondary data.

The Optimal Hedge Ratio (H) $= \frac{\sigma_{sf}}{\sigma_f^2} = 0.90$

Hedging Effectiveness (E) $= \frac{Var(U) - Var(H)}{Var(U)} = 0.92$

Next the residual series are tested for ARCH effect using CCC-M GARCH Model. The results obtained are reported below.

Table 5.19

Testing Futures price Residuals for ARCH effect (Federal Bank Period – 1I)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	-0.000224	0.000868	-0.258335	0.7961
Variance Equation				
C	5.60E-05	7.89E-06	7.104548	0.0000
RESID(-1)^2	0.227259	0.023896	9.510172	0.0000**
GARCH(-1)	0.802578	0.020090	39.94844	0.0000**

** Significance at 1% level. Source: Secondary data.

Above table showed residuals of future prices. Residuals of spot price obtained from obtained from CCC-M GARCH model as shown below

Table 5.20

Testing Spot price Residuals for ARCH effect (Federal Bank Period – 1I)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	-0.000423	0.000798	-0.530642	0.5957
Variance Equation				
C	4.57E-05	6.05E-06	7.555792	0.0000
RESID(-1)^2	0.237528	0.021666	10.96316	0.0000**
GARCH(-1)	0.803148	0.017608	45.61319	0.0000**

** Significance at 1% level. Source: Secondary data.

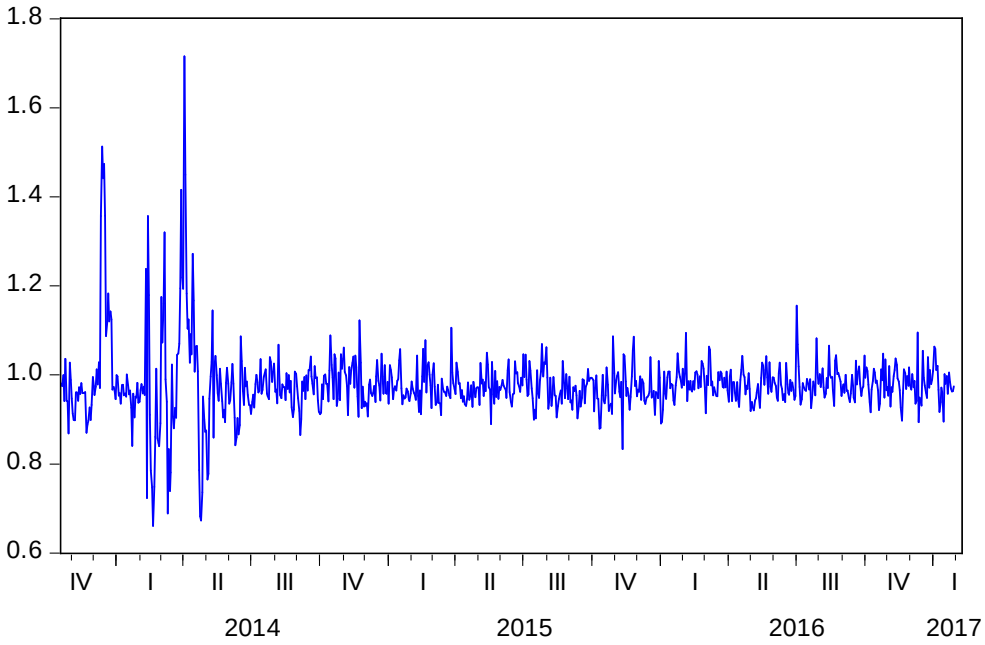
Average Time Varying Hedge Ratio $(H_t) = \frac{h_{sf,t}}{h_{ff,t}}$ = 0.97

Average Time Varying Hedging Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)}$ =0.98

The time-varying hedge ratios of current month Federal Bank futures prices for the second sub-period under study are depicted below.

Figure 5.28

Time Varying Hedge Ratio of Federal Bank (Period – 1I)



From the above analysis of Federal Bank futures prices, it can be concluded that the risk involved in holding positions in Federal bank can be minimized if combined with positions in Federal Bank futures to the extent of 90 percent. Average of period I and period II of Constant and dynamic hedging effectiveness of Federal bank futures prices are 0.86 and 0.91 respectively. In other words, diversification with Federal Bank futures can reduce the risk arising from unexpected price variations of Federal Bank to the extent of 86 to 91 percent.

III. Optimal Hedge Ratio (OHR) and Hedging Effectiveness of HDFC Bank Future prices

Stock split of HDFC Bank held on 16th July 2011. Hence the total period is divided into two

(A) Period I (1 January 2011 to 14 July 2011)

Spot price and Futures prices are changed to log form as ‘log spot ’and ‘log futures’. Stationarity of this time series data are tested by using Augmented Dickey-Fuller (ADF) test.

Table 5.21

Unit Root Tests of HDFC Bank (Period-1)

Variables	Levels	First difference
log spot price	-1.182391(0.6809)	-11.56594(0.0000)**
Log future prices	-1.125456(0.7045)	-11.62723(0.0000)**

Figures in () are p-values. ** indicates significance at 1% level.
Source: Secondary data.

Both 'spot price' and 'futures price' series are non-stationary but are found to be stationary at first difference

Fig. 5.29 and Fig. 5.30 shows first difference of spot price and futures price

Figure 5.29

First difference - Spot Price of HDFC Bank (Period 1)

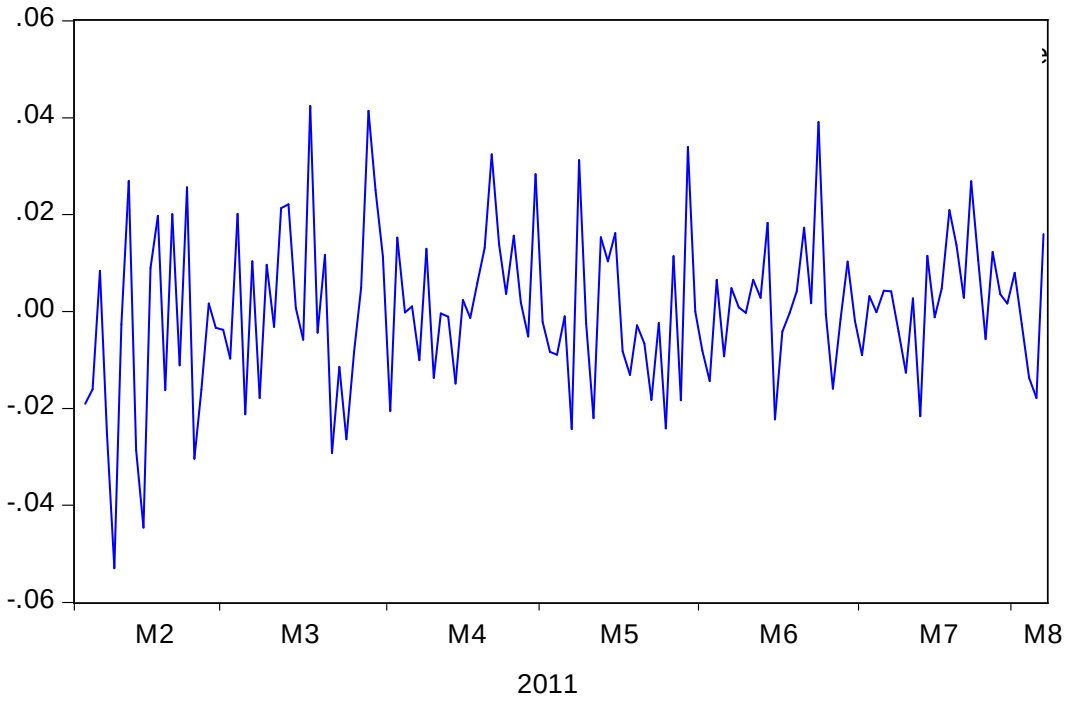
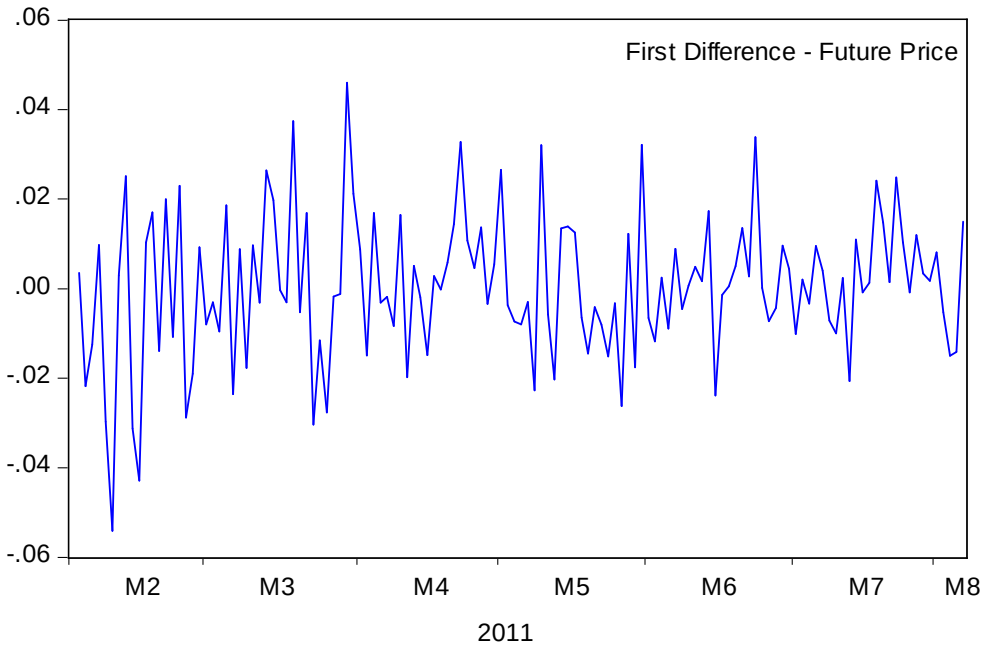


Figure 5.30

First Difference - Futures Prices of HDFC Bank (Period 1)



Next step is testing co integration between spot price and future prices. This study used Johansen co integration tests (both Trace and Eigen value) and results obtained are shown below.

Table 5.22

Testing Co integration between Spot Price and Future Price (HDFC Bank Period – 1) Using Johansen Co integration Tests

Hypothesized No. of CE(s)	Eigen value	Trace Statistic(λ trace)	Max-Eigen Statistic(λ max)
None	0.409743	70.85472(0.0000)*	69.58993(0.0000)*
At most 1	0.009536	1.264796(0.2607)	1.264796 (0.2607)

Figures in () are p-values. * denotes rejection of the hypotheses at the 0.05 level.
Source: Secondary data.

Both Trace and Max-Eigen value tests indicate 1 co integrating eqn (s) at the 0.05 level. The price movement of both futures prices and spot price are indicated by Fig.5.31 and Fig.5.32.

Figure 5.31

Futures Prices of HDFC Bank (Period 1)

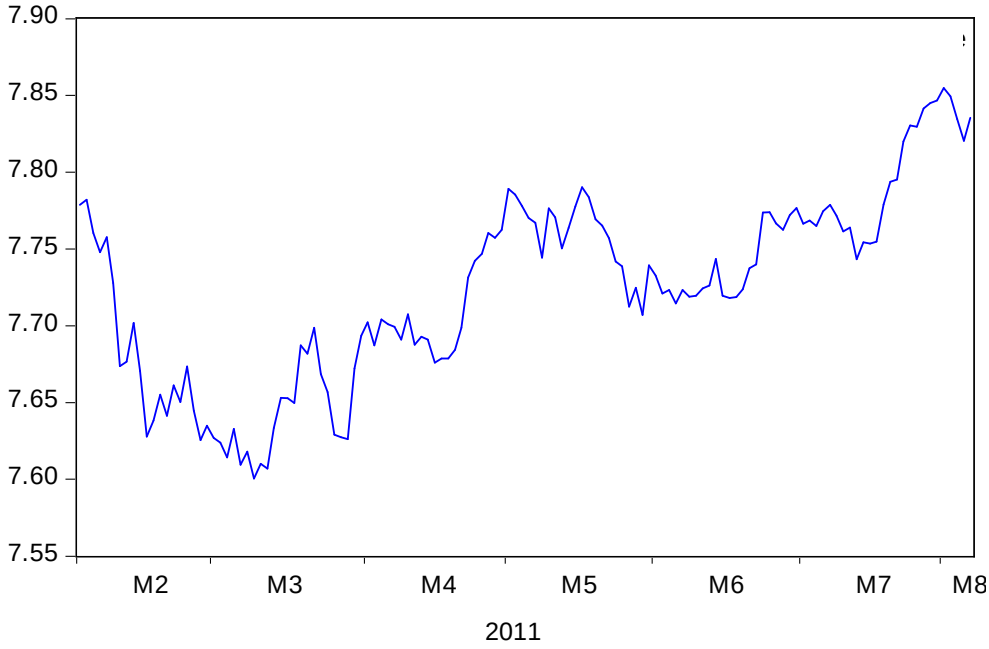
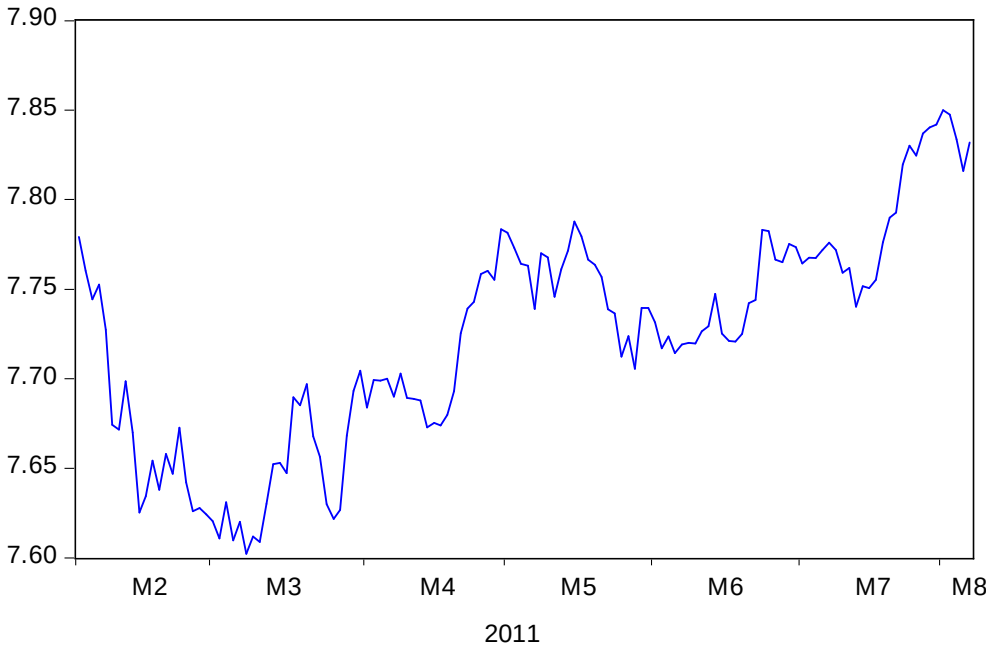


Figure 5.32

Spot Price of HDFC Bank (Period 1)



Since the series are 1 (1) and are co integrated, modelled using VECM and the residuals are obtained. Fig 4.40 and Fig. 4.41 depict the residuals of VECM.

Figure 5.33

Residuals of Spot Price from VECM (HDFC Bank -Period 1)

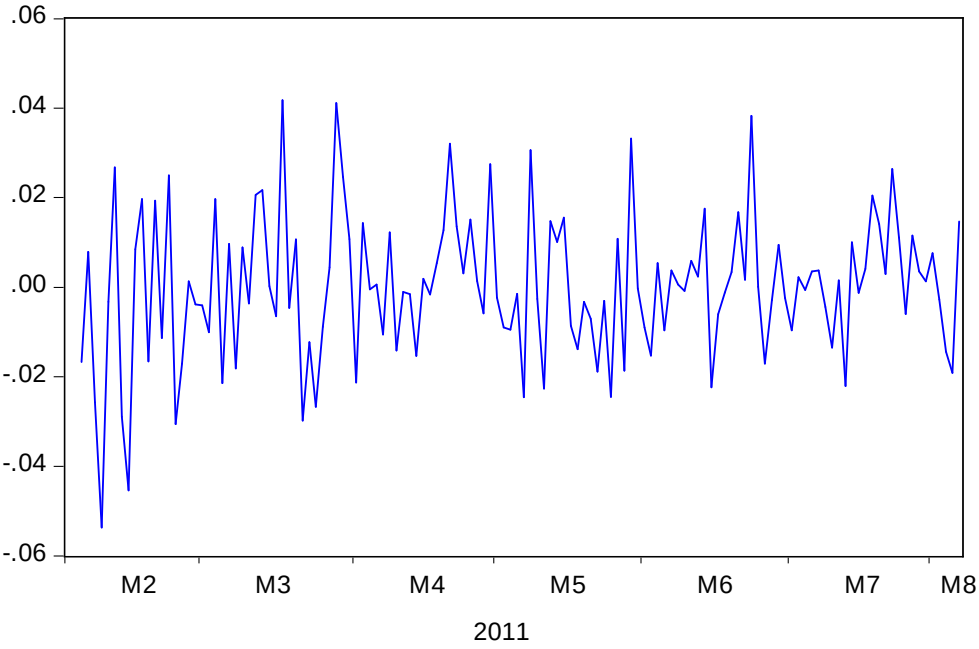
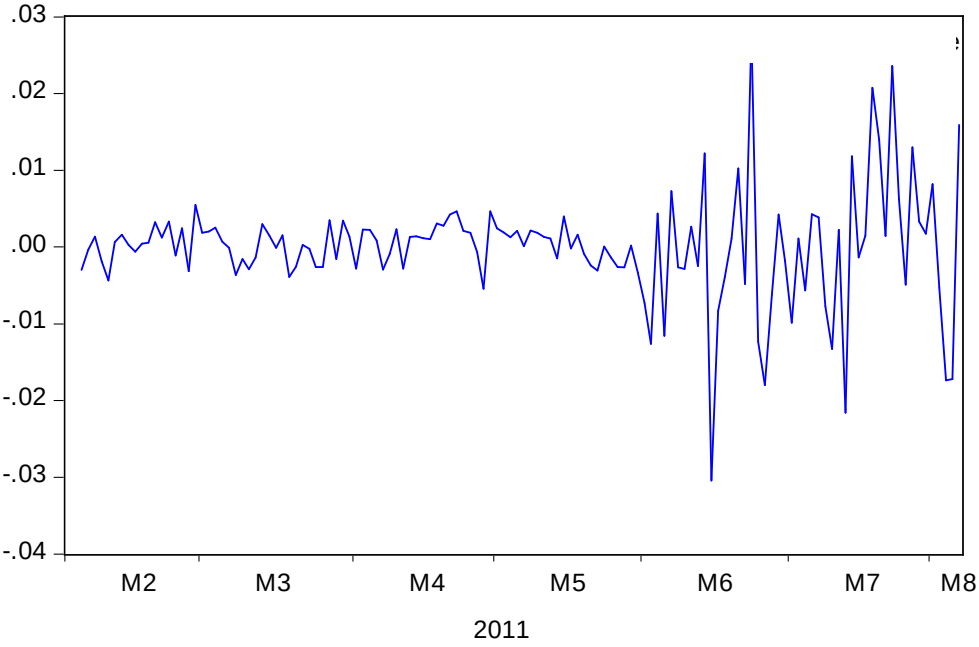


Figure 5.34

Residuals of Futures Prices from VECM (HDFC Bank -Period 1)



The descriptive statistics of the residual series which are used in the calculation of hedge ratios are reported below.

Table 5.23

Descriptive Statistics of the Residuals from VECM (HDFC Bank Period – 1)

	Residual (Future price) ε_{ft}	**Residual (spot price) ε_{st}**
Mean	-5.52E-19	1.05E-19
Median	-0.000368	0.000666
Std. deviation	0.016472	0.007266

Source: Secondary data.

The Optimal Hedge Ratio (H) $= \frac{\sigma_{s,f}}{\sigma_f^2} = 0.82$

Hedging Effectiveness (E) $= \frac{Var(U) - Var(H)}{Var(U)} = 0.13$

Next is the residual series are tested for ARCH effect using CCC-M GARCH Model. The results obtained are reported below.

Table 5.24

Testing Future prices Residuals for ARCH effect (HDFC Bank Period – 1)

Variable	**Coefficient**	**Std. Error**	**Z-Statistic**	**p-Value**
C	0.000274	0.000267	1.026204	0.3048
Variance Equation				
C	2.84E-08	3.84E-07	0.073960	0.9410
RESID(-1)^2	0.280502	0.078273	3.583622	0.0003**
GARCH(-1)	0.804187	0.066263	12.13631	0.0000**

** Significance at 1% level. Source: Secondary data.

Above table showed residuals of future prices. Residuals of spot price obtained from obtained from CCC-M GARCH model as shown below

Table 5.25

Testing Spot Price Residuals for ARCH effect (HDFC Bank Period – 1)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	0.000453	0.001236	0.366295	0.7141
Variance Equation				
C	4.77E-06	2.49E-06	1.911667	0.0559
RESID(-1)^2	-0.075518	0.039754	-1.899617	0.0575**
GARCH(-1)	1.052924	0.048711	21.61564	0.0000**

** Significance at 1% level. Source: Secondary data.

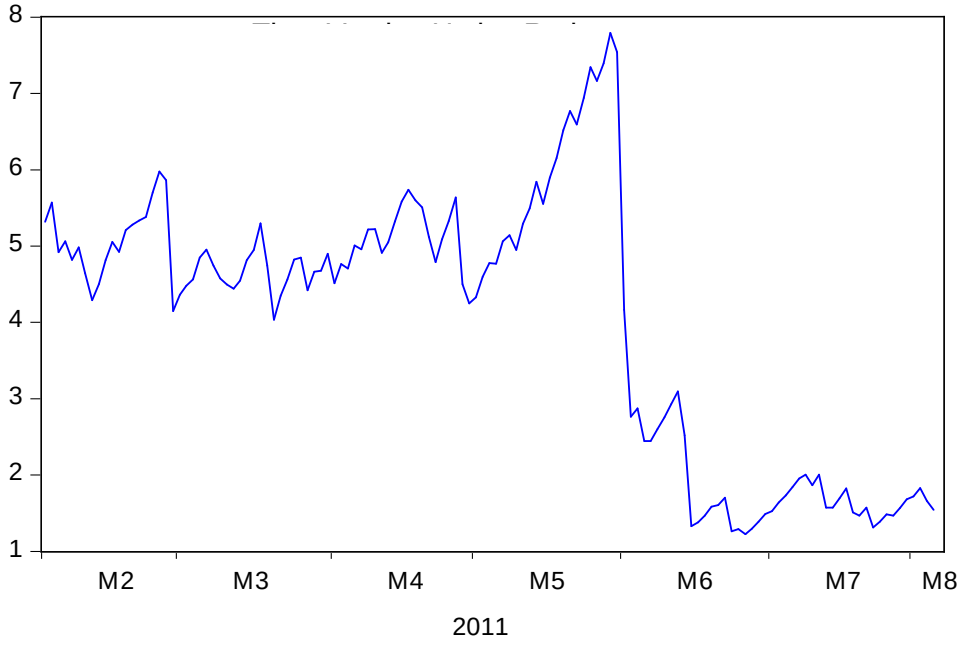
Average Time Varying Hedge Ratio $(H_t) = \frac{h_{sf,t}}{h_{ff,t}} = 0.76$

Average Time Varying Hedging Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)} = 0.15$

The time-varying hedge ratios of current month HDFC bank future prices for the first sub-period under study are depicted below

Figure 5.35

Time Varying Hedge Ratio of HDFC Bank (Period – 1)



(B) Period II (16 July 2011 to 17 July 2017)

Spot price and Futures price are changed to log form as 'log spot' and 'log future'. Stationarity of this time series data are tested by using Augmented Dickey-Fuller (ADF) test.

Table 5.26

Unit Root Tests of HDFC Bank (Period-1I)

Variables	Levels	First difference
log spot	0.115923 (0.9669)	-29.06646 (0.0000)**
Log future	0.082526 (0.9644)	-28.93775 (0.0000)**

Figures in () are p-values. ** indicates significance at 1% level.
Source: Secondary data.

Both 'spot price' and 'futures price' series are found to be non-stationary but are stationary at first difference. Graph of first difference of spot price and futures prices are presented in Fig. 5.36 and Fig. 5.37.

