Index Futures
A Perspective

Navneet Bansal
navneet@bseindia.com
Preface

Dear friends,

Introduction of derivatives in Indian Capital Market is beginning of new era, which is truly exciting. Both BSE and NSE started trading index futures in June 2000. Option on indices is expected to be introduced soon and SEBI is toying with many more derivative products like options on individual scrips and covered warrants. Therefore, in the time to come, I see a multi-product, efficient, effective and exuberant derivatives market.

Derivative Products are basically used for risk management purposes. Worldwide derivatives markets are showing unprecedented growth. In fact, volumes in derivatives markets are many times the volumes in the underlying markets.

The exploitation of derivatives’ value generation capabilities by the market participants requires sound understanding of products’ nuances and their strategic uses. This product is designed to contribute here i.e. educate market participants about the basics of derivatives. This work focuses on index futures in Indian context.

Here, I take this opportunity to thank Dr. Manoj Vaish (Dy. Executive Director, BSE), Mr. Arun Dolas (AGM – BSE Training Institute) and Mr. Sachin Chaudhari of BSE Training Institute for their encouragement, suggestions and co-operation at every juncture during the project.

I would also like to acknowledge the significant contribution of Mr. Manish Bansal (Officer – SEBI) in this endeavor of mine. He was involved in this venture right from the conceptualization stage to completion. I am indebted to him for his valuable suggestions and guidance during the work.

Finally, I am thankful to all the participants of my different programs, whose interactive discussions in class helped me in developing this product.

I look forward to your constructive criticism and suggestions which would offer me an opportunity to enrich this work further.

Wishing you all the best.

Navneet Bansal
navneet@bseindia.com
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Chapter 1

Introduction to derivatives

The term derivative indicates that it has no independent value i.e. it derives its value from some underlying. Underlying can be securities, commodities, bullion, currency, live stock or anything else. In other words, Derivative means forward, future, option or any other hybrid contract of pre determined fixed duration, linked for the purpose of contract fulfillment to the value of a specified real or financial asset or to an index.

In the international markets, various derivative products are traded. To start with, you need to understand the following three:

1. Forward,
2. Future, and
3. Option.

[Note - Readers should understand the forward, future and option as concepts; because, once the concept is understood, it may be applied to any segment irrespective of the underlying. In other words, concepts do not change with the change in the underlying or the underlying is immaterial.]

Forward contracts

Forward contract is a one to one bipartite contract, which is to be performed in future at the terms decided today. Let us understand the concept with the help of an illustration.

Illustration:

Two parties A and B enter into a contract to buy and sell say 100 shares of Reliance at Rs. 250 per share, two months down the line from the date of contract. Assume, A is the buyer and B is the seller. In the instant case, product (shares of Reliance), quantity