Figure 5.36

First Difference - Futures Price of HDFC Bank (Period 1I)

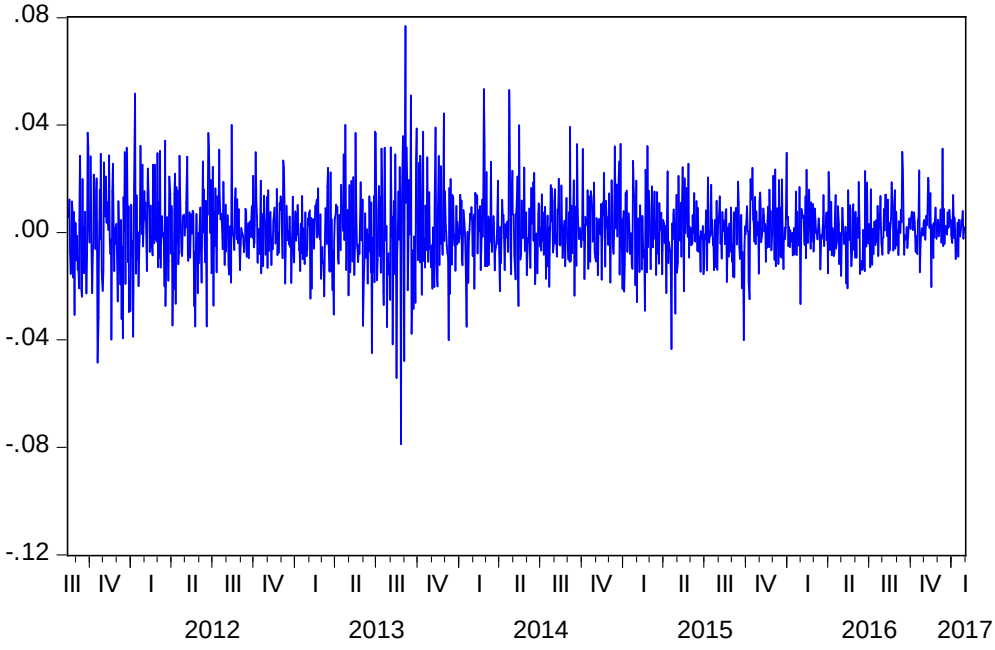
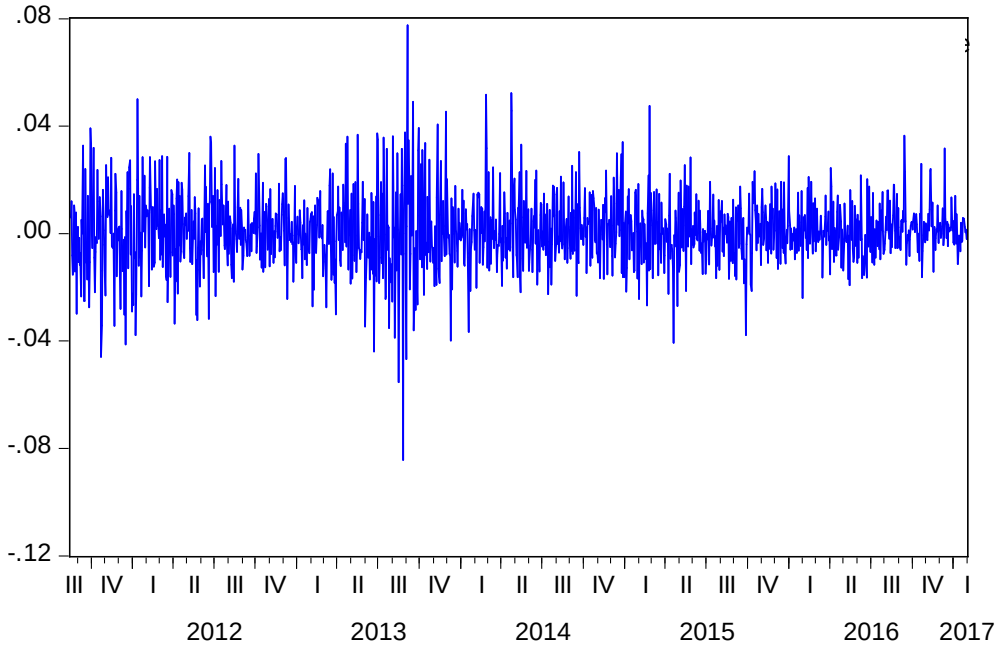


Figure 5.37

First Difference Spot Price of HDFC Bank (Period 1I)



After the test of stationarity, the co integrating relationship between spot price and futures price are tested by using Johansen co integration tests (both Trace and Eigen value). The results obtained are shown below

Table 5.27

Testing Co integration between Spot Price and Future Price (HDFC Bank Period – 1I) Using Johansen Co integration Tests

Hypothesized No. of CE(s)	Eigen value	Trace Statistic (λ trace)	Max-Eigen Statistic (λ max)
None*	0.099365	148.7528(0.0001)	148.7146 (0.0001)
At most 1	2.69E-05	0.038165(0.8451)	0.038165 (0.8451)

Figures in () are p-values. * denotes rejection of the hypotheses at the 0.05 level.
Source: Secondary data.

Both Trace and Max-Eigen value tests indicate 1 co integrating eqn (s) at the 0.05 level.

The price movement of both futures prices and spot price are indicated byFig.5.38 and Fig.5.39.

Figure 5.38

Future Prices of HDFC Bank (Period 1I)

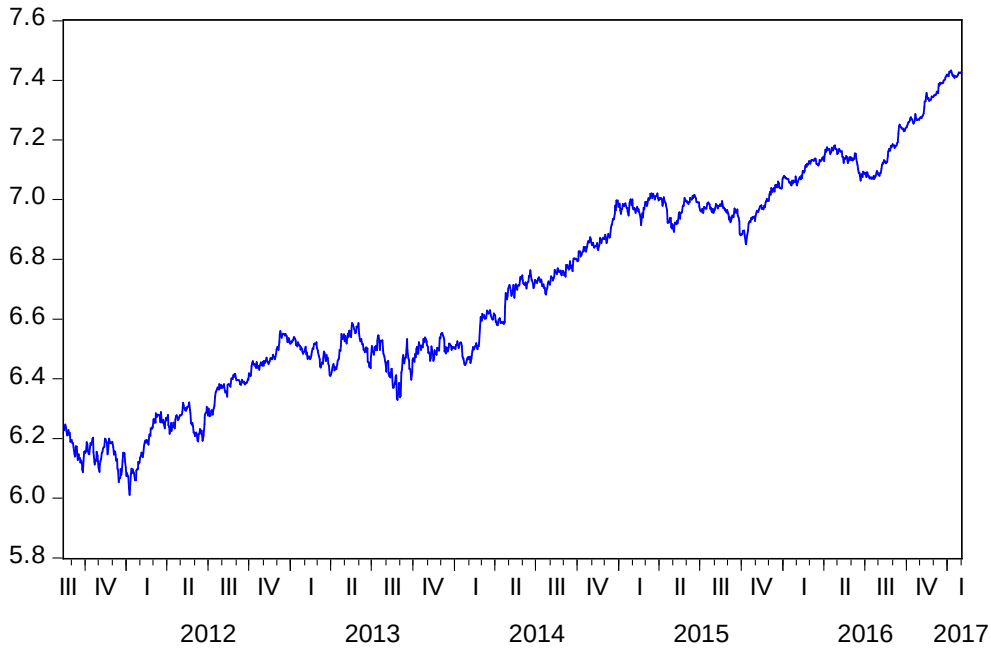
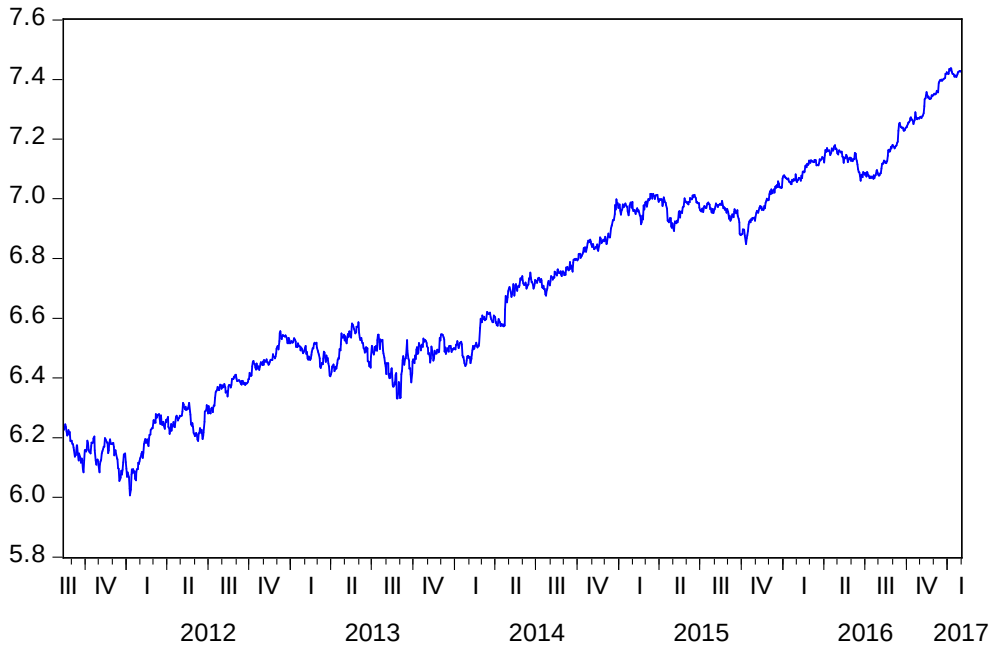


Figure 5.39

Spot Price of HDFC Bank (Period 1I)



Since the log series are 1 (1) and are co integrated, we use VECM to model them and the residuals are obtained. These residuals are depicted in the graphs below.

Figure 5.40

Residuals of Spot Price from VECM (HDFC Bank Period 1I)

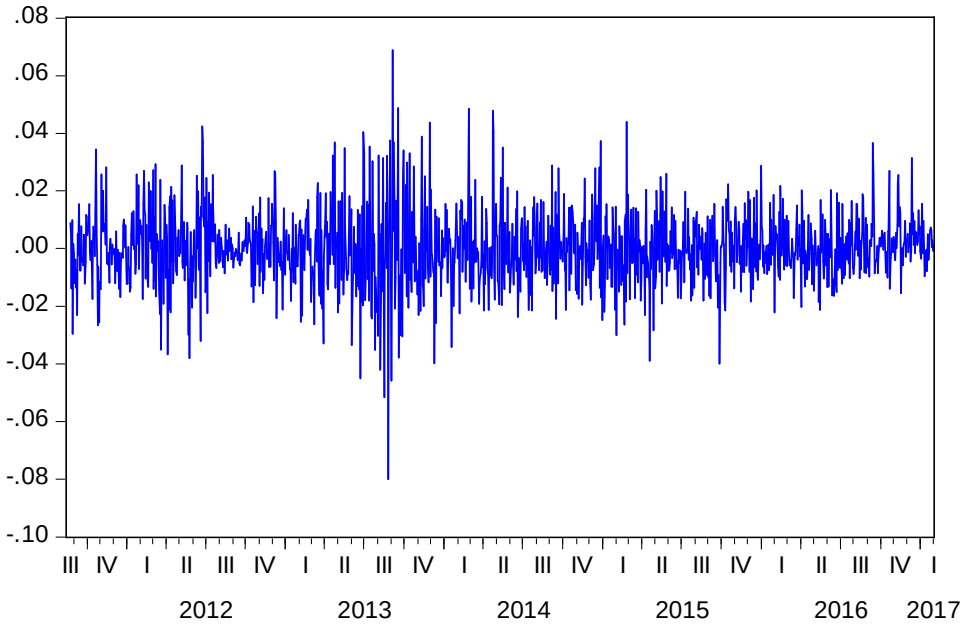
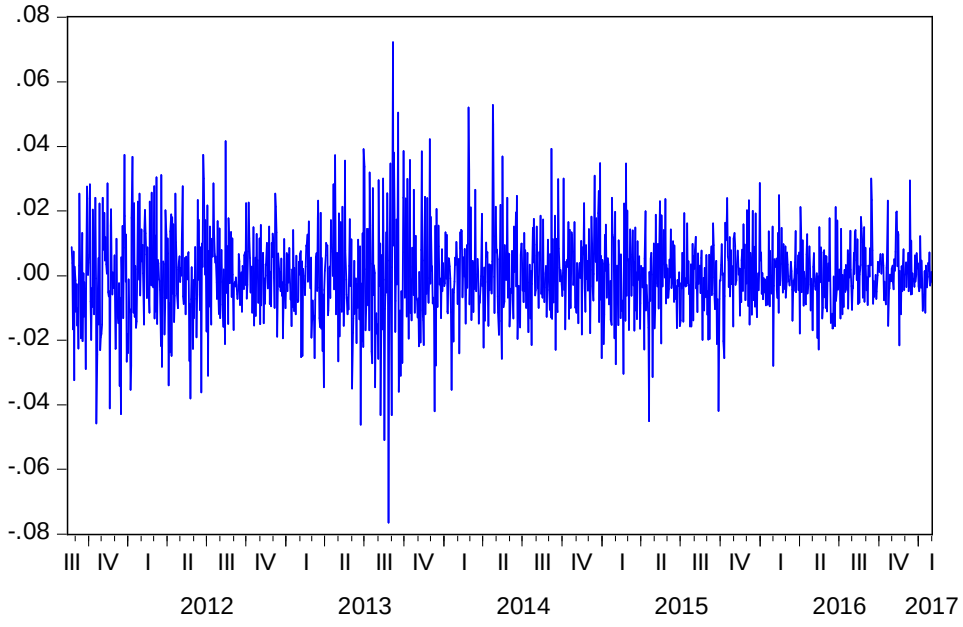


Figure 5.41

Residuals of Futures Price from VECM (HDFC Bank Period 1I)



The Following Table (5.28) lists the descriptive statistics of the residual series. Variances and covariance of the residuals used in the calculation of OHR are computed from the standard deviation reported below

Table 5.28

Descriptive Statistics of the Residuals from VECM (HDFC Bank Period – 1I)

	Residual (Future price) ε_{ft}	**Residual (spot price) ε_{st}**
Mean	-7.70E-19	8.41E-19
Median	-0.000475	-0.000380
Std. deviation	0.013500	0.012795

Source: Secondary data.

The Optimal Hedge Ratio (H) $= \frac{\sigma_{sf}}{\sigma_f^2} =$ 0.90

Hedging Effectiveness (E) $= \frac{Var(U) - Var(H)}{Var(U)} =$ 0.81

The residual series are tested for ARCH effect using CCC-M GARCH model and the results are reported below.

Table 5.29

Testing Futures Prices Residuals for ARCH effect (HDFC Bank Period – 1I)

Variable	**Coefficient**	**Std. Error**	**Z-Statistic**	**p-Value**
C	0.000201	0.000334	0.601197	0.5477
Variance Equation				
C	7.08E-07	3.84E-07	1.846152	0.0649
RESID(-1)^2	0.031257	0.004519	6.916194	0.0000**
GARCH(-1)	0.964397	0.004895	196.9978	0.0000**

** Significance at 1% level. Source: Secondary data.

Above table showed residuals of future prices. Residuals of spot price obtained from obtained from CCC-M GARCH model as shown below

Table 5.30

Testing Spot price Residuals for ARCH effect (HDFC Bank Period – 1I)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	0.000192	0.000310	0.620525	0.5349
Variance Equation				
C	2.58E-06	8.68E-07	2.977678	0.0029
RESID(-1)^2	0.056554	0.009091	6.220609	0.0000**
GARCH(-1)	0.927316	0.011810	78.52281	0.0000**

** Significance at 1% level. Source: Secondary data.

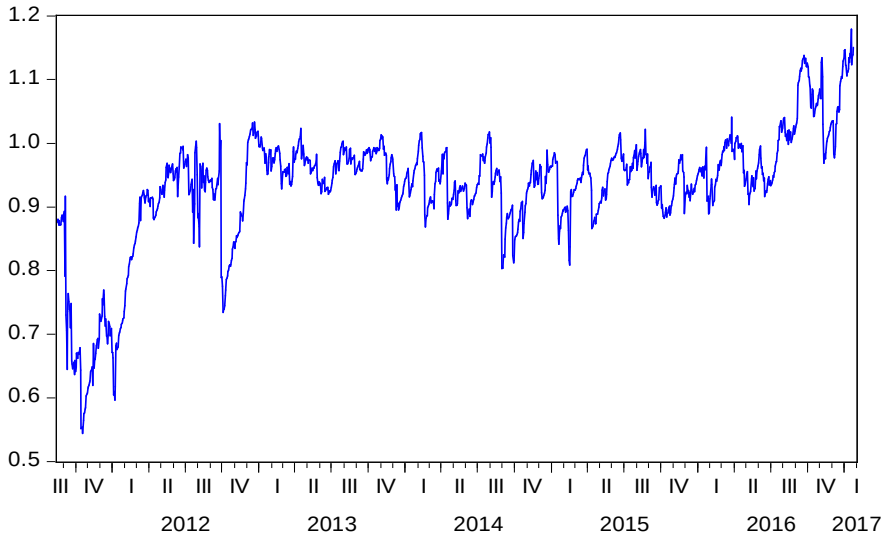
Average Time Varying Hedge Ratio $(H_t) = \frac{h_{sf,t}}{h_{ff,t}}$ = 0.93

Average Time Varying Hedging Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)}$ = 0.92

The following diagram presents the Time Varying hedge ratios of HDFC Bank future prices

Figure 5.42

Time Varying Hedge Ratio of HDFC Bank (Period – 1I)



From the above analysis it can be concluded that the variances of return from a hedged portfolio of HDFC bank shall be minimum when a position in cash segment is combined with a position in futures market to the extent of 80 to 90 percent of the former. Further, the time varying hedge ratios of HDFC bank for period I and period II are 76 and 93 percent respectively. Hedging efficiency of HDFC bank futures is approximately 47 to 54 percent.

IV. Optimal Hedge Ratio (OHR) and Hedging Effectiveness of Kotak Bank Futures prices

Kotak Bank announced its bonus issue on 6 June 2015 and came into existence on 9 July 2015. It gave a structural break into time series data. So the total period is divided into two sub periods.

(A) Period I (1 January 2011 to 8 July 2015)

Spot price and Futures price changed to log form as 'log spot' and 'log futures'. Stationarity of this time series data are tested by using Augmented Dickey-Fuller (ADF) test.

Table 5.31

Unit Root Tests of Kotak Bank (Period-1)

Variables	Levels	First difference
log spot	-2.934064 (0.1521)	-32.80417(0.0000) **
Log future	-2.918539 (0.1569)	-32.61557 (0.0000) **

Figures in () are p-values. ** indicates significance at 1% level.
Source: Secondary data.

Both 'spot price' and 'futures price' series have a unit root but are stationary at first difference. Graph of first difference of log futures and log spot are presented in Fig. 5.43 and Fig. 5.44.

Figure 5.43

First Difference - Futures Prices of Kotak Bank (Period 1)

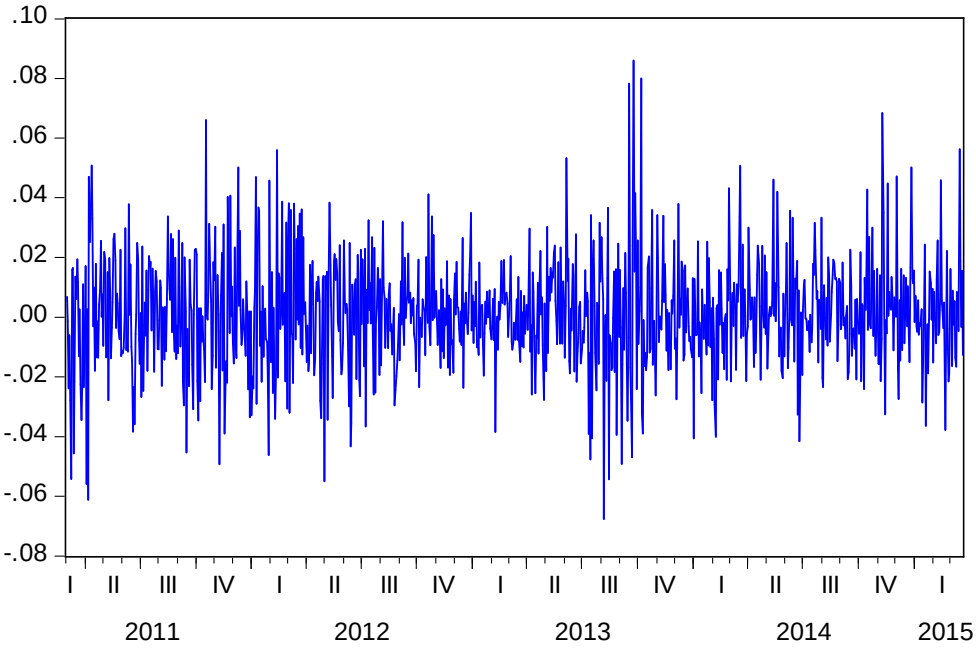
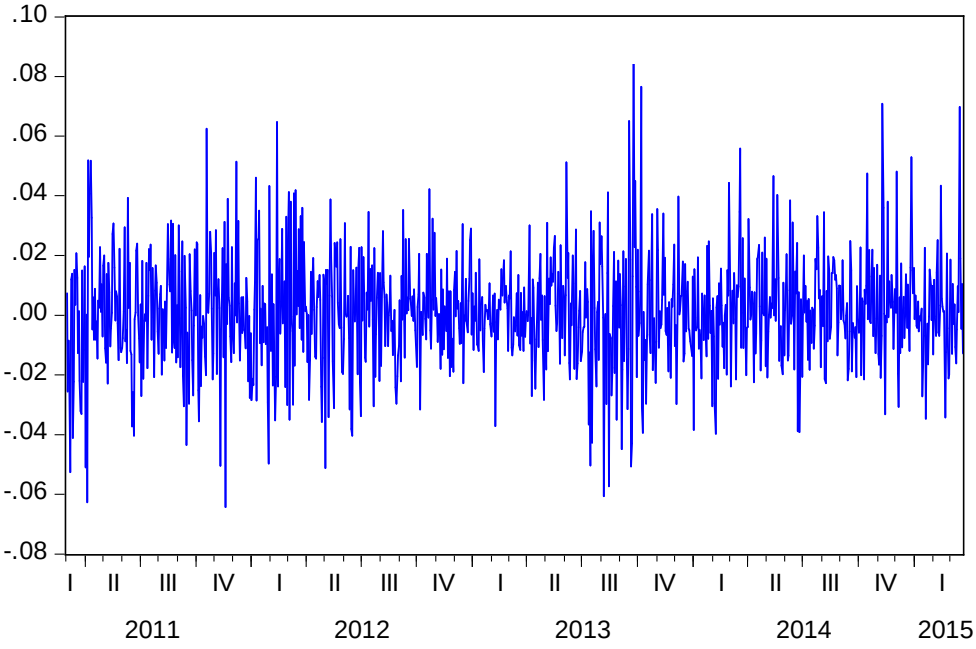


Figure 5.44

First Difference - Spot Price of Kotak Bank (Period 1)



After the test of stationarity, test the co integrating relationship between spot price and future price by using Johansen co integration tests (both Trace and Eigen value). The results obtained are reported below.

Table 5.32

Testing Co integration between Spot Price and Futures Prices (Kotak Bank Period – 1) Using Johansen Co integration Tests

Hypothesized No. of CE(s)	Eigen value	Trace Statistic (λ trace)	Max-Eigen Statistic (λ max)
None	0.195558	230.0670(0.0001)*	230.0095(0.0001*
At most 1	5.44E-05	0.057553(0.8104)	0.057553(0.8104)

Figures in () are p-values. * denotes rejection of the hypotheses at the 0.05 level.
Source: Secondary data.

Both Trace and Max-Eigen value tests indicate 1 co integrating eqn (s) at the 0.05 level.

The price movement of both spot price and future prices are indicated byFig.5.45 and Fig.5.46.

Figure 5.45

Futures Prices of Kotak Bank (Period 1)

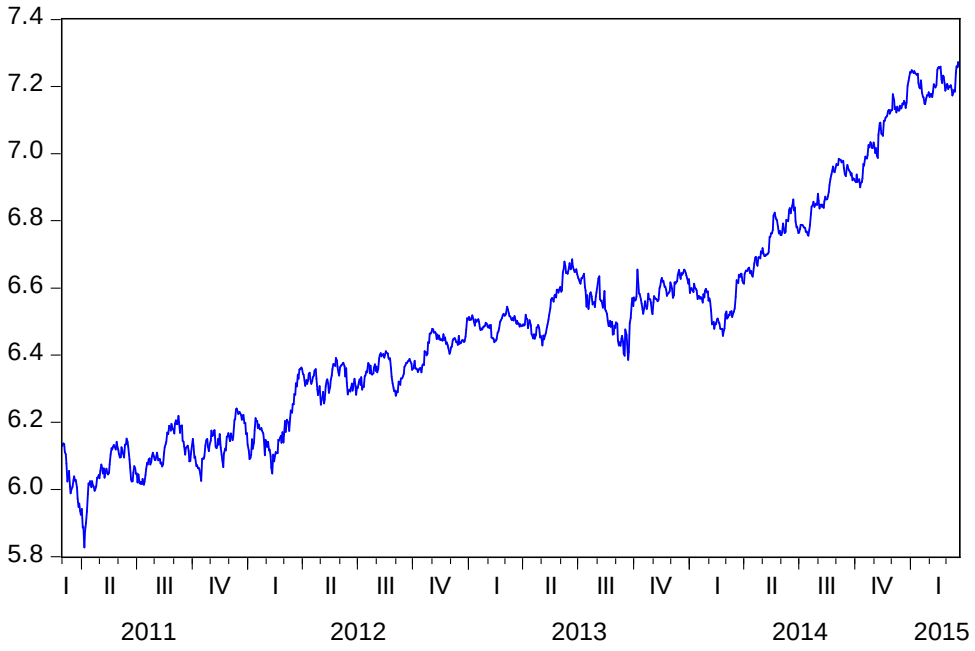
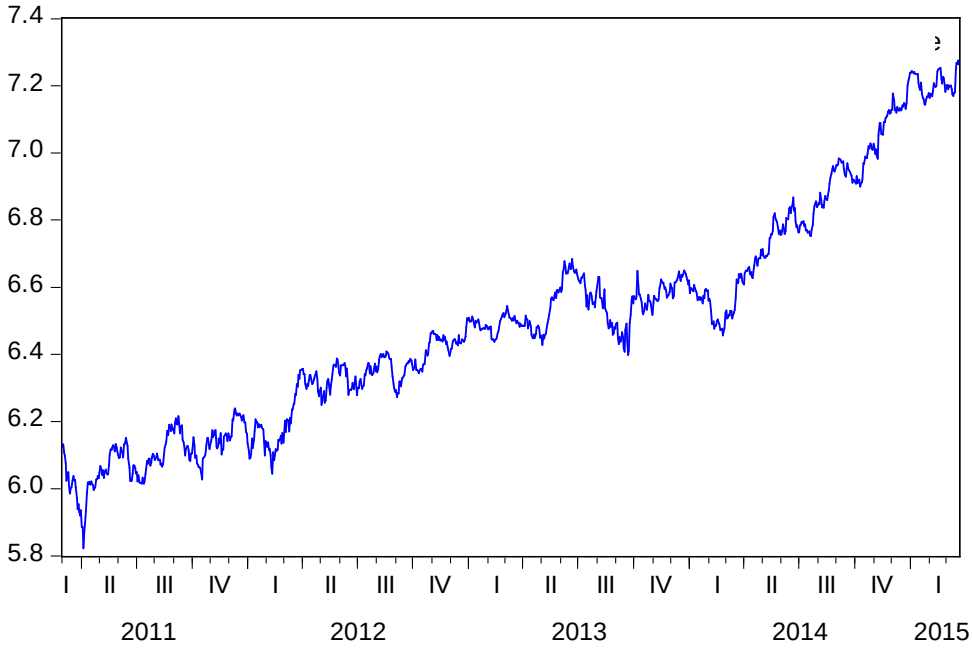


Figure 5.46

Spot Prices of Kotak Bank (Period 1)



Since the series are 1 (1) and are co integrated, modelled using VECM and the residuals are obtained. Fig 5:47 and Fig. 5:48 depict the residuals of VECM.

Figure 5.47

Residuals of spot price from VECM (Kotak Bank Period 1)

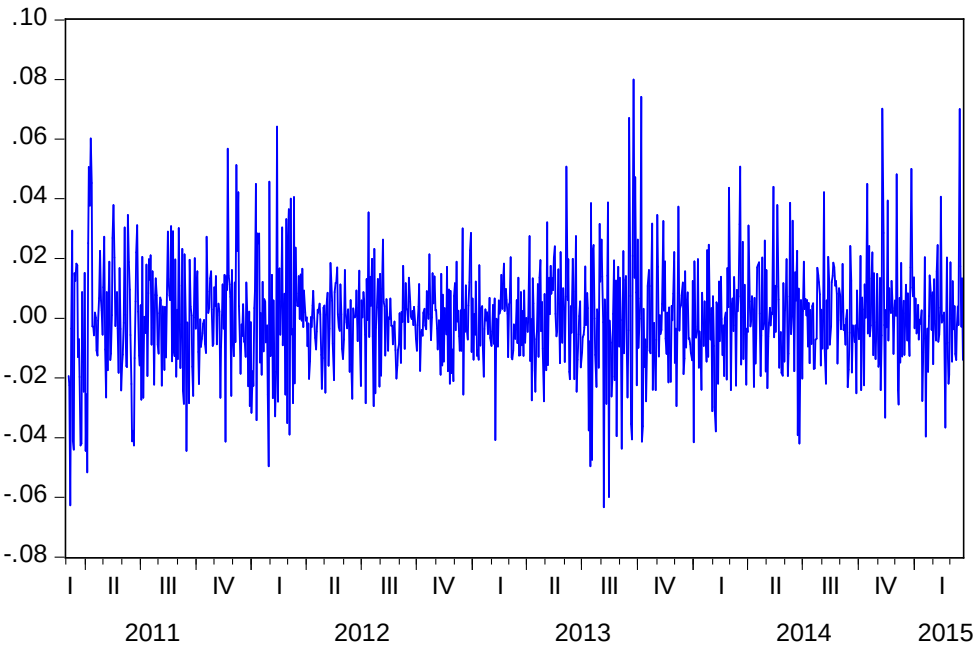
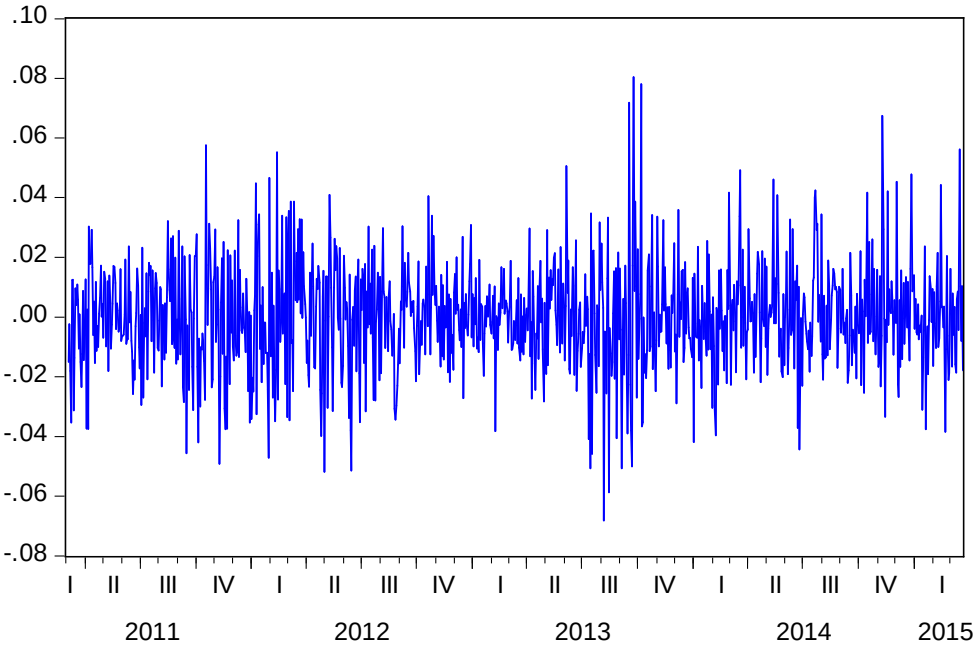


Figure 5.48

Residuals of Futures Price from VECM (Kotak Bank Period 1)



The descriptive statistics of the residual series which are used in the calculation of hedge ratios are described below.

Table 5.33

Descriptive Statistics of the Residuals from VECM (Kotak Bank Period – 1)

	Residual (Future price) ε_{ft}	**Residual (spot price) ε_{st}**
Mean	8.47E-19	-3.77E-19
Median	2.25E-05	7.44E-05
Std. deviation	0.017989	0.017838

Source: Secondary data.

The Optimal Hedge Ratio (H) $= \frac{\sigma_{s,f}}{\sigma_f^2} = 0.70$

Hedging Effectiveness (E) $= \frac{Var(U) - Var(H)}{Var(U)} = 0.62$

Next is the residual series tested for ARCH effect using CCC-M GARCH Model. The results obtained are reported below

Table 5.34

Testing Futures Prices Residuals for ARCH effect (Kotak Bank Period – 1)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	0.000269	0.000522	0.514259	0.6071
Variance Equation				
C	5.99E-06	3.07E-06	1.952627	0.0509
RESID(-1)^2	0.040428	0.010652	3.795344	0.0001**
GARCH(-1)	0.941109	0.017899	52.57926	0.0000**

** Significance at 1% level. Source: Secondary data.

Above table showed residuals of future prices. Residuals of spot price obtained from obtained from CCC-M GARCH model as shown below

Table 5.35

Testing Spot Price Residuals for ARCH effect (Kotak Bank Period – 1)

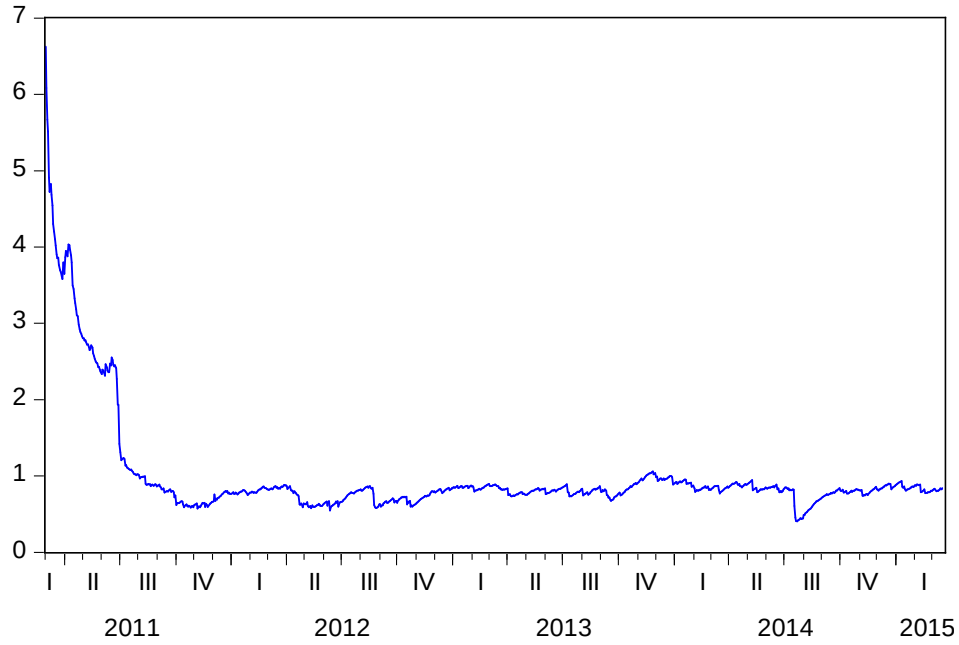
Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	0.000126	0.000503	0.251120	0.8017
Variance Equation				
C	6.81E-06	2.67E-06	2.546973	0.0109
RESID(-1)^2	0.049990	0.011078	4.512469	0.0000**
GARCH(-1)	0.927050	0.016773	55.26924	0.0000**

** Significance at 1% level. Source: Secondary data.

Average Time Varying Hedge Ratio $(H_t) = \frac{h_{sf,t}}{h_{ff,t}} = 0.99$

Average Time Varying Hedging Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)} = 0.92$

Fig 5.49: Time Varying Hedge Ratio of Kotak Bank (Period – 1)



(B) Period II (9 July 2015 to 17 July 2017)

Spot price and Futures price changed to log form as 'log spot' and 'log futures'. Stationarity of this time series data are tested by using Augmented Dickey-Fuller (ADF) test.

Table 5.36

Unit Root Tests of Kotak Bank (Period-1I)

Variables	Levels	First difference
log spot	-2.337264 (0.4124)	-25.50007 (0.0000) **
Log future	-2.559504(0.2994)	-23.58344 (0.0000) **

Figures in () are p-values. ** indicates significance at 1% level.
Source: Secondary data.

Both 'spot price' and 'futures price' series are found to be non-stationary but are stationary at first difference. Graph of first difference of log spot and log futures are presented in Fig. 5.50 and Fig. 5.51

Figure 5.50

First Difference 'Futures Prices' of Kotak Bank (Period 1I)

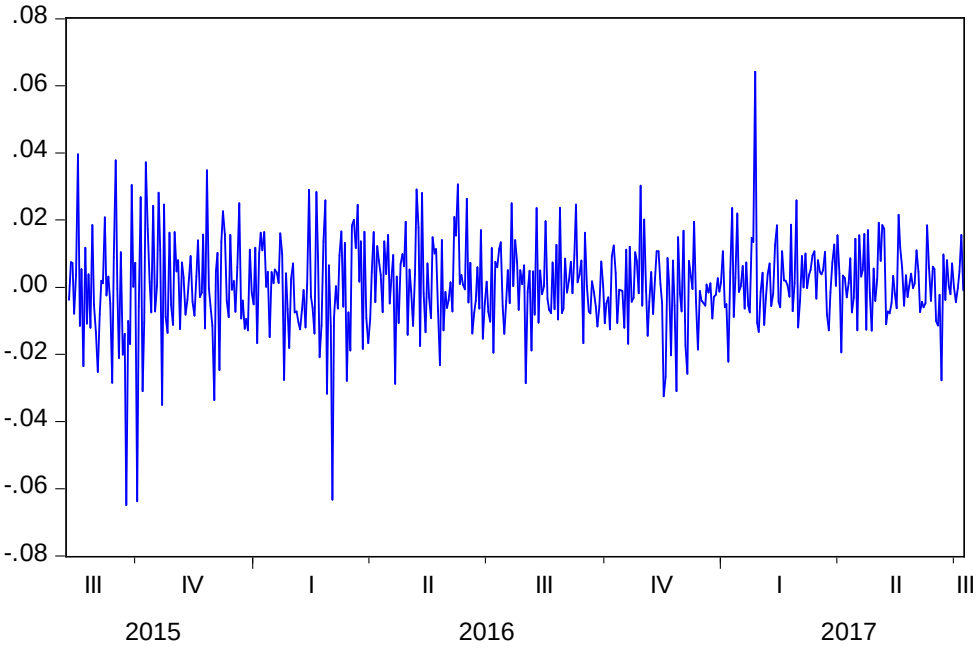
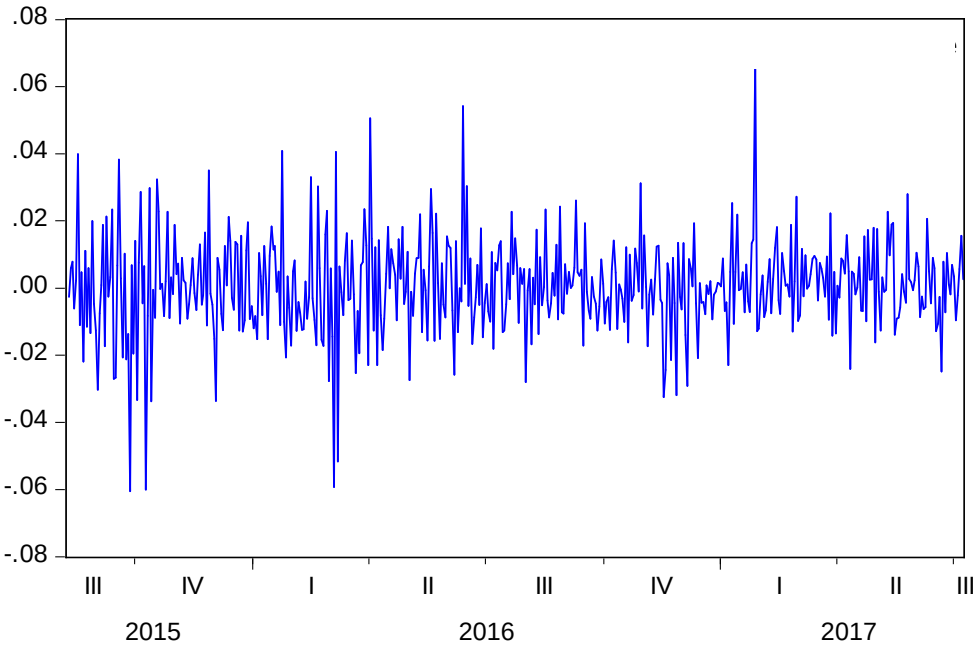


Figure 5.51

First Difference Spot Price of Kotak Bank (Period 1I)



After the test of stationarity, test the co integrating relationship between spot price and futures price by using Johansen co integration tests (both Trace and Eigen value). The results obtained are showed below.

Table 5.37

Testing Co integration between Spot Price and Futures Price (Kotak Bank Period – 1I) Using Johansen Co integration Tests

Hypothesized No. of CE(s)	Eigen value	Trace Statistic (λ trace)	Max-Eigen Statistic (λ max)
None	0.174962	95.22831(0.0000)*	95.20147(0.0000)*
At most 1	5.42E-05	0.026847(0.8698)	0.026847 (0.8698)

Figures in () are p-values. * denotes rejection of the hypotheses at the 0.05 level.
Source: Secondary data.

Both Trace and Max-Eigen value tests indicate 1 co integrating eqn (s) at the 0.05 level.

The price movement of both spot price and futures prices are indicated by Fig.5.52 and Fig.5.53.

Figure 5.52

Futures Prices of Kotak Bank (Period 1I)

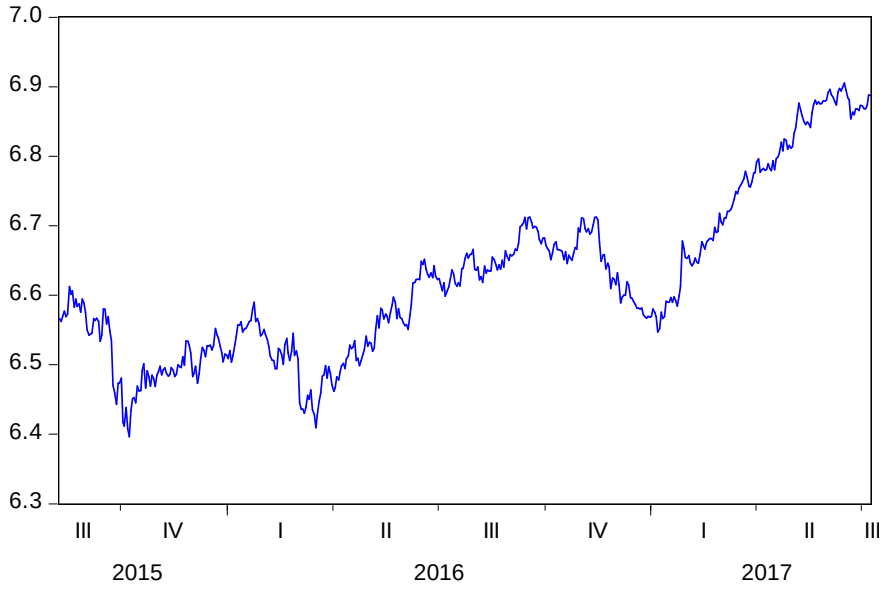
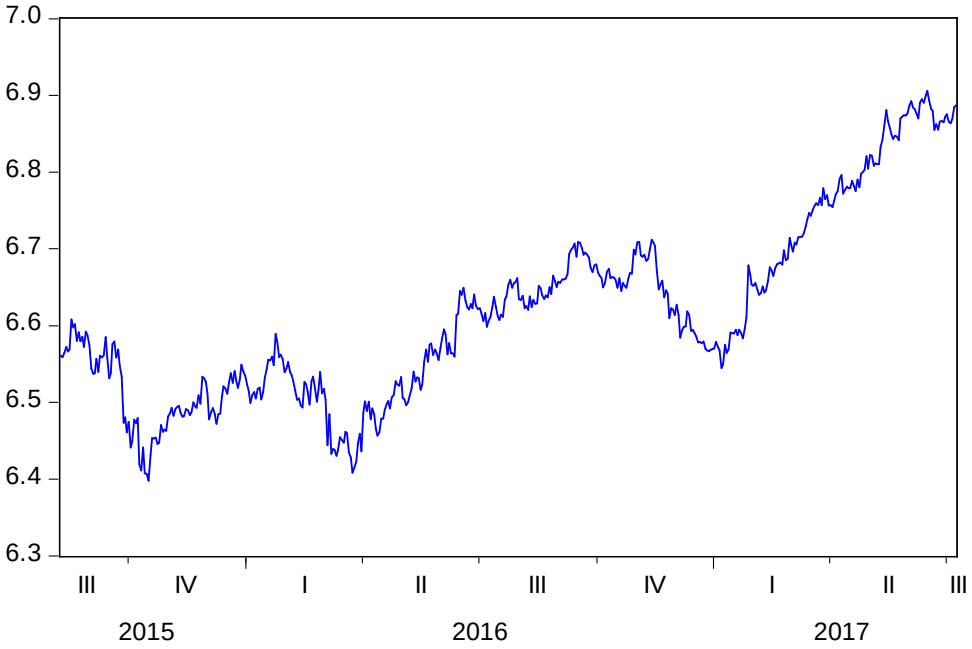


Figure 5.53

Spot Prices of Kotak Bank (Period 1I)



Since the series are 1 (1) and are co integrated, modelled using VECM and the residuals are obtained. Fig 5.54 and Fig. 5.55 depict the residuals of VECM.

Figure 5.54

Residuals of spot price from VECM (Kotak Bank Period 1I)

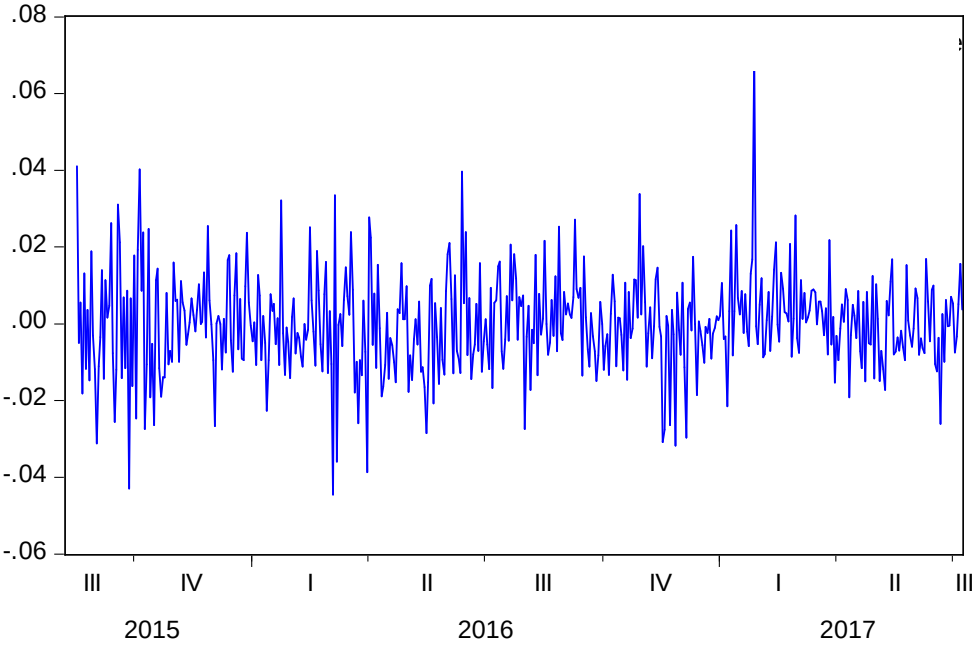
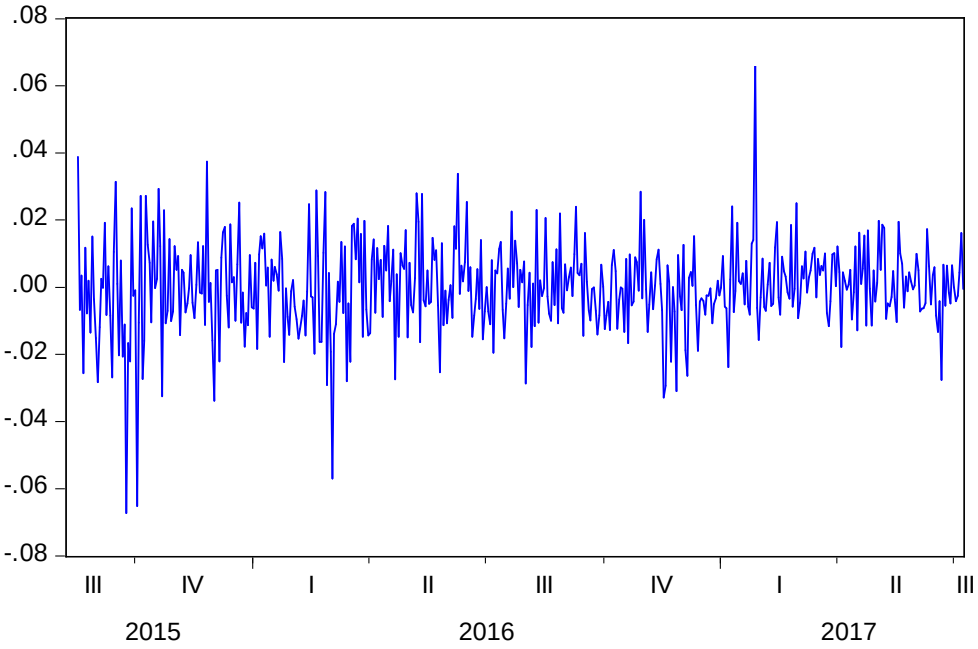


Figure 5.55

Residuals of Futures Price from VECM (Kotak Bank Period 1I)



The descriptive statistics of the residual series which are used in the calculation of hedge ratios are reported below.

Table 5.38

Descriptive Statistics of the Residuals from VECM (Kotak Bank Period – 1I)

	Residual (Future price) ε_{ft}	**Residual (spot price) ε_{st}**
Mean	3.69E-19	-1.82E-18
Median	-0.000251	-8.45E-05
Std. deviation	0.013517	0.012916

Source: Secondary data.

The Optimal Hedge Ratio (H) $= \frac{\sigma_{sf}}{\sigma_f^2} = 0.40$

Hedging Effectiveness (E) $= \frac{Var(U) - Var(H)}{Var(U)} = 0.17$

Next is the residual series tested for ARCH effect using CCC-M GARCH Model. The results obtained are reported below.

Table 5.39

Testing Futures Prices Residuals for ARCH effect (Kotak Bank Period – 1I)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	0.000475	0.000550	0.863221	0.3880
Variance Equation				
C	1.97E-06	3.03E-07	6.513396	0.0000
RESID(-1)^2	-0.026737	0.003435	-7.783793	0.0000**
GARCH(-1)	1.010537	0.002569	393.4021	0.0000**

** Significance at 1% level. Source: Secondary data.

Above table showed residuals of future prices. Residuals of spot price obtained from obtained from CCC-M GARCH model as shown below

Table 5.40

Testing Spot Price Residuals for ARCH effect (Kotak Bank Period – 1I)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	7.79E-05	0.000582	0.133840	0.8935
Variance Equation				
C	6.47E-06	2.62E-06	2.474333	0.0133
RESID(-1)^2	0.014783	0.010494	1.408665	0.1589**
GARCH(-1)	0.941572	0.021254	44.30050	0.0000**

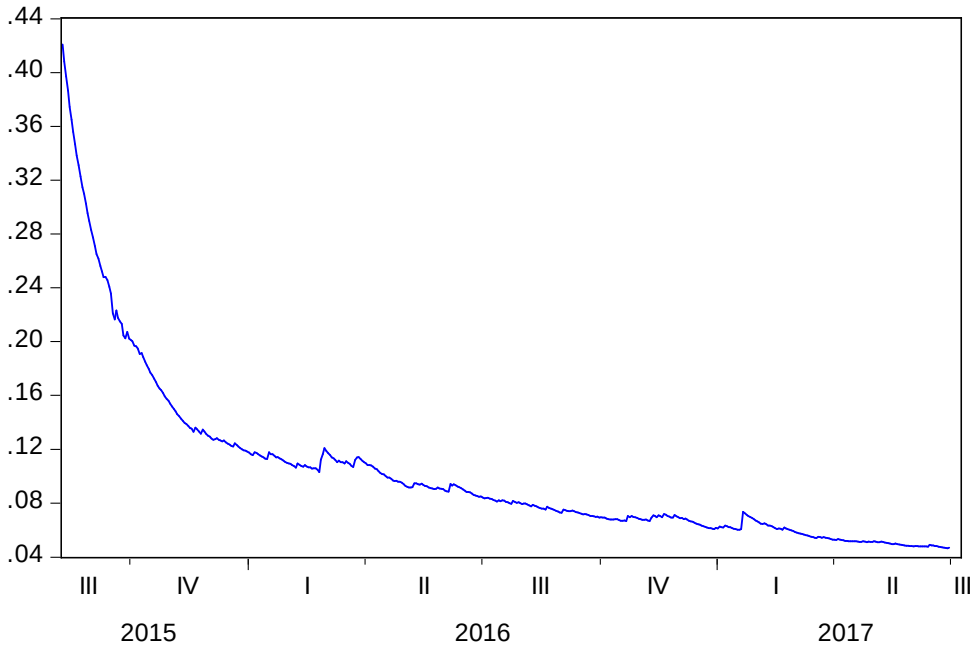
** Significance at 1% level. Source: Secondary data.

Average Time Varying Hedge Ratio $(H_t) = \frac{h_{sf,t}}{h_{ff,t}}$ = 0.10

Average Time Varying Hedging Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)}$ = 0.17

Figure 5.56

Time Varying Hedge Ratio of Kotak Bank (Period – 1I)



The above analysis of the hedging efficiency of Kotak bank future prices shows that average of the optimum hedge ratio for period I and period II of both constant and time varying is 55 and 50 percent respectively. It means that the variance of return from Kotak bank shall be minimum when a position in spot market is accompanied by a position in Kotak Bank futures prices to the extent of 50 to 55 percent. Further, diversification of the portfolio by combining positions in cash segment of Kotak Bank with Kotak Bank futures can reduce the overall risk by 39 to 44 percent.

V. Optimal Hedge Ratio (OHR) and Hedging Effectiveness of SBI Futures Prices

Stock split announcement of SBI gave a structural break in time series data. So the total period is divided into two sub periods. Period one is before stock split and period two is after the stock split.

Period I (1 January 2011 to 20 November 2014)

The spot price and futures price series have been subjected to a logarithmic transformation and the series obtained are designated as 'log spot ' and 'log futures' respectively. These series are tested for stationarity at levels and first difference using Augmented Dickey-Fuller (ADF) test. The results are summarised below:

Table 5.41

Unit Root Tests of SBI (Period-1)

Variables	Levels	First difference
log spot	-2.061408 (0.2607)	-26.70330 (0.0000) **
Log future	-2.007463 (0.2837)	-27.43392 (0.0000) **

Figures in () are p-values. ** indicates significance at 1% level.
Source: Secondary data.

Both 'log spot ' and 'log futures' series have a unit root but are stationary at first difference. Graph of first difference of log spot and log future are presented in Fig. 5. 57 and Fig. 5.58.

Figure 5.57

First Difference - Spot Price of SBI (Period 1)

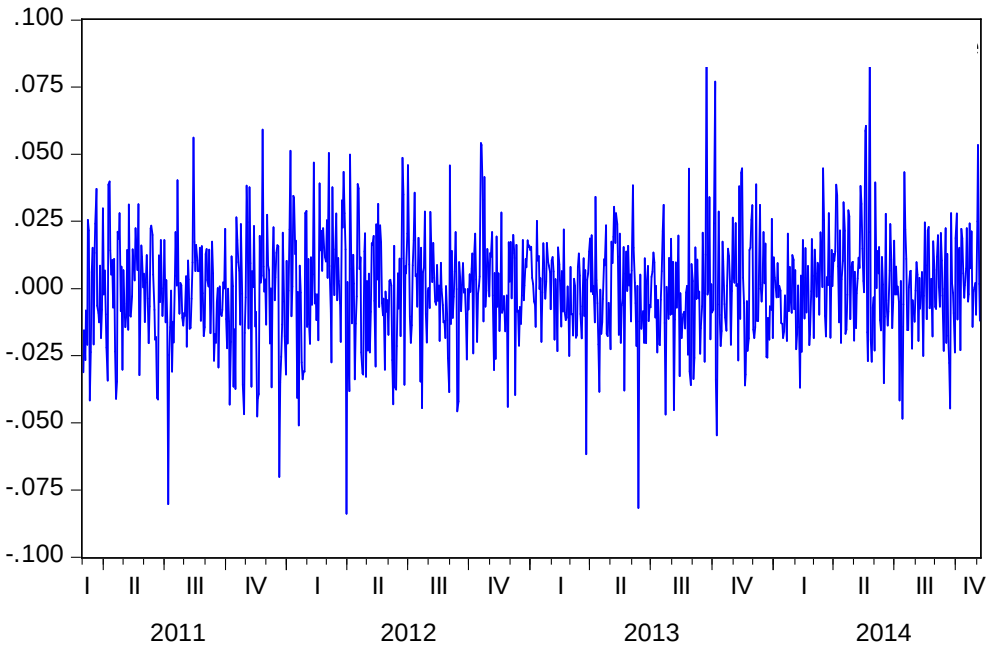
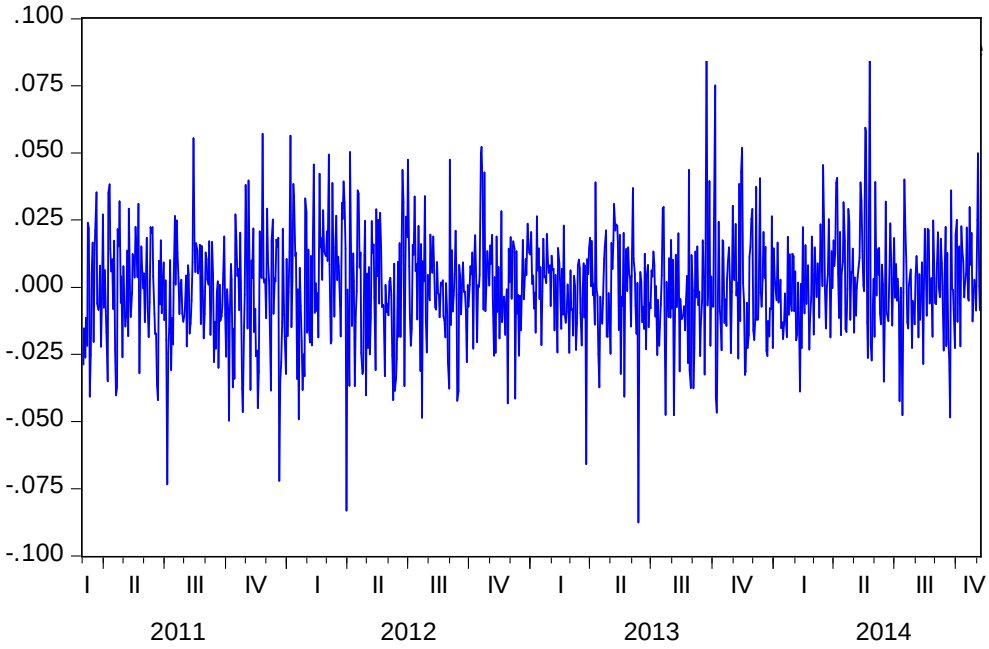


Figure 5.58

First Difference - Futures Price of SBI (Period I)



After the test of stationarity, the co integrating relationship between spot price and futures price are tested by using Johansen co integration tests (both Trace and Eigen value). The results obtained are shown below.

Table 5.42

Testing Co integration between Spot Price and Futures Price (SBI Period – 1) Using Johansen Co integration Tests

Hypothesized No. of CE(s)	Eigen value	Trace Statistic (λ trace)	Max-Eigen Statistic (λ max)
None	0.075201	77.81330(0.0000) *	74.81669 (0.0000) *
At most 1	0.003126	2.996613(0.0834)	2.996613 (0.0834)

Figures in () are p-values. * denotes rejection of the hypotheses at the 0.05 level.
Source: Secondary data.

Both Trace and Max-Eigen value tests indicate 1 co integrating eqn (s) at the 0.05 level. The price movement of both spot price and futures prices are indicated byFig.5.59 and Fig.5.60.

Figure 5.59

Spot Price of SBI Bank (Period 1)

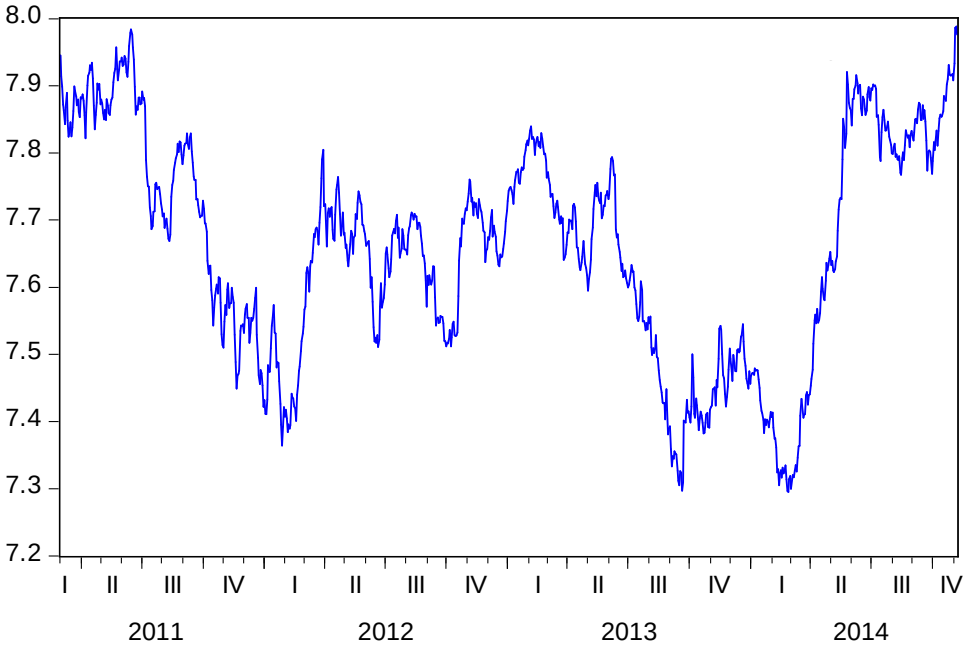
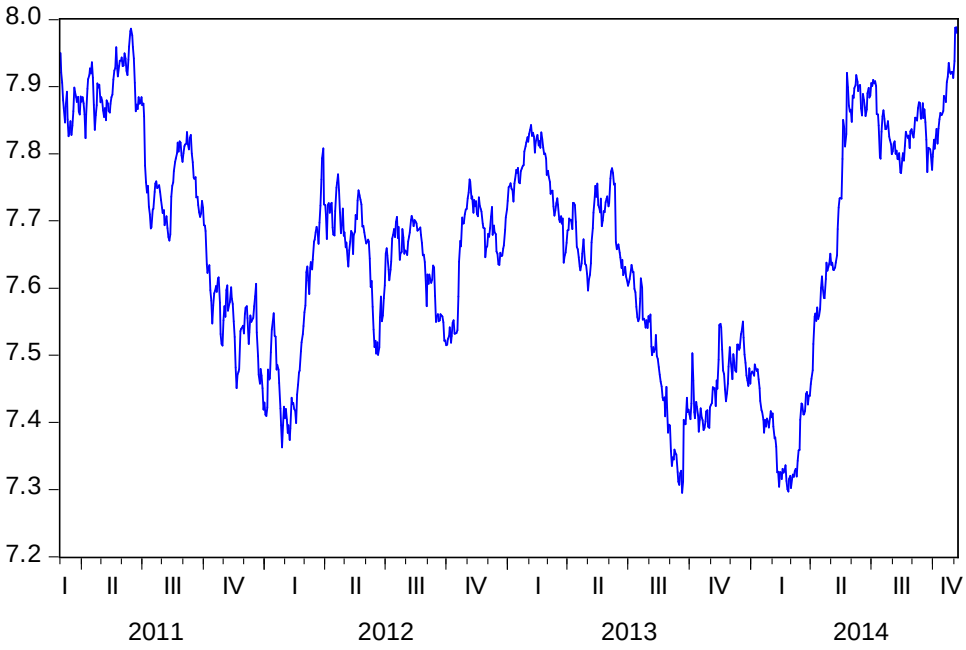


Figure 5.60

Futures Prices of SBI Bank (Period 1)



The presence of co integration is confirmed by the Johansen co integration tests (both Trace and Eigen value). Since the series are 1(1) and are co integrated, they

are modelled using VECM and the residuals are obtained. Fig. 5.61 and Fig. 5.62 depict the residuals of VECM applied to 'log spot ' and 'log futures' respectively.

Figure 5.61

Residuals of Spot Price from VECM (SBI Period 1)

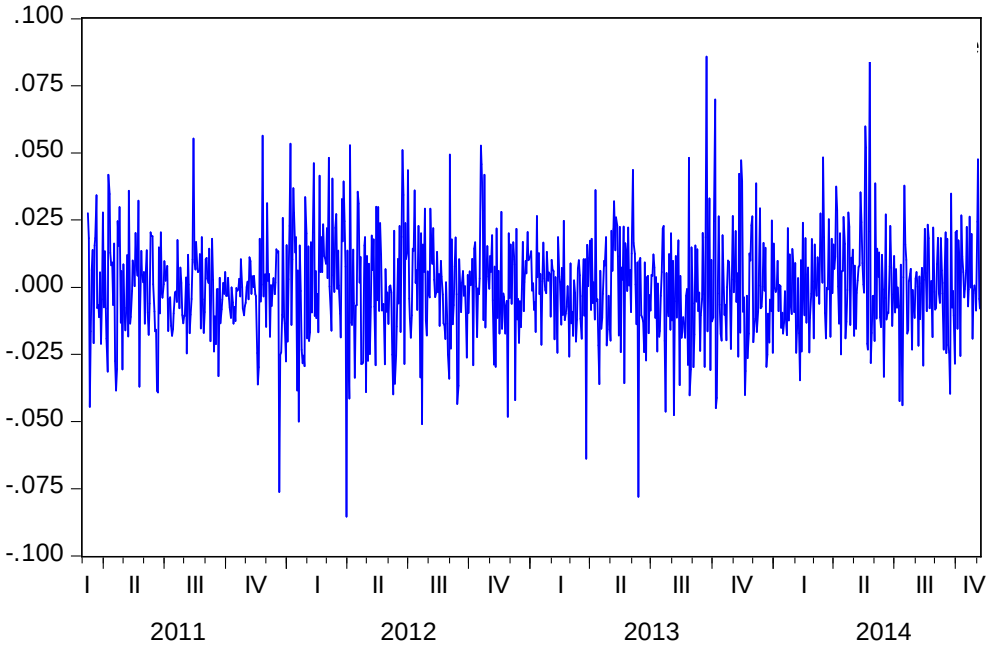
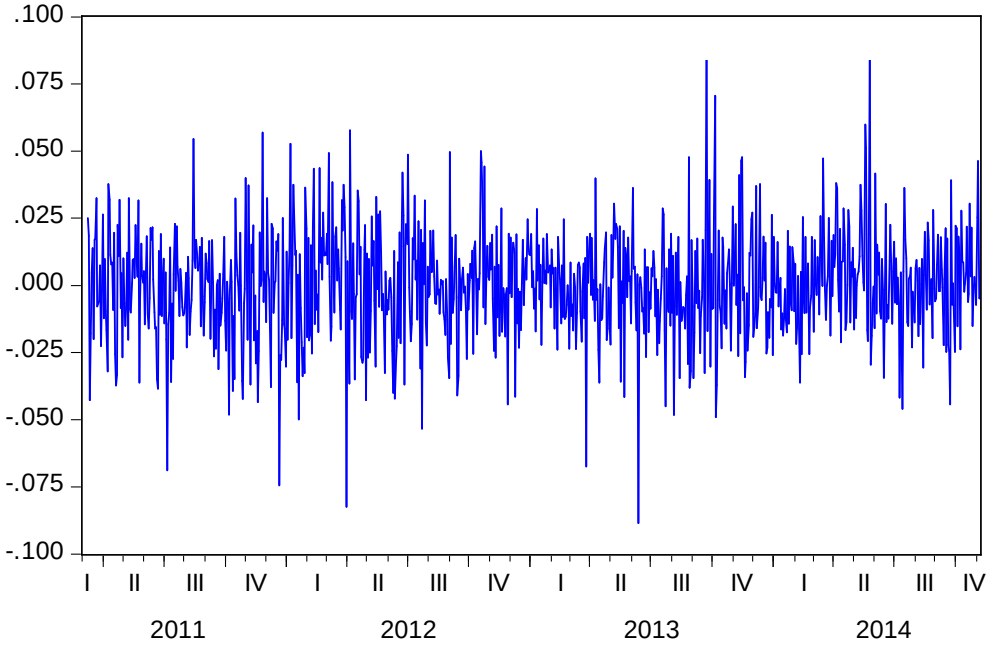


Figure 5.62

Residuals of Futures Price from VECM (SBI Period 1)



The descriptive statistics of the residual series from VECM are reported below

Table 5.43

Descriptive Statistics of the Residuals from VECM (SBI Period – 1)

	Residual (Future price) ε_{ft}	**Residual (spot price) ε_{st}**
Mean	1.64E-18	1.17E-18
Median	0.000705	-0.000134
Std. deviation	0.020179	0.019380

Source: Secondary data.

The Optimal Hedge Ratio (H) $= \frac{\sigma_{s,f}}{\sigma_f^2} = 0.9$

Hedging Effectiveness (E) $= \frac{Var(U) - Var(H)}{Var(U)} = 0.89$

Next the residual series are tested for ARCH effect using CCC-M GARCH Model. The results obtained are reported below.

Table 5.44

Testing Futures price Residuals for ARCH effect (SBI Period – 1)

Variable	**Coefficient**	**Std. Error**	**Z-Statistic**	**p-Value**
C	-0.000104	0.000643	-0.161126	0.8720
Variance Equation				
C	2.01E-05	1.30E-05	1.550752	0.1210
RESID(-1)^2	0.026533	0.011536	2.300005	0.0214**
GARCH(-1)	0.923720	0.040380	22.87555	0.0000**

** Significance at 1% level. Source: Secondary data.

Above table showed residuals of future prices. Residuals of spot price obtained from obtained from CCC-M GARCH model as shown below

Table 5.45

Testing Spot price Residuals for ARCH effect (SBI Period – 1)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	-0.000437	0.000577	-0.758173	0.4483
Variance Equation				
C	3.66E-05	1.55E-05	2.362132	0.0182
RESID(-1)^2	0.072095	0.022288	3.234674	0.0012**
GARCH(-1)	0.831161	0.058337	14.24750	0.0000**

** Significance at 1% level. Source: Secondary data.

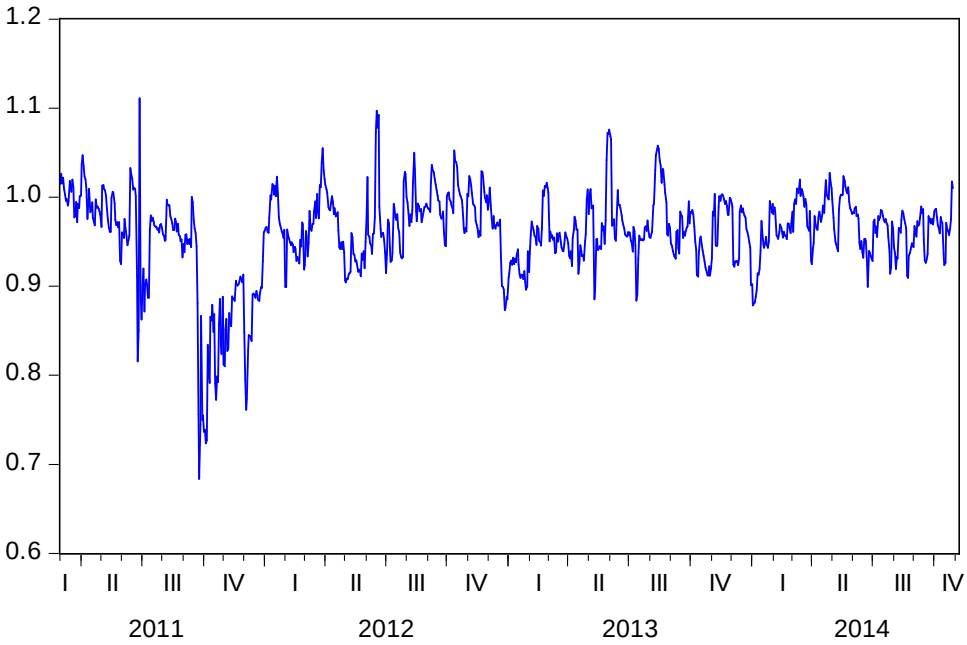
Average Time Varying Hedge Ratio $(H_t) = \frac{h_{sf,t}}{h_{ff,t}} = 0.95$

Average Time Varying Hedging Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)} = 0.96$

The time-varying hedge ratios of current month SBI future prices for the first sub-period under study are depicted below.

Figure 5.63

Time Varying Hedge Ratio of SBI (Period 1)



(A) Period II (21 November 2014 to 17 July 2017)

After the spot price and current month futures price series are subjected to logarithmic transformation, the log series obtained are tested for stationarity at levels as well as first difference using ADF test. The results are presented in Table 4.66.

Table 5.46

Unit Root Tests of SBI (Period-1I)

Variables	Levels	First difference
log spot	-1.594196 (0.4850)	-24.54206 (0.0000)**
Log futures	-1.582676 (0.4909)	-25.20974 (0.0000)**

Figures in () are p-values. ** indicates significance at 1% level.
Source: Secondary data.

Both 'log spot' and 'log futures' series are non-stationary but are found to be stationary at first difference. Graph of first difference of log spot and log futures are presented in Fig. 5.64 and Fig. 5.65.

Figure 5.64

First Difference Spot Price of SBI (Period 1I)

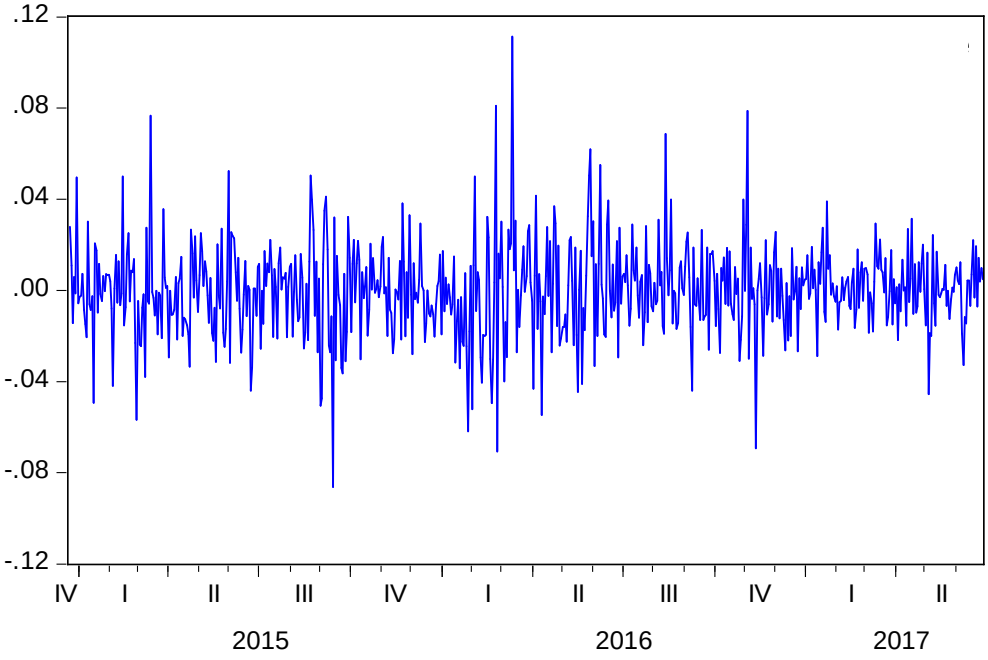
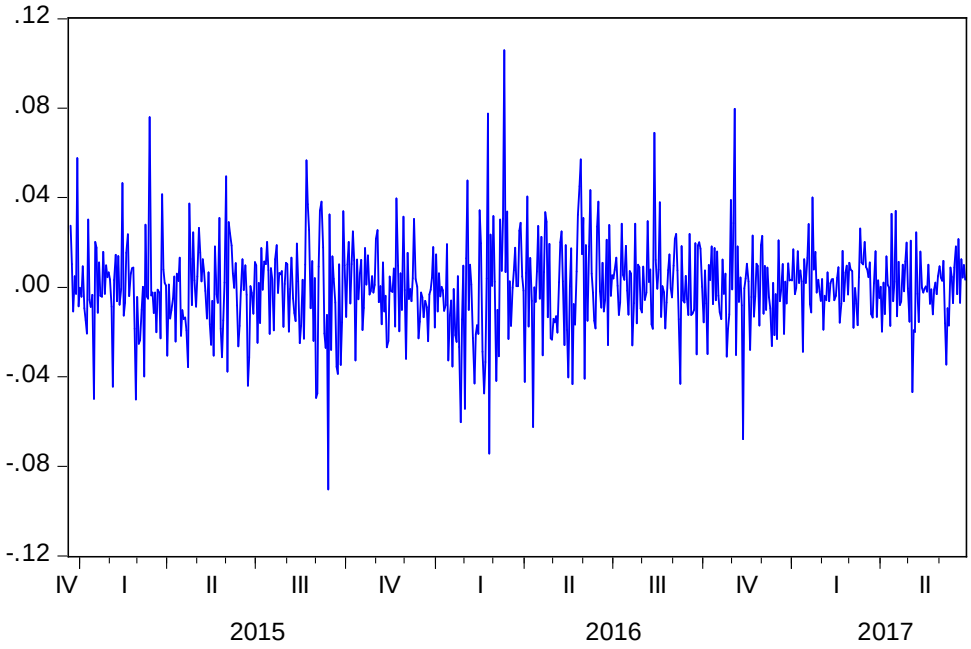


Figure 5.65

First Difference - Futures Prices of SBI (Period 1I)



After the test of stationarity, test the co integrating relationship between spot price and futures price by using Johansen co integration tests (both Trace and Eigen value). The results obtained are showed below.

Table 5.47

Testing Co integration between Spot Price and Futures Price (SBI Period – 1I) Using Johansen Co integration Tests

Hypothesized No. of CE(s)	Eigen value	Trace Statistic (λ trace)	Max-Eigen Statistic (λ max)
None	0.085305	61.13879(0.0000) *	58.31330 (0.0000) *
At most 1	0.004311	2.825484(0.0928)	2.825484 (0.0928)

Figures in () are p-values. * denotes rejection of the hypotheses at the 0.05 level.
Source: Secondary data.

Both Trace and Max-Eigen value tests indicate 1 co integrating eqn (s) at the 0.05 level. The price movement of both spot price and futures price are indicated by Fig.5.66 and Fig.5.67.

Figure 5.66

Spot Prices of SBI (Period 1I)

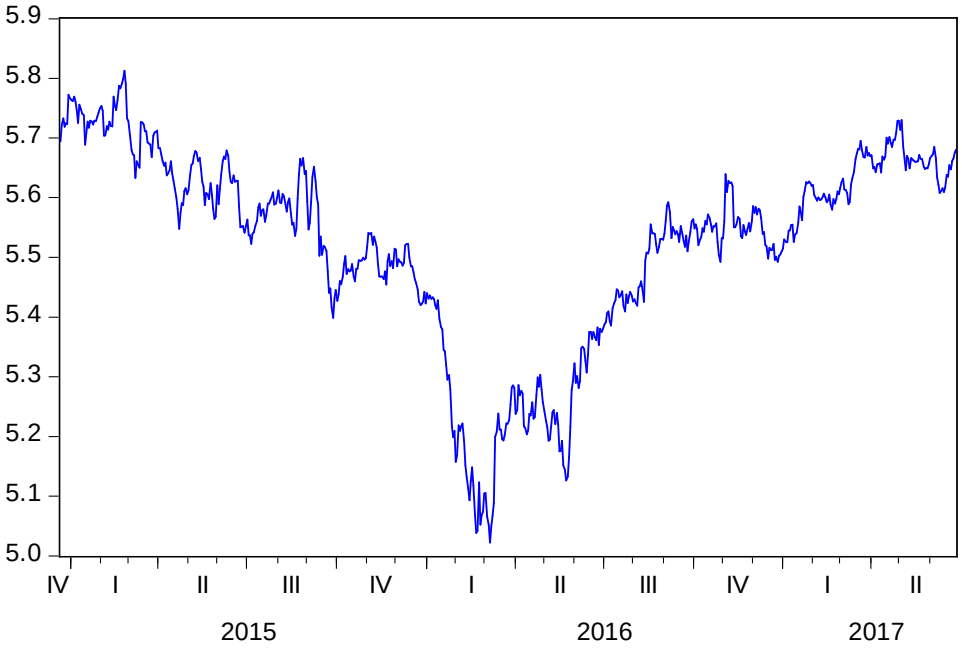
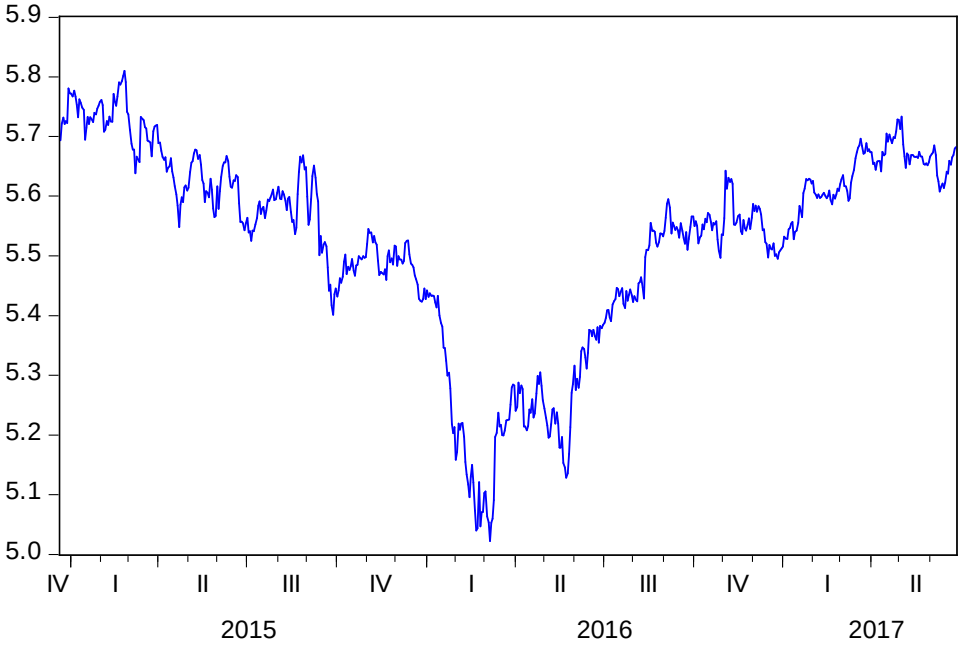


Figure 5.67

Futures Prices of SBI (Period 1I)



Since the series are 1 (1) and are co integrated, we model them using VECM and the residuals are obtained. Fig. 5.68 and Fig. 5.69 present the residuals of Vector Error

Correction Model applied to ‘log spot’ and ‘log futures’ series of SBI for Period – II under study.

Figure 5.68

Residuals of Spot Price from VECM (SBI Period 1I)

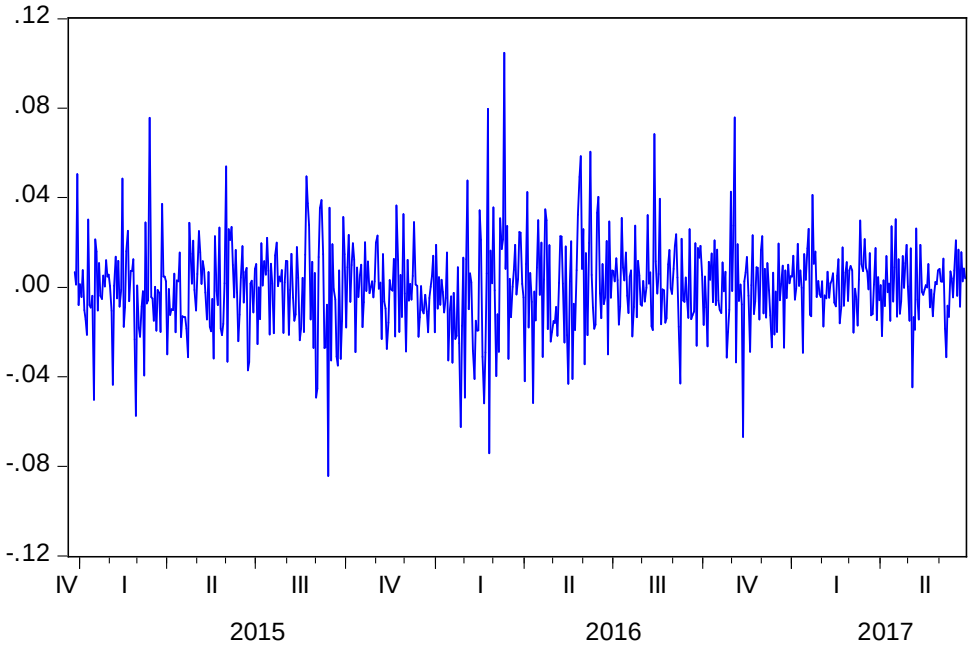
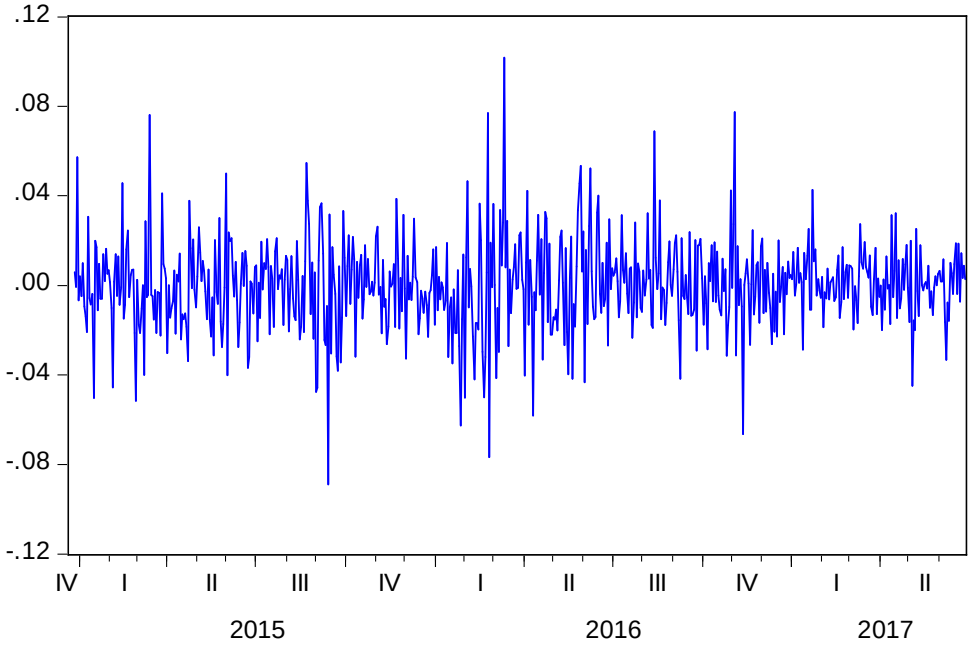


Figure 5.69

Residuals of Futures Prices from VECM (SBI Period 1I)



The descriptive statistics of the residual series from VECM are reported below.

Table 5.48

Descriptive Statistics of the Residuals from VECM (SBI Period – 1I)

	Residual (Future price) ε_{ft}	**Residual (spot price) ε_{st}**
Mean	-1.72E-18	6.63E-21
Median	0.000180	0.000402
Std. deviation	0.020236	0.020247

Source: Secondary data.

The Optimal Hedge Ratio (H) $= \frac{\sigma_{s,f}}{\sigma_f^2} =$ 0.90

Hedging Effectiveness (E) $= \frac{Var(U) - Var(H)}{Var(U)} = 0.98$

The residual series are tested for ARCH effect using CCC-M GARCH model. The results obtained are reported below.

Table 5.49

Testing Futures Prices Residuals for ARCH effect (SBI Period – 1I)

Variable	**Coefficient**	**Std. Error**	**Z-Statistic**	**p-Value**
C	0.000340	0.000695	0.488619	0.6251
Variance Equation				
C	1.73E-05	6.19E-06	2.786495	0.0053
RESID(-1)^2	0.098007	0.023236	4.217932	0.0000**
GARCH(-1)	0.861316	0.030997	27.78751	0.0000**

** Significance at 1% level. Source: Secondary data.

Above table showed residuals of future prices. Residuals of spot price obtained from CCC-M GARCH model as shown below

Table 5.50

Testing Spot Price Residuals for ARCH effect (SBI Period – 1I)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	0.000301	0.000692	0.435461	0.6632
Variance Equation				
C	1.79E-05	6.25E-06	2.868920	0.0041
RESID(-1)^2	0.099614	0.024074	4.137871	0.0000
GARCH(-1)	0.858240	0.031543	27.20828	0.0000

** Significance at 1% level. Source: Secondary data.

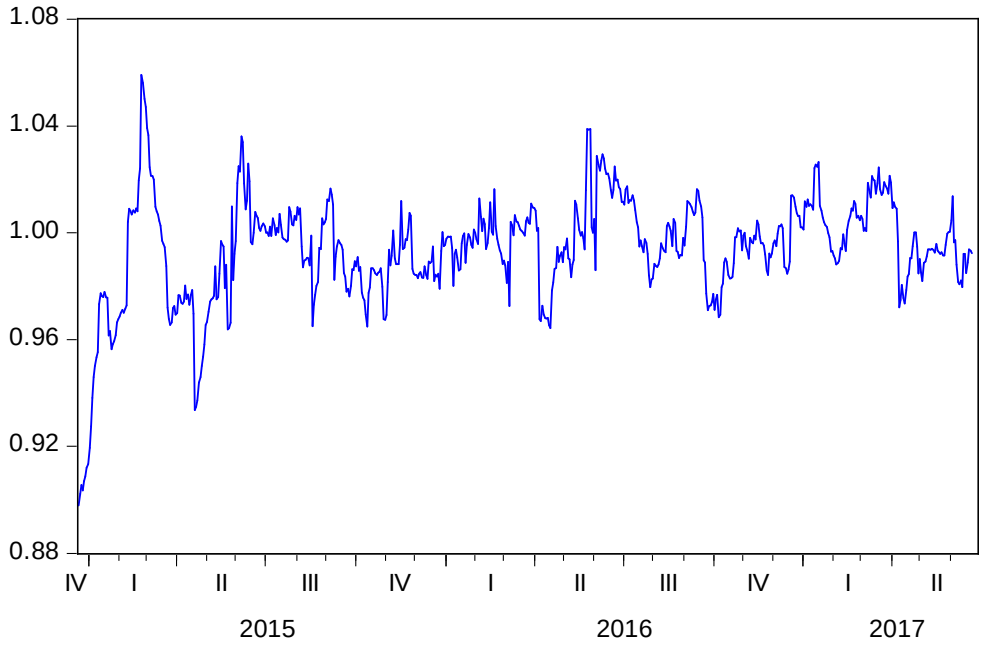
Average Time Varying Hedge Ratio $(H_t) = \frac{h_{sf,t}}{h_{ff,t}}$ = 0.90

Average Time Varying Hedging Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)}$ = 0.98

Fig. 5.70 – below depicts the time-varying hedge ratios of SBI future prices for the second sub period under study

Figure 5.70

Time Varying Hedge Ratio of SBI (Period 1I)



From the above analysis it can be concluded that the variances of return from a hedged portfolio of SBI bank shall be minimum when a position in spot market is combined with a position in futures market to the extent of 90 to 93 percent of the former. Further, the time varying hedge ratio of SBI is not substantially different from the constant ratio. Hedging efficiency of SBI bank future prices is approximately 93 to 97 percent.

VI. Optimal Hedge Ratio (OHR) and Hedging Effectiveness of Canara Bank Futures (1 January 2011 to 17 July 2017)

For estimating OHR and hedging effectiveness, spot price and futures price were changed into log form as 'log futures' and 'log spot'. ADF test is used to test stationarity of series at levels and first difference.

Table 5.51: Unit Root Test for Canara Bank

Variables	Levels	First difference
log spot	-2.274221 (0.1806)	-37.19672 (0.0000)**
Log future	-2.290945 (0.1751)	-38.11904 (0.0000)**

Figures in () are P-values. ** Significance at 1% level.
Source: Secondary data.

Both 'spot price' and 'futures price' series are found to be non-stationary but are stationary at first difference. Graph of first difference of spot price and futures prices are presented in Fig. 5.71 and Fig. 5.72.

Figure 5.71

First Difference - Futures Prices of Canara Bank

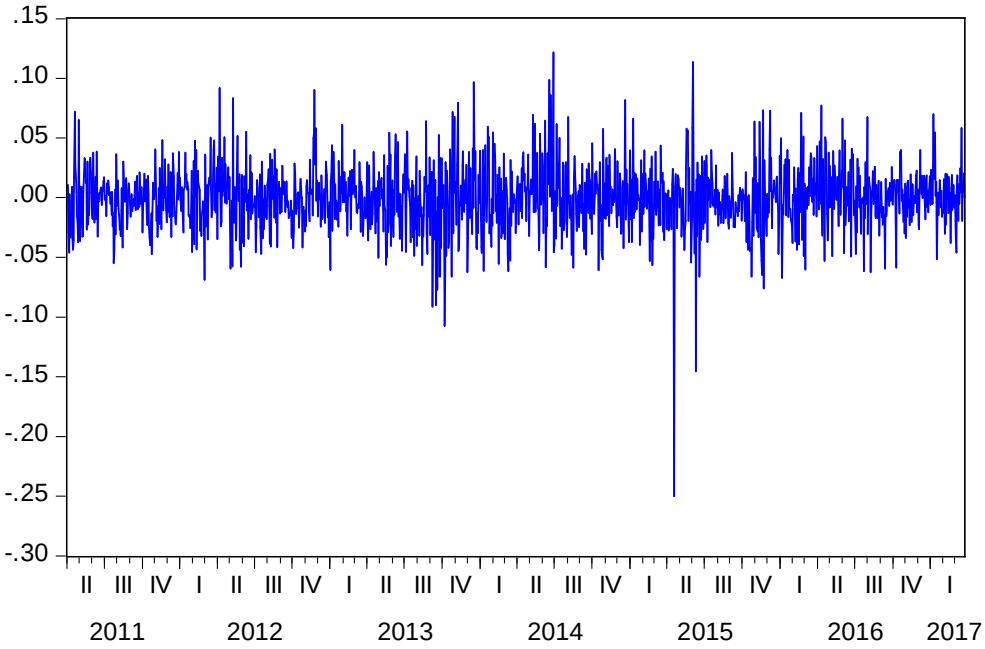
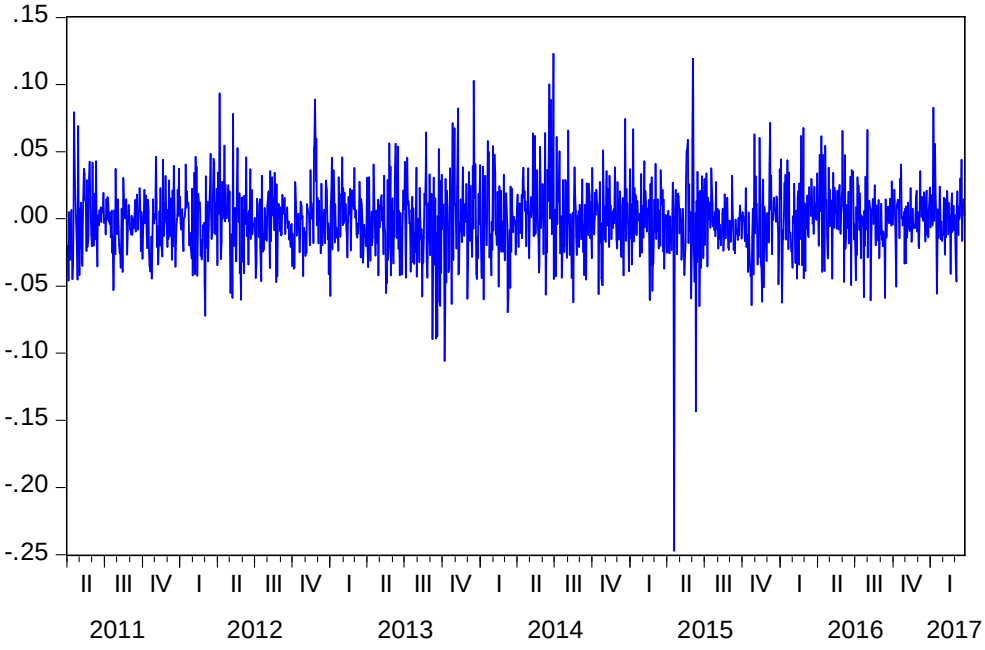


Figure 5.72

First Difference - Spot Price of Canara Bank



After the test of stationarity, the co integrating relationship between spot price and futures price are tested by using Johansen co integration tests (both Trace and Eigen value). The results obtained are showed below.

Table 5.52

Testing Co integration between Spot Price and Futures Prices (Canara Bank) Using Johansen Co integration Tests

Hypothesized No. of CE(s)	Eigen value	Trace Statistic (λ trace)	Max-Eigen Statistic (λ max)
None	0.143521	246.8364(0.0001) *	241.3741(0.0001) *
At most 1	0.003500	5.462279(0.2365)	5.462279 (0.2365)

Figures in () are p-values. * denotes rejection of the hypotheses at the 0.05 level.
Source: Secondary data.

Both Trace and Max-Eigen value tests indicate 1 co integrating eqn (s) at the 0.05 level.

The price movement of both spot price and futures prices are indicated by Fig.5.73 and Fig.5.74.

Figure 5.73

Futures Prices of Canara Bank

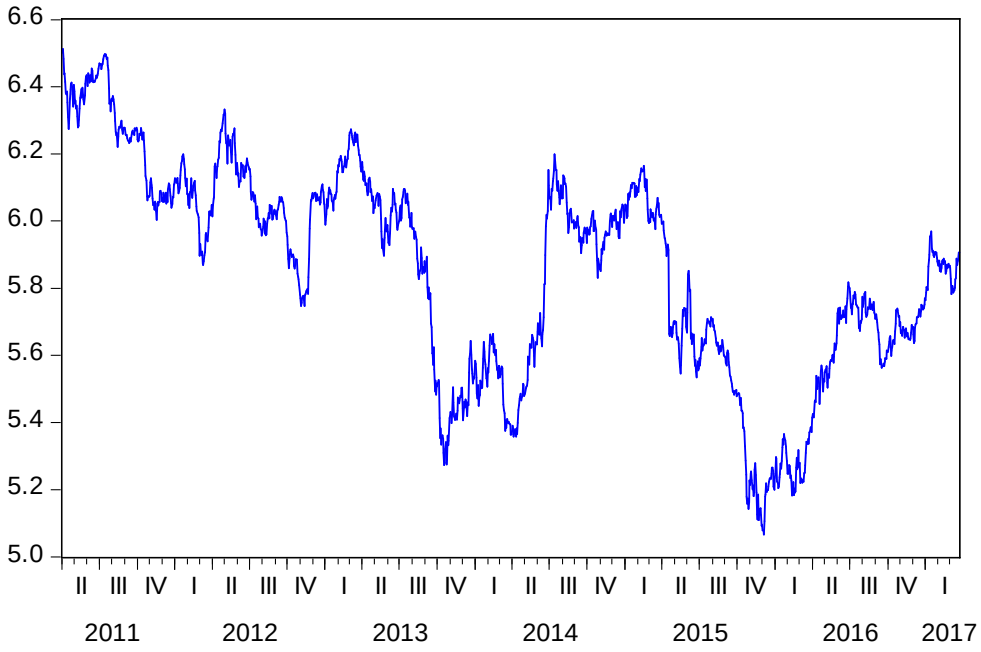
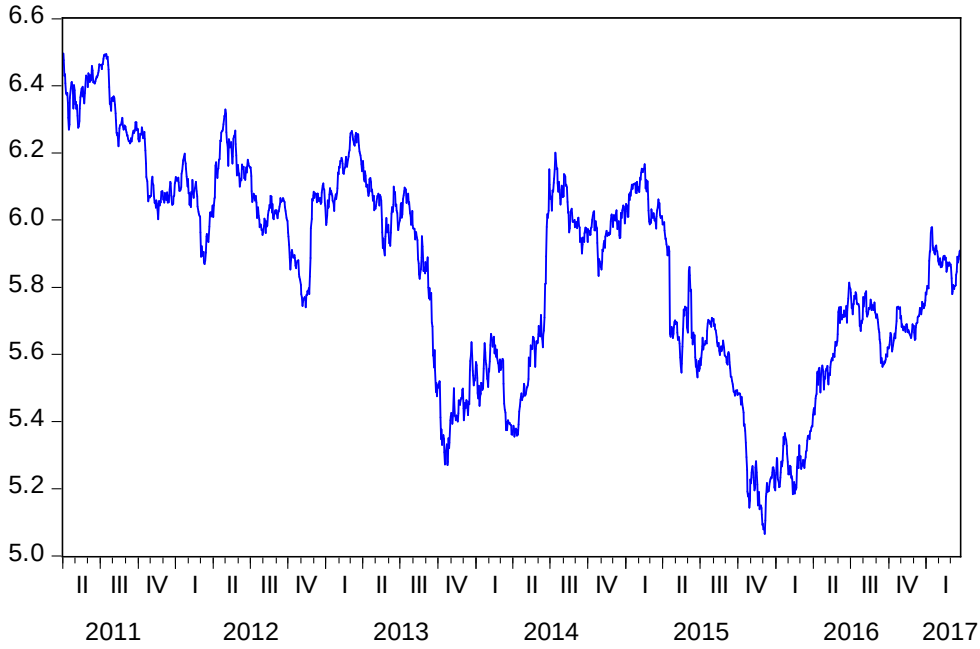


Figure 5.74

Spot Prices of Canara Bank



Since the series are 1 (1) and are co integrated, modelled using VECM and the residuals are obtained. Fig 5.75 and Fig. 5.76 depict the residuals of VECM.

Figure 5.75

Residuals of Futures Prices from VECM (Canara Bank)

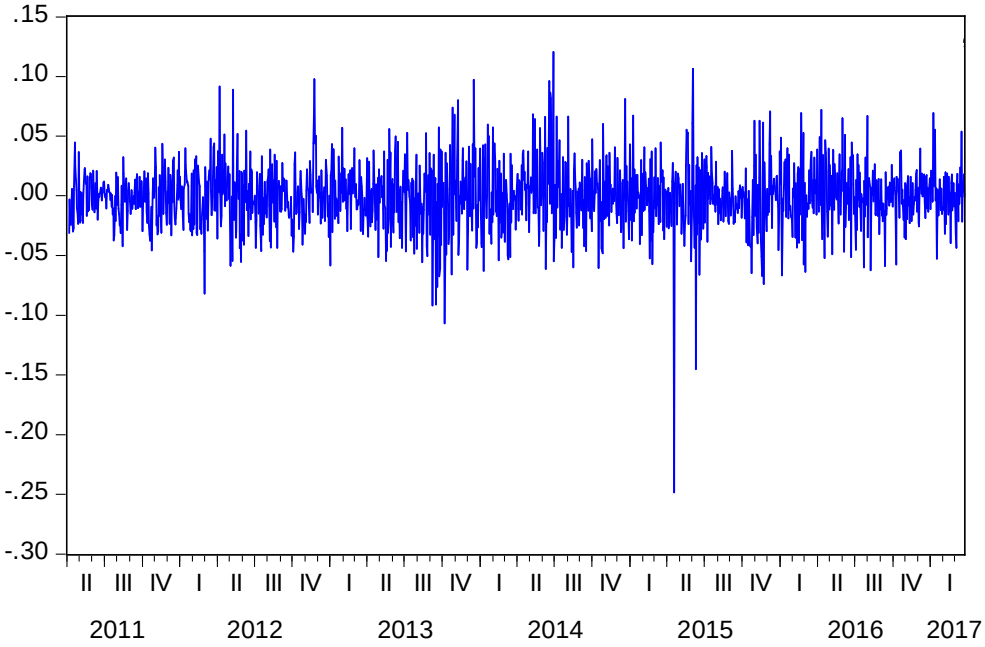
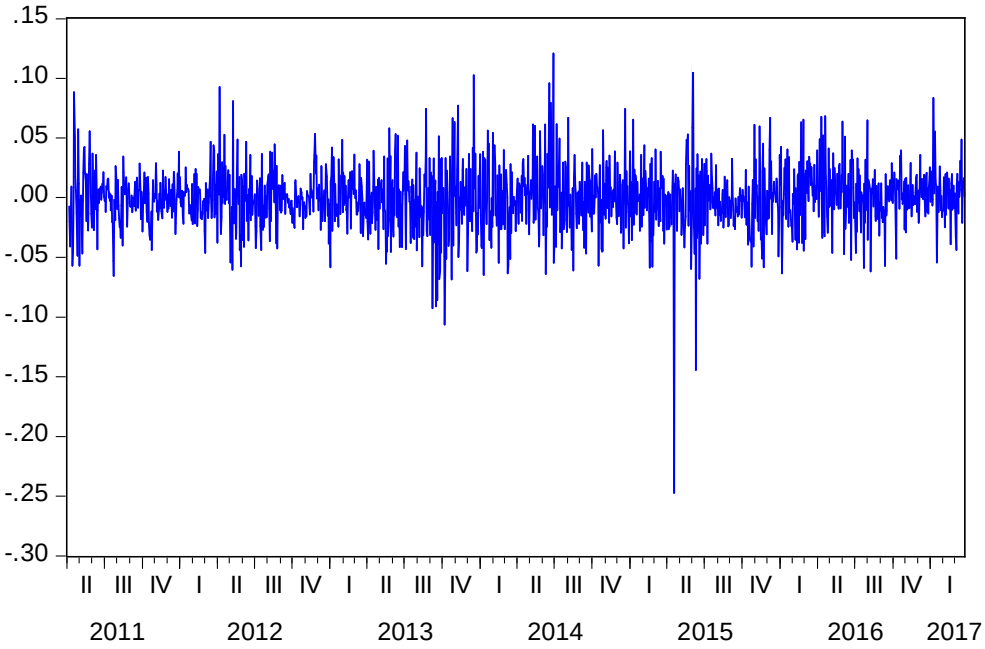


Figure 5.76

Residuals of Spot Price from VECM (Canara Bank)



The descriptive statistics of the residual series which are used in the calculation of hedge ratios are reported below.

Table 5.53

Descriptive Statistics of the Residuals from VECM (Canara Bank)

	Residual (Future price) ε_{ft}	**Residual (spot price)** ε_{st}
Mean	-0.000334	-0.000319
Median	0.000184	0.000349
Std. deviation	0.026777	0.026113

Source: Secondary data.

The Optimal Hedge Ratio (H) $= \frac{\sigma_{s,f}}{\sigma_f^2} = 0.90$

Hedging Effectiveness (E) $= \frac{Var(U) - Var(H)}{Var(U)} = 0.86$

Next the residual series are tested for ARCH effect using CCC-M GARCH Model. The results obtained are reported below.

Table 5.54

Testing Futures Prices Residuals for ARCH effect (Canara Bank)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	-0.000503	0.000682	-0.738193	0.4604
Variance Equation				
C	2.13E-05	6.22E-06	3.427256	0.0006
RESID(-1)^2	0.054424	0.010029	5.426894	0.0000**
GARCH(-1)	0.918063	0.016212	56.62932	0.0000**

** Significance at 1% level. Source: Secondary data.

Above table showed residuals of future prices. Residuals of spot price obtained from obtained from CCC-M GARCH model as shown below

Table 5.55

Testing Spot Price Residuals for ARCH effect (Canara Bank)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	-7.19E-05	0.000646	-0.111353	0.9113
Variance Equation				
C	2.37E-05	6.22E-06	3.810080	0.0001
RESID(-1)^2	0.066396	0.012044	5.512814	0.0000**
GARCH(-1)	0.901563	0.018146	49.68415	0.0000**

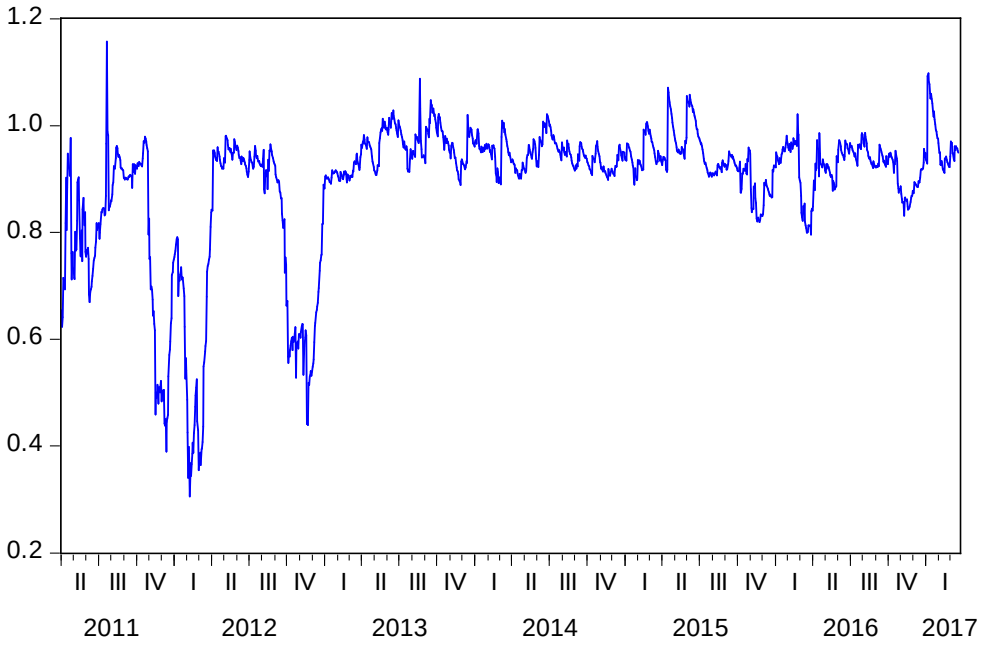
** Significance at 1% level. Source: Secondary data.

Average Time – Varying Hedge Ratio $(H_t) = \frac{h_{sf,t}}{h_{ff,t}}$ = 0 .89

Average Time Varying Hedging Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)}$ = 0.85

Figure 5.77

Time Varying Hedge Ratios of Canara Bank



The above analysis of the hedging efficiency of Canara Bank futures prices shows that the constant hedge ratio is 90 percent and time varying is 89 percent. It means that the variance of return from Canara Bank shall be minimum when a position in spot market is accompanied by a position in Canara Bank futures to the extent of 90 percent. Further, diversification of the portfolio by combining positions in Canara Bank‘s spot price market with Canara bank futures market can reduce the overall risk by 85 to 86 percent.

VI. Optimal Hedge Ratio (OHR) and Hedging Effectiveness of OBC Futures Prices (1 January 2011 to 17 July 2017)

For estimating OHR and hedging effectiveness, spot price and future price changed into log form as ‘log futures’ and ‘log spot’. ADF test is used to test stationarity of series at levels and first difference

Table 5.56

Unit Root Test for OBC

Variables	Levels	First difference
log spot price	-1.739943(0.4109)	-38.04411(0.0000)**
Log futures prices	-1.766051(0.3977)	-38.91913 (0.0000)**

Figures in () are P-values. ** Significance at 1% level.
Source: Secondary data.

Both 'log spot' and log futures' series are found to be non-stationary but are stationary at first difference. Graph of first difference of log spot and log futures are presented in Fig. 5.78 and Fig. 5.79.

Figure 5.78

First Difference - Spot Price of OBC

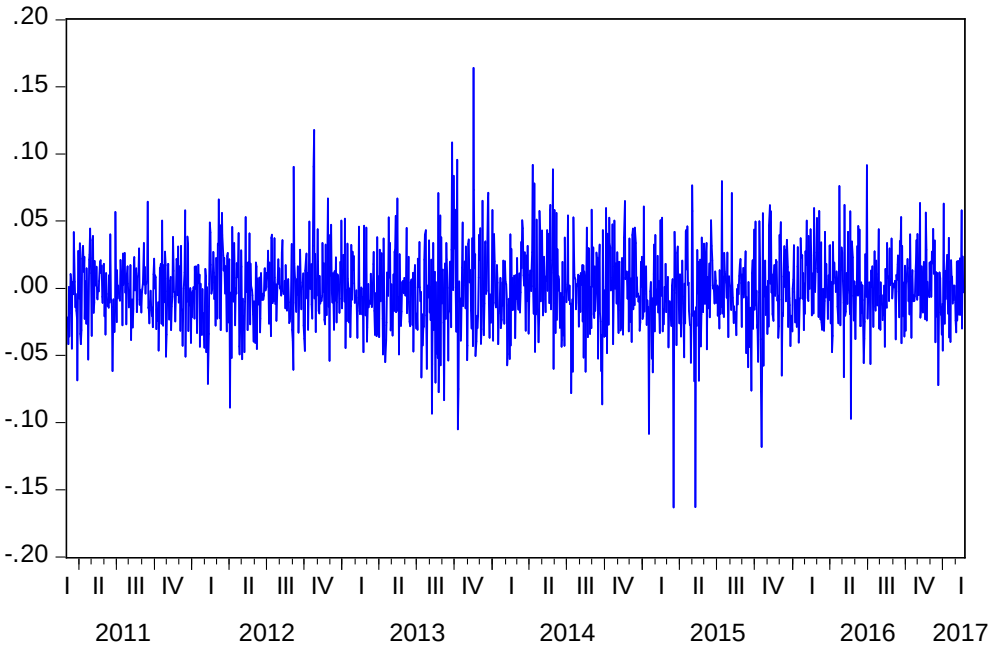
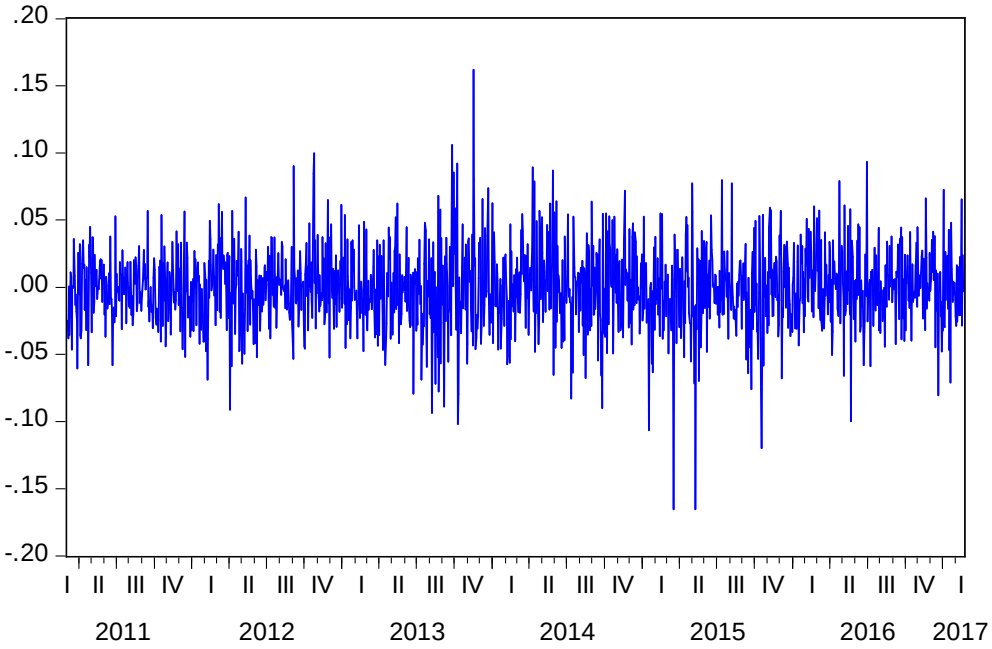


Figure 5.79

First Difference - Futures Prices of OBC



After the test of stationarity, test the co integrating relationship between spot price and futures price by using Johansen co integration tests (both Trace and Eigen value). The results obtained are showed below.

Table 5.57

Testing Co integration between Spot Price and Futures Prices (OBC Bank) Using Johansen Co integration Tests

Hypothesized No. of CE(s)	Eigen value	Trace Statistic (λ trace)	Max-Eigen Statistic (λ max)
None	0.069978	115.5691(0.0001) *	112.7377(0.0001) *
At most 1	0.001820	2.831418(0.0924)	2.831418 (0.0924)

Figures in () are p-values. * denotes rejection of the hypotheses at the 0.05 level.
Source: Secondary data.

Both Trace and Max-Eigen value tests indicate 1 co integrating eqn (s) at the 0.05 level. The price movement of both spot price and futures prices are indicated by Fig.5.80 and Fig.5.81.

Figure 5.80

Spot Prices of OBC

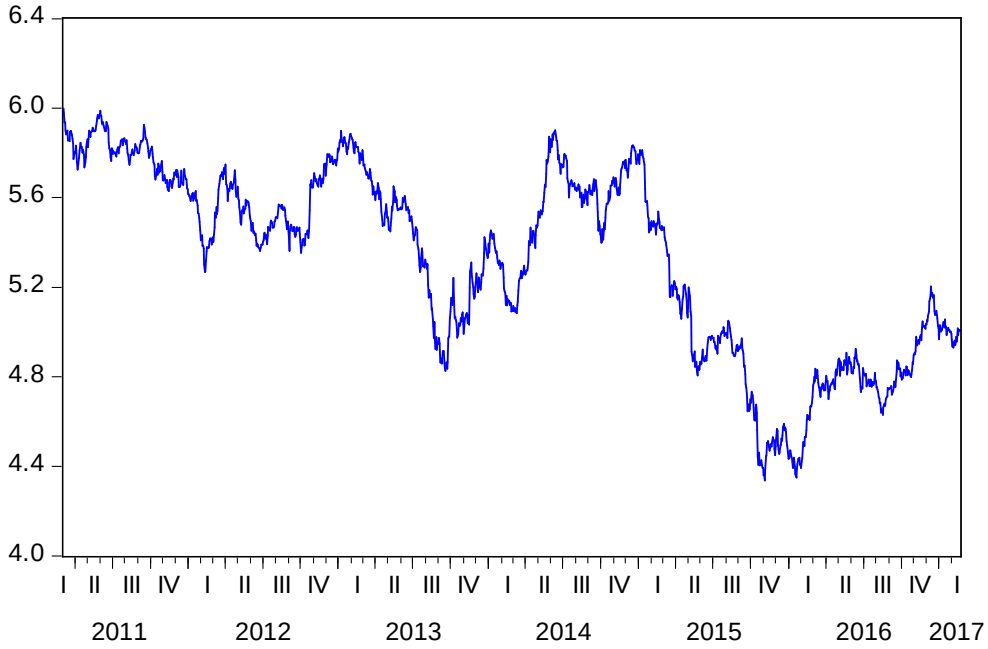
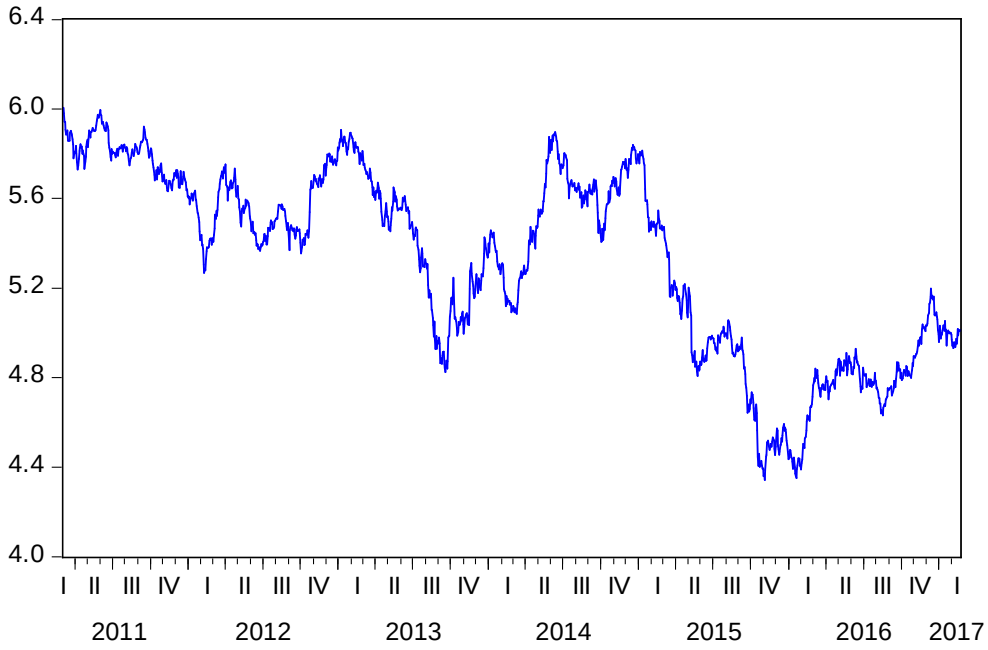


Figure 5.81

Futures Price of OBC



Since the series are 1 (1) and are co integrated, modelled using VECM and the residuals are obtained. Fig 5.82 and Fig. 5.83 depict the residuals of VECM**.**

Figure 5.82

Residuals of Futures Price from VECM (OBC)

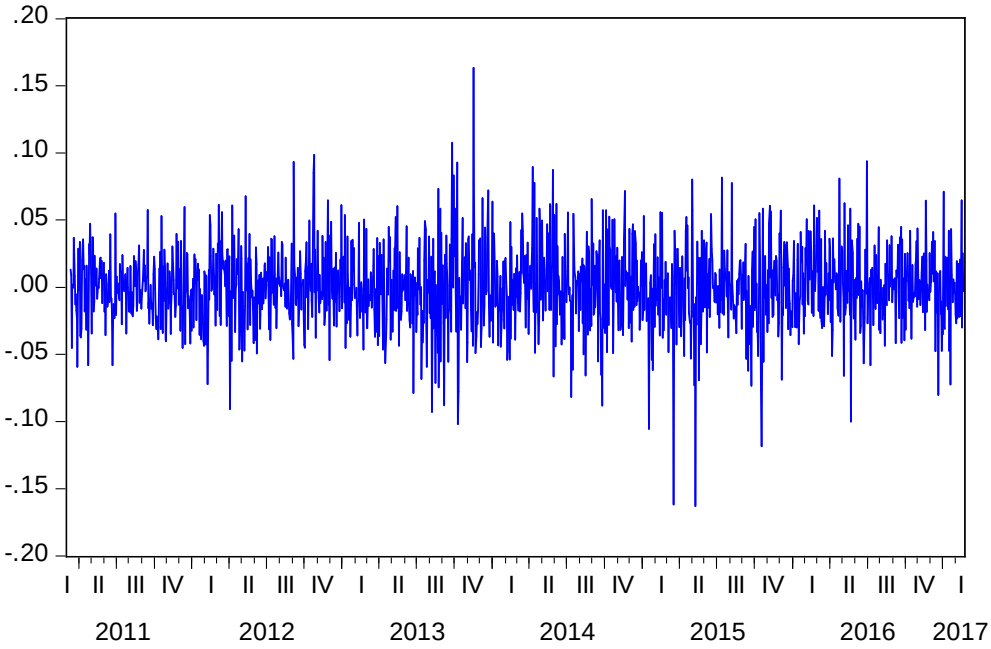
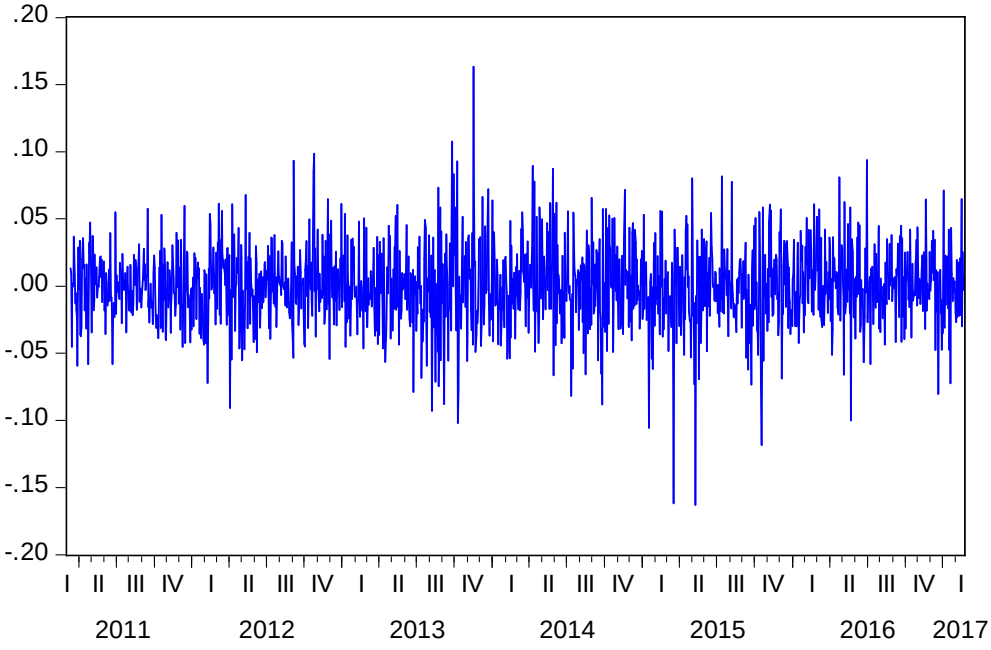


Figure 5.83

Residuals of Spot Price from VECM (OBC)



The descriptive statistics of the residual series which are used in the calculation of hedge ratios are reported below.

Table 5.58

Descriptive Statistics of the Residuals from VECM (OBC)

	Residual (Futures price) ε_{ft}	**Residual (spot price) ε_{st}**
Mean	5.51E-19	-2.32E-19
Median	-2.89E-06	-0.000796
Std. deviation	0.029453	0.028672

Source: Secondary data.

The Optimal Hedge Ratio (H) $= \frac{\sigma_{sf}}{\sigma_f^2} =$ 0.90

Hedging Effectiveness (E) $= \frac{Var(U) - Var(H)}{Var(U)} =$ 0.93

Next is the residual series tested for ARCH effect using CCC-M GARCH Model? The results obtained are reported below.

Table 5.59

Testing Futures price Residuals for ARCH effect (OBC Bank)

Variable	**Coefficient**	**Std. Error**	**Z-Statistic**	**p-Value**
C	0.000104	0.000732	0.142316	0.8868
Variance Equation				
C	1.37E-05	4.87E-06	2.814887	0.0049
RESID(-1)^2	0.027223	0.005418	5.024785	0.0000**
GARCH(-1)	0.957348	0.008865	107.9903	0.0000**

** Significance at 1% level. Source: Secondary data.

Above table showed residuals of future prices. Residuals of spot price obtained from obtained from CCC-M GARCH model as shown below

Table 5.60

Testing Spot Price Residuals for ARCH effect (OBC)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	0.000234	0.000687	0.340711	0.7333
Variance Equation				
C	8.20E-06	2.85E-06	2.878902	0.0040
RESID(-1)^2	0.039183	0.005523	7.094044	0.0000**
GARCH(-1)	0.951956	0.006297	151.1876	0.0000**

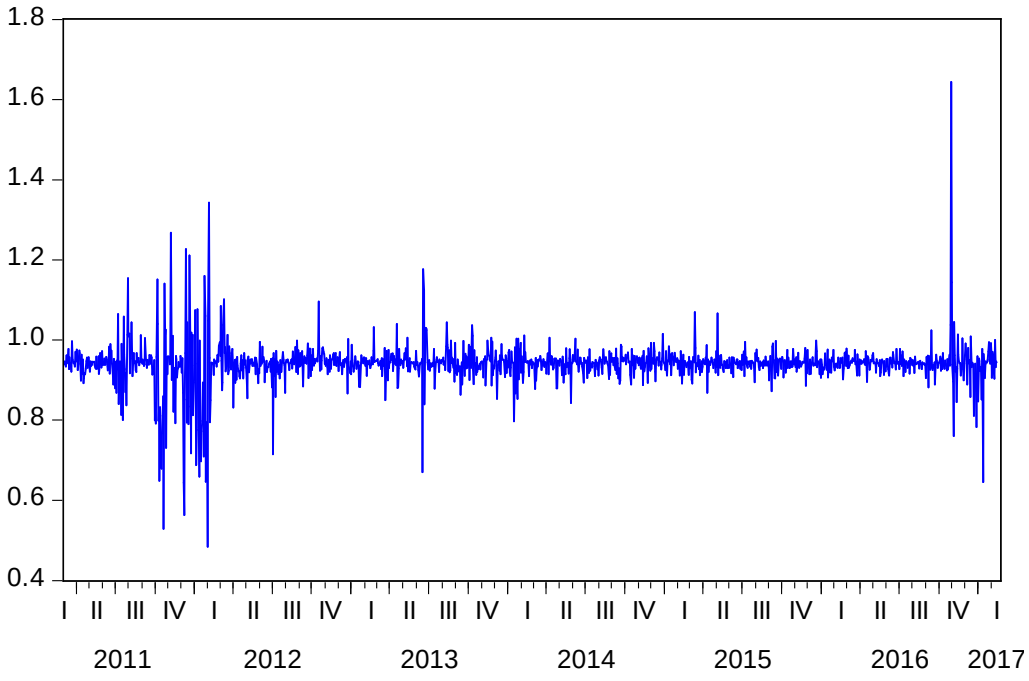
** Significance at 1% level. Source: Secondary data.

Average Time Varying Hedge Ratio $(H_t) = \frac{h_{sf,t}}{h_{ff,t}}$ = 0.93

Average Time Varying Hedging Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)}$ = 0.94

Figure 5.84

Time Varying Hedge Ratio of OBC



From the above analysis of OBC futures prices, it can be concluded that the risk involved in spot price market positions in OBC can be minimized if combined with positions in OBC futures prices to the extent of 90 to 93 percent of the former. Constant and dynamic hedging effectiveness of OBC futures prices are 0.93 and 0.94 respectively. In other words, diversification with OBC futures prices can reduce the risk arising from unexpected price variations of OBC to the extent of a modest 93 percent.

VII. Optimal Hedge Ratio (OHR) and Hedging Effectiveness of Yes Bank Futures(1 January 2011 to 17 July 2017)

The spot price and future price series are first converted to logarithmic series and are designated as 'log spot' and 'log future' respectively. These series are tested for stationarity at levels and first difference using Augmented Dickey-Fuller test. The results are reported below

Table 5.61

Unit Root Test for Yes Bank

Variables	Levels	First difference
log spot price	-2.858361 (0.1766)	-38.15995 (0.0000) **
Log future prices	-2.935878 (0.1513)	-37.14051 (0.0000) **

Figures in ( ) are P-values. ** Significance at 1% level. Source: Secondary data.

Both 'log spot' and long futures' series are found to be non-stationary but are stationary at first difference. Graph of first difference of log spot and log futures are presented in Fig. 5.85 and Fig. 5.86

Figure 5.85

First Difference - Spot Prices of Yes Bank

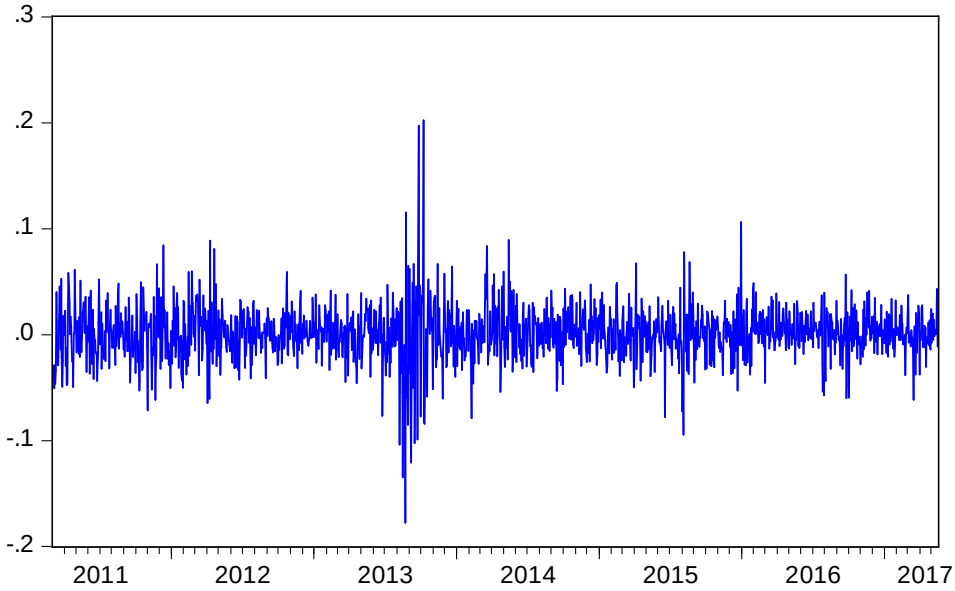
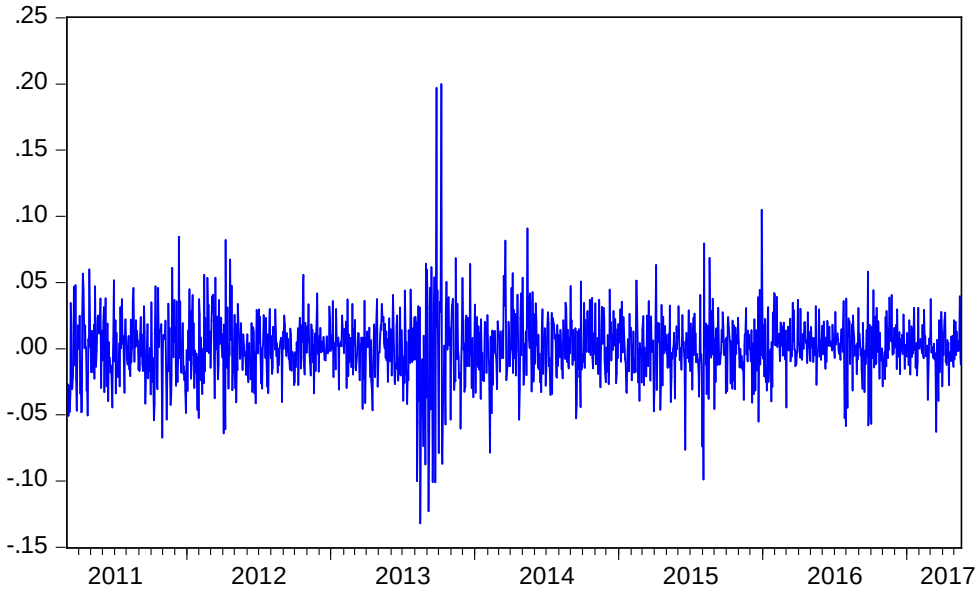


Figure 5.86

First Difference - Futures Prices of Yes Bank



Next we test the series for any co integrating relationship between the two, Johansen co integration tests (both Trace and Eigen value) are used to examine the co integration. The results obtained are reported below.

Table 5.62

Testing Co integration between Spot price and Futures Prices (Yes Bank) Using Johansen Co integration Tests

Hypothesized No. of CE(s)	Eigen value	Trace Statistic (λ trace)	Max-Eigen Statistic (λ max)
None	0.099747	169.6188(0.0001) *	169.3882 (0.0001) *
At most 1	0.000143	0.230580(0.6311)	0.230580 (0.6311)

Figures in () are p-values. * denotes rejection of the hypotheses at the 0.05 level.
Source: Secondary data.

Both Trace and Max-Eigen value tests indicate 1 co integrating eqn (s) at the 0.05 level. The price movement of both spot price and futures price are indicated byFig.5.87 and Fig.5.88.

Figure 5.87

Spot prices of Yes Bank

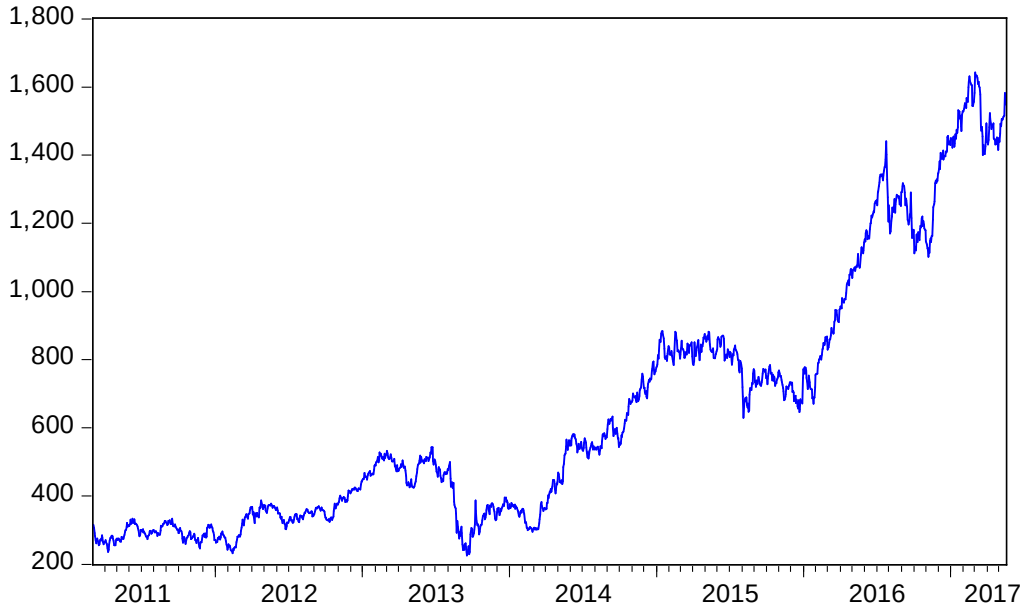
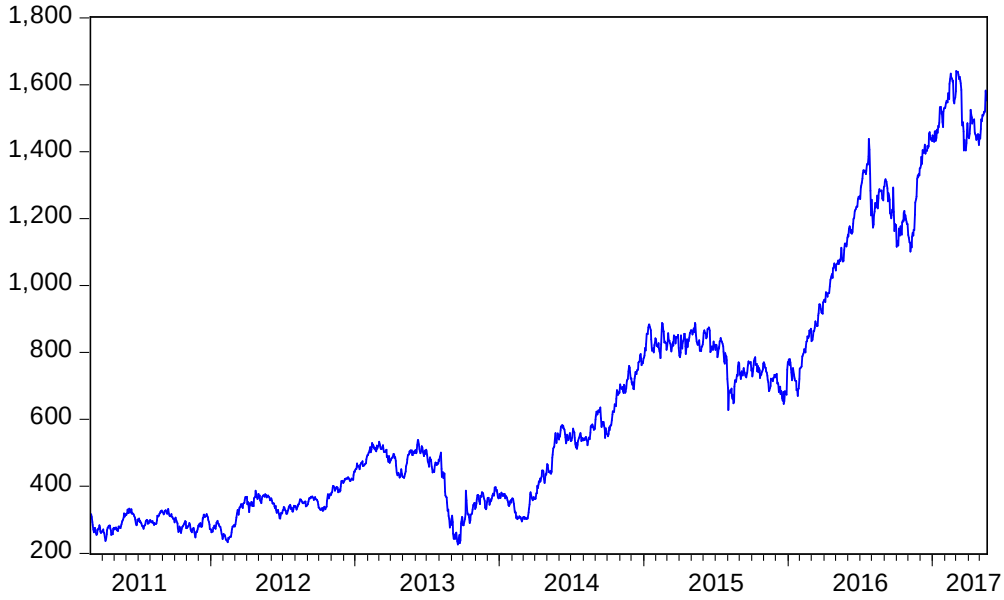


Figure 5.88

Futures Prices of Yes Bank



Since the log series are 1 (1) and are co integrated, we use VECM to model them and the residuals are obtained. These residuals are depicted in the graphs below.

Figure 5.89

Residuals of Futures Prices from VECM (Yes Bank)

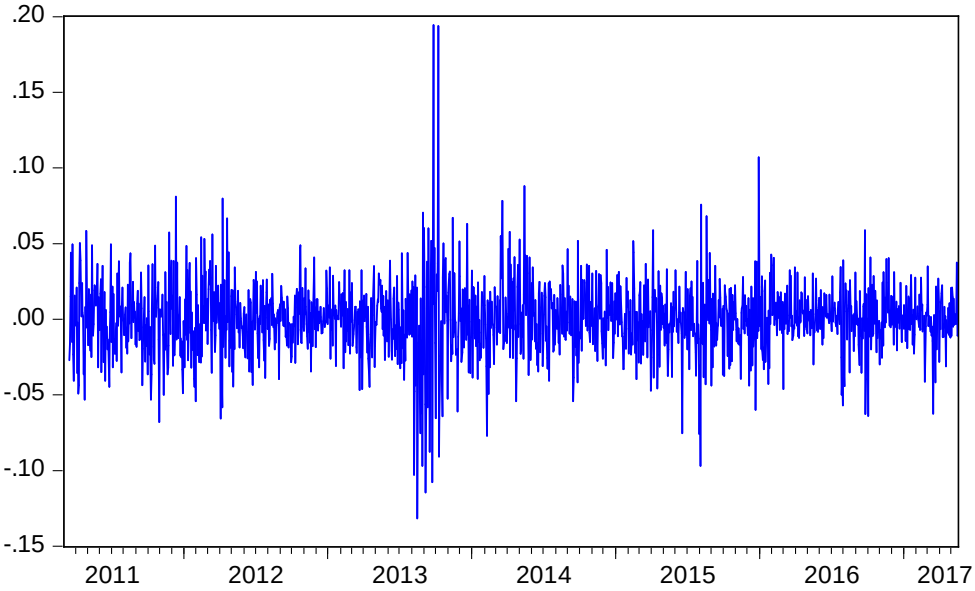
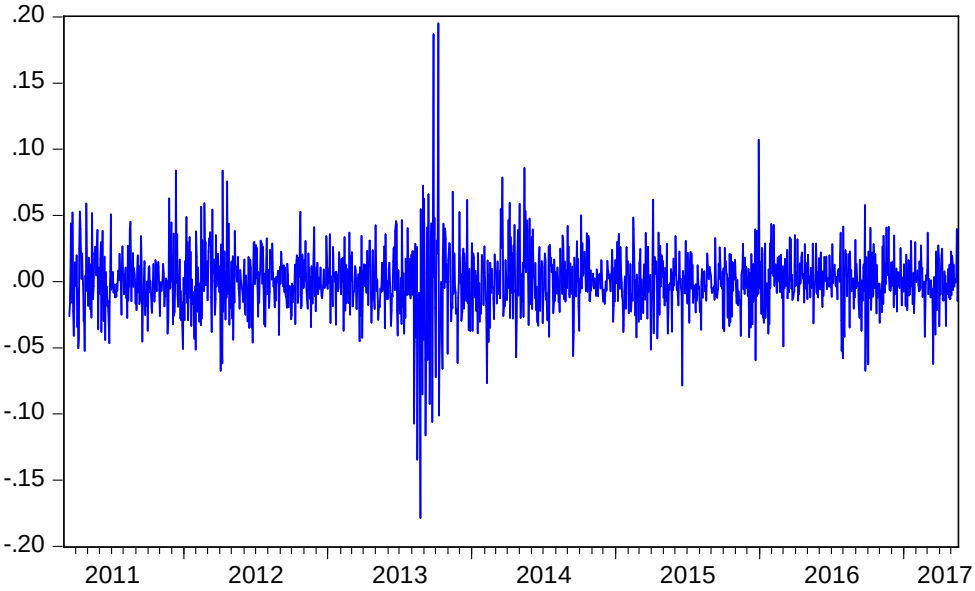


Figure 5.90

Residuals of Spot Prices from VECM (Yes Bank)



The Following Table (5.63) lists the descriptive statistics of the residual series. Variances and covariance of the residuals used in the calculation of OHR are computed from the standard deviation reported below.

Table 5.63

Descriptive Statistics of the Residuals from VECM (Yes Bank)

	Residual (Future price) ε_{ft}	**Residual (spot price) ε_{st}**
Mean	5.12E-19	-2.32E-19
Median	-0.000396	-0.000411
Std. deviation	0.024250	0.024127

Source: Secondary data.

The Optimal Hedge Ratio (H) $= \frac{\sigma_{s,f}}{\sigma_f^2} = 0.90$

Hedging Effectiveness (E) $= \frac{Var(U) - Var(H)}{Var(U)} = 0.81$

The residual series are tested for ARCH effect using CCC-M GARCH model and the results are reported below.

Table 5.64

Testing Futures Prices Residuals for ARCH effect (Yes Bank)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	0.000521	0.000514	1.012765	0.3112
Variance Equation				
C	1.29E-05	3.20E-06	4.019794	0.0001
RESID(-1)^2	0.066185	0.008430	7.851045	0.0000**
GARCH(-1)	0.910077	0.012368	73.58294	0.0000**

** Significance at 1% level. Source: Secondary data.

Above table showed residuals of future prices. Residuals of spot price obtained from obtained from CCC-M GARCH model as shown below

Table 5.65

Testing Spot price Residuals for ARCH effect (Yes Bank)

Variable	Coefficient	Std. Error	Z-Statistic	p-Value
C	0.000299	0.000484	0.617380	0.5370
Variance Equation				
C	1.30E-05	2.99E-06	4.354444	0.0000
RESID(-1)^2	0.072312	0.008590	8.417941	0.0000**
GARCH(-1)	0.902825	0.012083	74.72164	0.0000**

** Significance at 1% level. Source: Secondary data.

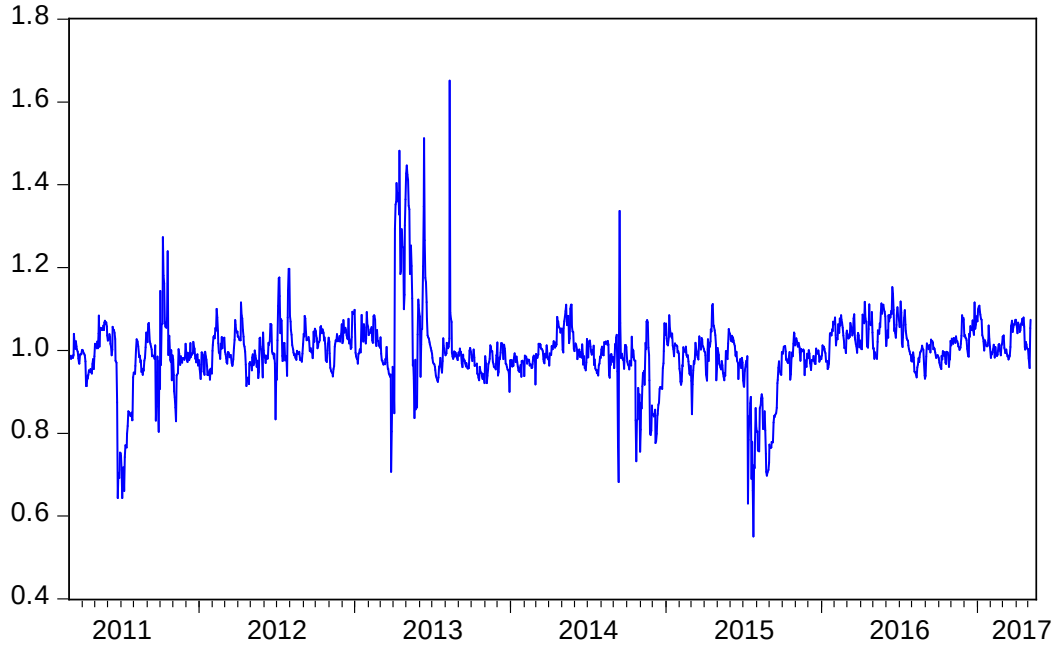
Average Time Varying Hedge Ratio $(H_t) = \frac{h_{sf,t}}{h_{ff,t}}$ = 0.90

Average Time Varying Hedging Effectiveness $(Et) = \frac{Var(U) - Var(H)}{Var(U)}$ = 0.95

The following diagram presents the dynamic hedge ratios of the YES Bank future prices.

Figure 5.91

Time Varying Hedge Ratio of Yes Bank



From the above analysis of Yes bank future prices, it can be concluded that the risk involved in spot price market positions in Yes bank can be minimized if combined with positions in Yes bank future prices to the extent of 90 percent .Constant and dynamic hedging effectiveness of Yes bank future prices are 0.81 and 0.95 respectively. In other words, diversification with Yes bank future prices can reduce the risk arising from unexpected price variations of Yes bank to the extent of a modest 88 percent.

5.7.2. Price Discovery of Banking Sector Future Prices

In the first part of results and discussions, we have to be tested stationarity and co integration of each bank by using ADF test and Johansen co integration test. All bank's data are stationary at first difference and are co integrated. In the Johansen co integration test, it is found that both Trace and Max-Eigen value tests indicate 1 co integrating eqn (s) at the 0.05 level in all cases. In other words it confirms long-run relationship between the spot price and future price of selected Banking sector stocks in NSE. Table 5.66 presented the result of Granger-causality test.

Table 5.66

Direction of Causality

Bank	Direction of Causality	$\chi 2$	Nature of Causality
Axis Bank I	Spot price does not cause future price	3.08645 (0.0462)	Bidirectional
	Future price does not cause spot price	99.0286 (0.0000)	
Axis Bank II	Spot price does not cause future price	1.80854 (0.1646)	Unidirectional
	Future price does not cause spot price	39.7177 (0.0000)	
Federal Bank I	Spot price does not cause future price	21.5795 (0.0000)	Bidirectional
	Future price does not cause spot price	10.8213 (0.0000)	
Federal Bank II	Spot price does not cause future price	0.25497 (0.7750)	Unidirectional
	Future price does not cause spot price	6.82077 (0.0012)	
HDFC I	Spot price does not cause future price	257.026 (0.0000)	Bidirectional
	Future price does not cause spot price	159.059 (0.0000)	
HDFC II	Spot price does not cause future price	2.02900 (0.1318)	Unidirectional
	Future price does not cause spot price	74.6341 (0.0000)	
Kotak Bank I	Spot price does not cause future price	28.6960 (0.0000)	Bidirectional
	Future price does not cause spot price	49.2877 (0.0000)	
Kotak Bank II	Spot price does not cause future price	3.70263 (0.0253)	Bidirectional
	Future price does not cause spot price	45.8406 (0.0000)	
	Future price does not cause spot price	16.8484 (0.0000)	

Bank	Direction of Causality	$\chi 2$	Nature of Causality
SBI I	Spot price does not cause future price	0.05708 (0.9445)	Unidirectional
	Future price does not cause spot price	31.9070 (0.0000)	
SBI II	Spot price does not cause future price	0.84051 (0.4320)	Unidirectional
	Future price does not cause spot price	32.5203 (0.0000)	
Canara Bank	Spot price does not cause future price	21.5621 (0.0000)	Bidirectional
	Future price does not cause spot price	15.5003 (0.0000)	
OBC	Spot price does not cause future price	2.03470 (0.1311)	Unidirectional
	Future price does not cause spot price	16.8484 (0.0000)	
YES	Spot price does not cause future price	0.39668 (0.6726)	Unidirectional
	Future price does not cause spot price	75.4783 (0.0000)	

Source: Secondary data.

Table 5.66 presents the result of testing causality of 8 banks (5 banks are analysed by dividing into two sub periods). From the table we can conclude that 6 cases (Axis Bank I, Canara bank, Federal bank I, HDFC bank I, Kotak bank I and Kotak bank II) show bidirectional causality. Remaining 7 cases (Axis Bank II, Federal bank II, HDFC bank II, OBC, SBI bank I, SBI bank II and YES bank) show unidirectional causality. From this we can understand that Future price leads to price discovery of spot price in the case of banking sector futures.

5.8. CONCLUSION

The constant as well as time-varying hedge ratios and hedging effectiveness of the future prices of different banks studied are presented in the following table.

Table 5.67

OHR and Hedging Effectiveness of Selected Bank future prices

Bank	Constant		Time varying	
	OHR	Hedging Effectiveness	OHR	Hedging Effectiveness
Axis Bank I	.70	.40	.66	.50
Axis Bank II	.71	.44	.86	.70
Federal Bank I	.90	.75	.86	.85
Federal Bank II	.90	.92	.97	.98
HDFC I	.82	.13	.76	.15
HDFC II	.90	.71	.93	,92
Kotak Bank I	.70	.62	.99	.92
Kotak Bank II	.40	.17	.10	.17
SBI I	.90	.89	.95	.96
SBI II	.90	.98	.90	.98
Canara Bank	.90	.86	.89	.85
OBC	.90	.93	.93	.94
YES	.90	.81	.90	.95

Source: Secondary data.

The optimal hedge ratio, in cases 7 banks among 8 is more than .70 which means that the variance of a hedged portfolio shall be the minimum when a position in spot price market is combined with a position in the futures prices market to the extent of 70 to 90 percent of the former. Further, the time-varying hedge ratios are not substantially different from the constant ratios. In the case of Kotak Bank, its average constant and time varying hedge ratios are .45 and .55

The study highlights that the hedging efficiency of banking futures prices under study is good. It means that hedging with banking sector future prices shall be able to bring down the risk of an unhedged portfolio in a very good manner.

This chapter also analysed price discovery role of banking futures prices. In all case it shows at least unidirectional causality. So we can say banking futures functioning efficiently. There is information pass from futures market to spot market.

BINOOSA T. “ROLE OF FUTURES IN RISK REDUCTION: A STUDY WITH REFERENCE TO SELECT BANKS’ FUTURES”. THESIS. PG DEPARTMENT OF COMMERCE, P.S.M.O COLLEGE TIRURANGADI, UNIVERSITY OF CALICUT, 2018.

Chapter VI

Summary, Findings, Suggestions and Conclusion

6.1. Introduction

This chapter contains the summary of the study, findings drawn from the analysis, suggestions based on the findings and the concluding remarks based on objectives.

6.2 Summary

Globalisation and liberalisation of financial market and constitution of NSE gave drastic change in the operation of the financial market. As a consequence of this change, a lot of innovations have been made in the functioning and structuring of the financial market in the country. Most critical aspect of innovation was the development of derivative segment in the Indian financial market. SEBI appointed a committee of 24 members under the Chairmanship of Dr. L. C. Gupta on November 18, 1996 to develop proper regulatory framework for derivatives trading in India. The committee recommended introduction of derivatives in Indian stock market in their report submitted on March 17, 1998. SEBI set up another committee to study measures for risk in derivatives market. They submitted report which explained functioning of derivative market. Initially derivatives in India were introduced as a risk reduction tool on June 2000 through the introduction of stock index futures. This was followed by the introduction of the index option (June 2000), stock options (July 2001) and stock futures (Nov 2001). It was introduced due to high volatility of the Indian stock market. Increased volatility in asset prices in financial markets, increased integration of national financial markets with the international markets, improvements in the communication facilities necessitates the introduction of derivatives in India.

Derivatives are the instrument whose value is derived from underlying assets. Underlying asset may be commodities, stocks, currencies, metals, interest rate etc. Different types of derivatives include futures, forwards; options and swaps. Most

important derivatives instruments are futures and options; it has become essential instruments of price discovery, portfolio diversification and risk hedging in recent times on the Indian stock markets. Most popular and powerful instrument of financial derivatives is futures. Futures contracts, better known as *Futures*, create an important instrument for handling or hedging risk in commodity and financial market due to price instabilities in the market.

Among various sectors in NSE, Banking sector witnessed a constant growth in the last 10 years. In terms of number, banking sector is the largest sector in NSE as compared to other sectors. So, the banking sector is most suitable for this study. Hence, the study considers Nifty as a proxy for the Indian stock market and special focus is given to stock futures in banking sector.

In the highly competitive market, both financial innovations in the form of new financing and investment products as well as the design of efficient risk management procedures are crucial for the development of banking sector. Proper risk management tools were required to ensure viable and stable growth of industry. Futures are high profit and high loss instrument and its improper use without a proper study will lead to huge loss. So, the study examines the hedging effectiveness of futures in banking sector and price discovery of banking futures and how far it is suitable for managing risk exposure in banking sector.

In this context, some research questions have been raised. The study has been undertaken to answer the following questions:

Are the bank futures being suitable for hedging?

What are hedge ratio and hedging effectiveness of bank futures?

Are the bank futures performing price discovery function of future market?

What is the attitude of traders towards banking futures?

What are the reactions of traders to various information related to capital market?

To what extend traders used bank futures for hedging?

The present study is a humble effort to answer these questions. The main objectives of the study are;

- To study the traders' attitude towards futures in banking sector
- To identify the extent of hedging with derivatives by hedgers in banking sector
- To analyse reactions of traders to various information related to capital market.
- To measure the hedging efficiency of selected futures in banking sector.
- To identify the price discovery pattern of selected banking sector futures

This study focused the individual stock futures in NSE.136 stock futures in 11 sectors is available in NSE. Among these sectors only one sector that is banking sector was selected for the study. 24 stocks futures from banking sector are traded in NSE. 8 banks randomly selected for the study. So, this study limited to the area of banking futures only.

This study is designed as a descriptive and analytical one that makes use of both primary and secondary data. Hedging efficiency and price discovery of banking futures are analysed by using secondary data acquired from the official website of NSE. Secondary data includes daily closing futures price and daily closing of spot price in respect of 8 selected banks namely Axis bank, Canara bank, Federal bank, HDFC bank, Kotak bank, OBC, SBI and YES bank. These 8 banks were selected from 24 banks listed in NSE. Though different futures contracts of banks are traded simultaneously, the data in respect of current month contracts alone are considered.

The study used primary data for drawing conclusions on the traders' attitude towards banking futures, extend of hedging by hedgers and traders reaction to various information. The population of the study is the traders in banking futures in the state of Kerala. Primary data was collected from 360 sample respondents from 6 selected districts of Kerala. Multi stage sampling was used for the collection of primary data. In the first stage, the state of Kerala was divided into three region namely southern region, central region and northern region. In the second stage 2 districts were

selected from each region using random sampling. From southern region, Thiruvananthapuram and Kottayam were selected, Ernakulam and Thrissur from central region and Kozhikode and Malappuram from northern region. In the third stage, 10 stock broking firms were selected from each district on random basis. In the fourth stage, 6 banking futures traders from each stock broking firms were selected by using purposive sampling method. A structured pre-tested questionnaire was used for collecting data from the respondents. Vector Error Correction Model (VECM) is used to estimate the constant hedge ratio. GARCH model is applied to calculate time varying hedge ratio. Granger causality test is used to check price discovery. Primary data collected were analysed by using statistical tools such as ratios, percentages, averages, charts, statistical tests etc. Chi-square test, one-way ANOVA, correlation, regression test were used for arriving at inferences from the data.

The results of the study are presented as six chapters. The first chapter covers the introduction of the study which covers the background of study, significance of the study, research problem, objectives, scope and methodology of the study. The details of the literature reviewed for the study is discussed in the second chapter. The third chapter presents various concepts relating to futures and technical terms related to trading of futures. The forth chapter covers the data analysis of primary data relating to traders' attitude, hedging habit and traders' reaction to various information. The secondary data relating to hedging effectiveness and price discovery are analysed in the fifth chapter. The last chapter discusses the summary of the study, key findings, suggestions and conclusions.

6.3. Findings of the Study

Major findings from the analysis of both primary and secondary data are described under five headings namely

- Findings related to attitude of traders
- Findings related to investors' reactions to various information
- Findings related to hedging habit of traders' with bank futures

- Findings related to banking sector futures as hedging tool
- Findings related to price discovery function of banking futures

6.3 .1.Findings Related to Attitude of Traders

Under this head various sub headings are included namely demographic profile of respondents, experience of derivative traders, frequency of derivative trading, amount of investment in stock futures, awareness about derivatives, trader's awareness about futures, investor attitude towards derivatives, preference of investors towards different sectors in NSE, investment in futures of banks, duration of holding bank futures, purpose of using bank futures, attitude towards banking futures, reason of selecting banking futures, experience of risk and return from banking futures and satisfaction from trading.

6.3.1.1. Demographic Profile of Sample Respondents

- Gender wise distribution shows that 91.7% of the traders are male and only 8.3% of the samples are female.
- The maximum numbers of traders are in the age group of 31- 40 years.
- Education wise distribution of the sample shows that 52.2% of the respondents are graduates and 27.5 % of the respondents are post graduates.
- Majority of the sample traders' monthly income of family come under the category of ₹ 25000 and below. And second highest group of respondents come under the category of 25001– 50000.
- Occupation wise distribution shows that private sector constitutes the most prominent group among sample traders.

6.3.1..2. Experience of Derivative Traders

- Most prominent group of sample traders have the experience of 5-10 years in stock market and 25.3% of traders have the experience of more than 10 years.

- 36.4 % of sample respondents have more than five years' experience in derivative trading and 25.8 percent traders have 1 to 3 years' experience.
- 29.2 percent of traders from south region have the experience in between 1 to 3 years in derivatives market. 55.9 percent of traders from central region have the experience of more than 5 years in derivatives market. 35 percent of traders from north region have the experience in between 1 to 3 years in derivative market. Well experienced traders are more in central region.
- From the HSE and below category, 30 percent of traders have the experience of 1 to 3 year. Among degree holders, 42.6 percent have more than 5-year experience. 33.3 percent from PG holders have experience of only 1 to 3 year. 54.5 percent traders among professionals have more than five-year experience. Well experienced traders are from professionals and degree holders. But the hypothesis testing shows educational qualification of traders has no association with experience in Derivative market.
- 45 percent of private sector employees and 30.5 percent of business men have more than 5 years' experience but only 12.2 percent from government sector and 12.2 percent among professionals have the experience of above 5 years. Private sector and business men are well experienced.

6.3.1.3. Frequency of Derivative Trading

- Prominent group traders are occasional traders. 28.6 percent of traders are trading occasionally, 28.3 percent of traders are trading frequently, 16.4 percent of traders are trading rarely, and regular traders are 26.7 percent.

6.3.1.4. Amount of Investment in Stock Futures

- Majority (41.9 %) of traders use an amount below ₹ 100,000 for buying stock futures. 33.3 percent of traders invest amount between ₹ 100,000 to 200,000. 14.2 percent of traders are using more than ₹ 300,000. 10.6 percent of traders use the amount of ₹ 200,000 to 300,000.

6.3.1.5. Awareness on Derivatives

- Traders are highly aware about futures and options. But awareness about Swaps is low. Mean score of awareness about futures and options are 4.1750 and 4.0694 respectively. Mean score of awareness about swaps is 2.2389 only.
- Awareness of traders towards derivative products varies according to regions and age group. Traders from south and central are more aware than traders from north. Age group of 31 – 40 is more aware than other age group. Age group of 51 – 60 and above 60 are less aware as compared to other age group.
- Hypothesis test showed educational qualifications and monthly income of family have no significant role in awareness level.
- As per nature of occupation, traders' level of awareness also varies. Awareness of professionals is high among different occupation group.
- Years of experiences brings changes in the awareness level of traders. Awareness and experience are directly proportional.

6.3.1.6. Trader's Awareness on Futures

- Traders are highly aware about stock futures and index futures. Mean score of awareness about stock futures and index futures are 4.2444 and 4.2444 respectively.
- When compared to traders' awareness about futures instruments and region, it is found that there is no regional difference in awareness. It means traders from three regions are highly aware about stock futures and index futures.
- Age difference showed difference in awareness. Awareness is high among the group of 31 – 40 years and low in the group of above 60 years.
- One-way ANOVA test is used to compare educational qualification and traders' awareness about futures instruments. This statistical test concluded that educational qualifications do not depend on awareness.

- Monthly income of family is associated with traders' awareness about futures instruments. Awareness is high in the group of income in between 25001 – 50000 and low in the group of income in between 75001 – 100000.
- Association of occupation and traders level of awareness about futures instruments is not significant. Awareness of different occupation group is same.
- Test to find association between years of experience in derivative market and traders' level of awareness about future instruments is significant. Awareness is high among the group of traders who have the experience of more than five years.

6.3.1.7. Traders' Attitude towards Derivatives

- Traders have positive attitude towards derivatives.
- Test of association between traders' attitude towards derivatives and region, age, occupation is not significant. Therefore, this study inferred that attitude of traders from different region; different age group and different occupation group are same.
- Educational qualification, Monthly income and years of experience in derivative market are associated with traders' attitude towards derivatives.

6.3.1.8. Preference of Traders towards Different Sectors in NSE

- Traders give first preference to banking sector.
- Traders give second preference to pharma sector.
- Traders give third preference to IT sector.
- Traders give fourth preference to auto2, 3 and 4 sectors.
- Traders give fifth preference to finance, finance housing& financial institutions sector.
- Traders give sixth preference togas, metal & oil sector
- Traders give seventh preference to construction & diversified sector.

- Traders give eighth preference to refineries, steel, aluminium & textiles sector.
- Traders give ninth preference to telecom sector
- Traders give tenth preference to electrical & engineering sector.
- Traders give eleventh preference to power& mining sector.
- Traders give twelfth preference to cement & cigarettes sector

6.3.1.9. Investment in Futures of Banks

- Out of 360 respondents, 97 traders use 10 to 15 percent, 92 traders use below 5 percent, 70 traders use 10 to 15 percent, 68 traders use above 20 percent and 33 traders use 15 to 20 percent of their investment for trading in futures of banks.

6.3.1.10. Duration of Holding Bank Futures

- 61.7 percent of traders hold futures for less than one month. 26.7 percent of respondents hold bank futures for one to two months. 7.2 percent of traders are holding for more than 3 month and 4.4 percent of traders hold for two to three months.

6.3.1.11. Purpose of Using Bank Futures

- Most of the respondents (64.2 percent) used futures for speculation. 29.7 percent of traders used it for hedging and very less people (6.1 percent) are using it for arbitrage.
- This study showed that there is no association between the region and purpose of using bank futures.
- In the south region 78 (65 percent) traders used bank futures for speculation, 37 (30.8 percent) traders used it for hedging and only 5 (4.2 percent) used it for arbitrage.

- In the central region 80 (66.7 percent) traders used bank futures for speculation, 34 (28.3 percent) traders used it for hedging and only 6 (5 percent) traders used it for arbitrage.
- In the north region, 73 (60.8 percent) traders used futures of banks for speculation, 36 (30 percent) traders used it for hedging and 11(9.2 percent) used it for arbitrage.
- The study found that there is an association between the purpose of using bank futures and years of experience in derivative market.
- Out of 69 traders who have the experience of less than one year, 62.3 per cent are using bank futures for speculation, 34.8 per cent of the traders are using bank futures for hedging, and 2.9 per cent are using bank futures for arbitrage.
- In the case of 93 traders, who have the experience of one to three years, 62.4 per cent of traders are using bank futures for speculation, 35.5 per cent are using bank futures for hedging and 2.2 per cent are using bank futures for arbitrage.
- Out of 67 traders who have the experience of 3 - 5 year, 74.6 per cent are using bank futures for speculation, 16.4 per cent of the traders are using bank futures for hedging, and 9 per cent are using bank futures for arbitrage.
- In case of 131 traders who have the experience of above 5 years, 61.1 per cent are using bank futures for speculation, 29.8 per cent are using bank futures for hedging and 9.2 per cent are using bank futures for arbitrage.

6.3.1.12. Attitude towards Banking Futures

- Traders have positive attitude towards banking futures. Mean value (61.9250) is more than the middle value (51).
- Test of association between traders' attitude towards banking futures and age, educational qualifications, occupation is not significant. Therefore, this

study inferred that attitude of traders among different age group; different educational qualifications group and different occupation group are same.

- Region, Monthly income and years of experience in derivative market are associated with traders' attitude towards banking futures.

6.3.1.13. Reason of Selecting Banking Futures

- Traders give speculation as the reason for selecting bank futures as their first preference. They marked second rank for hedging, third rank for high rate of return, forth rank for investment leverage and fifth rank for risk diversification.
- Reason of selecting bank futures is different in different region. In the south region, most of the traders give first rank for speculation and second for hedging. Traders from central region give first preference for speculation and second for hedging. In the north region, traders give first rank to speculation, second rank to high rate of return.
- Traders from all category of experience gave first preference for speculation. Except three to five years' experience category of traders, others give second rank for hedging and third rank for high rate of return. Three to five years' experience category of traders marked second and third rank for high rate of return and investment leverage.

6.3.1.14. Experience of Risk and Return from Banking Futures

- Under risk and return from banking futures, 60.8 percent of traders have the experience of high risk and high return. 34.4 percent of traders have the experience of average return and average risk. 4.7 percent of traders have the experience of low return and low risk.

6.3.1.15. Satisfaction from Trading

- Traders are satisfied with different aspects of trading in banking futures. Six trading aspects were included for testing satisfaction. Among these, mean

score of satisfaction is high for timely available buyers and sellers and low in availability of information and coverage of risk.

- There is no significant association between the satisfaction from trading and the selected demographic variables such as region, educational qualification, occupation and experience of risk and return. Therefore, the study inferred that the traders from different region (south, central and north), educational qualification (HSE, Degree, PG and Professional), occupation (Govt: employee, professional private sector and business), have equal level of satisfaction from trading. It also inferred that traders' view point about risk and return from banking futures and trading satisfaction from banking futures are not associated.
- Association between age and satisfaction from trading of banking futures are significant. Satisfaction is high among the age group of 31 to 40 years and low among the group of 51 to 60 years.
- Years of experience are associated with satisfaction from trading of banking futures. Traders having more than five years' experience had high satisfaction while traders having experience in between three to five years have low satisfaction.
- Usage level of technical analysis and fundamental analysis correlated to satisfaction from trading of banking futures. Satisfaction is high among the traders who have intensively used the technical and fundamental analysis for trading.

6.3 .2. Findings Related to Traders' Reactions to Various Information

This section describes the findings about various sources of information, preference of various information, usage of technical and fundamental analysis for taking decision and traders' decisions related to various information.

6.3.2.1. Sources of Information

- Most of the traders give their first preference to seminar/ workshop for taking their trading decisions
- Second preference of source of information is given to recommendation of friends / relatives.
- Among five sources of information, third rank is given to press/ media.
- Most of the traders give fourth and fifth rank to opinion of stock brokers and expert opinion respectively.
- Comparison of preference of sources of information with different region states that the traders from three regions give first rank to expert opinion. Traders from south and north give second rank to press, but traders from central give second rank to stock brokers and they give third rank to press. South and north traders give third rank to stock brokers, fourth rank to friends and fifth rank to seminar. Traders from central region give fourth rank to seminar and fifth rank to friends.

6.3.2.2. Usage of Technical Analysis and Fundamental Analysis

- Usage of technical analysis by 45.8 percent of traders is high and 37.8 percent of traders are very high. 4.2 percent of traders are not using technical analysis for taking trading decisions. Usage of technical analysis by 6.7 percent of traders is very low and 5.6 percent of traders are low.
- In the case of fundamental analysis, 54.7 percent of traders' usage is high, and 29.4 percent of traders are very high. Usage of 2.8 percent of traders is low and 3.9 percent of traders are very low. 9.2 percent of traders do not use fundamental analysis for taking, buying or selling decisions.
- Association between usage of technical analysis and region are significant. More than half of the traders from south (55.8 percent) and north (54.2 percent) are rated as high regarding usage of technical analysis. 41.7 percent of traders from south and 27.5 percent of traders from north rated use of

technical analysis as high. Traders from the central, 44.2 percent of respondents rated use of technical analysis as very high and 27.5 percent of respondents rated as high.

- Usage of fundamental analysis is high among 53.3 percent of traders from south region. Usage of fundamental analysis is very high, among 36.7 percent of traders from south region. In the central region 47.5 percent of traders' usage is high, and 39.2 percent of traders' usage is very high. 63.3 percent of traders use it as high manner and 17.5 percent of traders do not use it in north region.
- Association between years of experience in derivative market and use of technical analysis is significant. Usage of technical analysis by 58 percent of traders is high and 33.3 percent of traders are very high among traders who have less than one year experience. Usages of traders having 1- 3 year experience are high among 50.5 percent of traders and very high among 38.7 percent of traders. Usages of traders having 3- 5 year experience are high among 38.8 percent of traders and very high among 29.9 percent of traders. Usage of traders having experience of above 5 years is very high among 43.5 percent and high among 39.7 percent.
- Association between years of experience in derivative market and use of fundamental analysis is significant. 49.3 percent of traders under the category of less than one-year experience rated usage of fundamental analysis as high. 55.9 percent of traders from the category of one to three-year experience rated usage of fundamental analysis as high. 58.2 percent of traders under the category of three to five-year experience rated usage of fundamental analysis as high. 55 percent of traders from the category of above five-year experience rated usage of fundamental analysis as high. From this study, we can say that usage of fundamental analysis is high among most of the traders.

6.3.2.3. Traders Preference of various information

- Traders give first preference to financial result, second to RBI announcement, third to economic news, forth to political news and fifth to mergers and acquisition. Six to ten ranks is given to dividend announcement, right issue and bonus issue, expert opinion, past performance of market and stock brokers' tips and opinion respectively. Rank from 11 to 13 is given to insider information, advertisement and intuition respectively.

6.3.2.4. Traders' Reactions towards Various Information

- 65 per cent of traders take decision after careful study in the case of financial result. After getting information of financial result, 21.7 percent of traders wait for some time before taking decisions, 11.7 percent of traders do not react and only 1.7 percent of traders are immediately reacting.
- While corporates announcing its dividend, 32.5 per cent of traders take decision after careful study, 18.3 percent of traders wait for some time before taking decisions, 25.8 percent of traders do not react, and 23.3 percent of traders are immediately reacting.
- In the case of right and bonus issue, 31.1 per cent of traders take decision after careful study, 23.3 percent of traders wait for some time before taking decisions, 29.4 percent of traders do not react, and 16.1 percent of traders are immediately reacting.
- While getting information about mergers and acquisition, majority of respondents (35.6%) react after careful study, 28.9 percent of traders wait for some time before taking decisions, 21.4 percent of traders do not react, and 14.2 percent of traders are immediately reacting.
- 65.3 per cent of traders take decision after careful study in the case of RBI announcement. 15 percent of traders wait for some time before taking decisions, 16.1 percent of traders do not react and only 3.6 percent of traders are immediately reacting.

- After getting information of political news, 45 percent of traders are take decision after careful study, 17.5 percent of traders wait for some time before taking decisions, 20.3 percent of traders do not react, and 17.2 percent of traders are immediately reacting.
- In the case of economic news, 50.6 per cent of traders take decision after careful study, 18.3 percent of traders wait for some time before taking decisions, 19.4 percent of traders do not react, and 17.5 percent of traders are immediately reacting.
- 36.4 per cent of traders do not react to insider information, 29.7 percent of traders wait for some time before taking decisions, 17.5 percent of traders are immediately reacting, and 16.4 percent of traders are reacting after careful study.
- 32.8 percent of traders wait for some time after getting expert opinion. 31.9 percent of traders are immediately reacting, 20.3 percent of traders do not react, and 15 percent of traders react after careful study of the expert opinion.
- In the case of past performance of market, 35.6 percent of traders wait for some time, 29.7 percent of traders do not react, 18.6 percent of traders react only after careful study and 16.1 percent of traders immediately react to the information.
- 36.4 percent of traders take immediate decision towards intuition, 28.1 percent of traders waits for some time, 19.4 percent of traders do not react, and 16.1 percent of traders react only after careful study.
- 43.3 percent of traders take immediate decision towards advertisement, 33.6 percent of traders waits for some time, 16.9 percent of traders do not react, and 6.9 percent of traders react only after careful study.
- While getting stock brokers' tips and opinion to traders, majority of them (34.2%) take decision after careful study, 30.3% percent of traders wait for some time, 17.8 percent of traders do not react, and 17.8 percent of traders take immediate decision.

- While comparing region with traders' reaction to various information in the market, some reaction to information shows regional difference and some shows no regional differences. The information which do not show regional differences are financial result, dividend announcement, right issue and bonus issue, political news, past performance of market, Intuition, advertisement and stock brokers tips and opinion. Reactions of traders which show regional differences are mergers and acquisition, RBI announcement, economic news, insider information and expert opinion.
- While comparing years of experience in derivative market with traders' reaction to various information in the market, some reaction to information show regional difference and some show no regional differences. The information which do not show difference in respect of years of experience are financial result, dividend announcement, right issue and bonus issue, political news, economic news, insider information, expert opinion and Intuition. Reactions of traders which show differences according to years of experiences are mergers and acquisition, RBI announcement, past performance of market, advertisement and stock brokers' tips and opinion.

6.3 .3. Findings Related to Hedging habit of traders' with Bank Futures

This section deals with hedging habit of traders' by using banking futures. Out of 360 traders, 326 traders are using banking futures for hedging. Findings related to various aspects of hedging are described below.

6.3.3.1. Risk Coverage through Hedging

- 39.3 percent of traders' risk coverage through hedging is 26 – 50 percent.
- 28.2 percent of traders' risk coverage through hedging is 0 - 25 percent.
- 24.6 percent of traders' risk coverage through hedging is 51 – 75 percent.
- 7.9 percent of traders' risk coverage through hedging is 76 – 100 percent

6.3.3.2. Type of Contract Used for Hedging

- Out of 326 hedgers, 52.7 percent of hedgers use current month contract for hedging. 32.5 percent use near month contract, 11.7 percent use combination of different contract and only 3.1 percent use far month contract. From this study, we can say that current month contract is more used for hedging.

6.3.3.3. Frequency of Usage of Bank Futures

- Out of 326 hedgers, 128 hedgers used bank futures frequently for hedging. 106 traders used bank futures occasionally for hedging and 56 hedgers used it rarely. Only 36 traders are always used bank futures for hedging.

6.3.3.4. Satisfaction from Hedging

- Hedgers are satisfied from hedging with banking futures**.** Mean score of all six factors are in between 3 and 4. It means traders are satisfied but not highly satisfied.
- Traders' satisfaction from hedging has no significant difference among different age group, educational qualifications, monthly income and occupation. Therefore, this study found that there is no difference in the satisfaction level of different region, age group, educational qualifications, monthly income and occupation.
- Years of experience are associated with satisfaction from hedging with banking futures. High satisfaction is seen among the traders who have the experience of more than five years. Low satisfaction among the traders who have the experience in between three to five years.
- No significant difference between percentage of risk coverage through hedging and satisfaction from hedging.
- Satisfaction from hedging depends on type of contract use for hedging. Satisfaction level is high when traders use far month contract.
- Frequency of hedging is related to satisfaction from hedging. Frequent hedgers are more satisfied than regular, occasional and rare hedgers.

6.3.4. Findings Related to Banks' Futures as Hedging Tool

- The optimal hedge ratio and hedging effectiveness of Axis bank in sub period I of the study is .70 and .40. Average dynamic hedge ratio and average dynamic hedging effectiveness of Axis bank in sub period I is .66 and .50. The optimal hedge ratio and hedging effectiveness of Axis bank in sub period II of the study is .71 and .44. Average dynamic hedge Ratio and average dynamic hedging effectiveness of Axis bank in sub period II is .86 and .70.

- The optimal hedge ratio and hedging effectiveness of Federal bank in sub period I of the study is .90 and .75.Average dynamic hedge ratio and average dynamic hedging effectiveness of Federal bank in sub period I is .86 and .85. The Optimal hedge ratio and hedging effectiveness of Federal bank in sub period II is .90 and .92. Average dynamic hedge ratio and average dynamic hedging effectiveness of Federal bank in sub period II is .97 and .98.

- The optimal hedge ratio of HDFC bank and hedging effectiveness in sub period I of the study is .82 and .13.Average dynamic hedge ratio and average dynamic hedging effectiveness of HDFC bank in sub period I is .76 and .15. The optimal hedge ratio and hedging effectiveness of HDFC bank in sub period II of the study is .90 and .81. Average dynamic hedge ratio and average dynamic hedging effectiveness of HDFC bank in sub period II is .93 and .92.

- The optimal hedge ratio and hedging effectiveness of Kotak bank in sub period I of the study is .70 and.62.Average dynamic hedge ratio and average dynamic hedging effectiveness of Kotak bank in sub period I is .99 and .92. The optimal hedge ratio and hedging effectiveness of Kotak bank in sub period II is.40 and .17. Average dynamic Hedge Ratio of Kotak bank in sub period II is .10. Average dynamic hedging effectiveness of Kotak bank in sub period II is .17.

- The optimal hedge ratio and hedging effectiveness of SBI in sub period I of the study is .90 and .89.Average dynamic hedge ratio and average dynamic hedging effectiveness of SBI bank in sub period I is .95 and .96. The optimal hedge ratio and hedging effectiveness of SBI bank in sub period II of the study is .90 and .98. Average dynamic hedge ratio and average dynamic hedging effectiveness of SBI in sub period II is .90 and .98.

- The optimal hedge ratio and hedging effectiveness of Canara bank is .90 and .86.Average dynamic hedge ratio and average dynamic hedging effectiveness of Canara bank is .86 and .85.

- The optimal hedge ratio and hedging effectiveness of OBC bank is .94 and .93.Average dynamic hedge ratio and average dynamic hedging effectiveness of OBC bank is .93 and .94.

- The optimal hedge ratio and hedging effectiveness of YES bank is .90 and .81.Average dynamic hedge ratio and average dynamic hedging effectiveness of YES bank is .90 and .95.

6.3 .5. Findings Related to Price Discovery Function of Banking Futures

By using Granger-causality test, price discovery function of banking futures is listed below. Unidirectional causality means future price causes spot price and not vice versa. Bidirectional causality means future price causes spot price and vice versa.

- Price discovery of Axis bank in sub period I is bidirectional.
- Price discovery of Axis bank in sub period II is unidirectional.
- Price discovery of Canara bank is bidirectional.
- Price discovery of Federal bank in sub period I is bidirectional.
- Price discovery of Federal bank in sub period II is unidirectional.
- Price discovery of HDFC bank in sub period I is bidirectional.
- Price discovery of HDFC bank in sub period II is unidirectional.
- Price discovery of Kotak bank in sub period I is bidirectional.
- Price discovery of Kotak bank in sub period II is bidirectional.

- Price discovery of OBC bank is unidirectional.
- Price discovery of SBI bank in sub period I is unidirectional.
- Price discovery of SBI bank in sub period II is unidirectional.
- Price discovery of YES bank is unidirectional

6.4. Suggestions

Based on the findings of the study, the researcher can provide the following suggestions which may be useful to traders, stock brokers, financial advisors etc

- Percentage of regular traders is only 26.7 percent. So, intermediaries should promote regular traders. It will help to boost up the market.
- Majority of the traders (41.9 %) used minimum amount for buying and selling of stock futures. Intermediaries should motivate the traders to use more amounts according to their capacity.
- Percentage of investment by majority of traders in futures of banks is low. Liquidity and hedging effectiveness is high in futures of banks. So, the intermediaries may have to conduct the programmes related to hedging.
- 64.2 percent of the traders give more preference to speculation. The reason might be lack of awareness about hedging and arbitrage opportunities. So, intermediaries should take initiative to popularise hedging and arbitrage by conducting training programmes.
- Traders' satisfaction is low in the availability of information and coverage of risk. Intermediaries should take steps to pass information to traders at correct time. Coverage of risk increased only through optimal hedge ratio. So, stock broking firms and financial advisors must suggest trading on basis of optimal hedge ratio.
- Representation of females is 8.3 percent in the market. So, intermediaries and policy makers should take initiatives to increase the female participation.
- Most traders give least preference to seminar among various source of information. So effective seminars and workshop which includes importance

of various information in the market and how to take decision for each information should be conducted by intermediaries/ authorities.

- Certain brokers are found to induce their clients to take positions just for the sake of achieving branch targets on volume and brokerage. This results in many uninformed clients losing their money, which in turn, adversely affects their confidence in the system. Therefore, such practices should be discouraged.

6.5. Conclusion

Banking sector is the largest sector in NSE. Demonetisation and various decisions taken by RBI were globally noticed. The study made attempt to analyse banking sector performance in the derivative market.

The optimal hedge ratio, in cases of 7 banks among 8 banks is more than .70 which means that the variance of a hedged portfolio shall be the minimum when a position in spot price market is combined with a position in the future prices market to the extent of 70 to 90 percent of the former. Further, the time-varying hedge ratios are not substantially different from the constant ratios. In the case of Kotak Bank, its average constant and time varying hedge ratios are .45 and .55. The study highlights that the hedging efficiency of banking futures prices under study is good. It means that hedging with banking sector futures prices shall be able to bring down the risk of a un hedged portfolio in a very good manner. This study has also analysed price discovery role of banking futures prices. From the analysis, 6 cases (Axis Bank I, Canara bank, Federal bank I, HDFC bank I, Kotak bank I and Kotak bank II) showed bidirectional causality. Remaining 7 cases (Axis Bank II, Federal bank II, HDFC bank II, OBC bank, SBI bank I, SBI bank II and YES bank) showed unidirectional causality. From this we can understand that Future price leads to price discovery of spot price in the case of banking sector futures.

Primary data used in this study to analyse traders' attitude, hedging habit and traders reactions to information. Traders have positive attitude towards derivatives and banking futures. Majority of the traders give first preference to banking sector.

Traders give more importance to speculation than hedging. Most of the traders give more importance to expert opinion. Traders give more importance to financial result and RBI announcement among various information in the stock market. In most of the cases, traders take trading decisions only after careful study. Major portion of traders are frequent hedgers. Traders are satisfied in trading and hedging with banking futures.

6.6. Scope for Further Research

This study indicates new avenues in research. Some of them are listed below.

- Comparison of hedging effectiveness of different sectors in NSE
- Comparative study of Derivative instruments in BSE and NSE.
- Arbitrage opportunities in Indian Futures market
- Marketing strategies followed by derivative traders and traders' attitude.
- Role of stock broking firms in promoting derivative trading and hedging.
- Various corporate announcements and its impact on future trading.

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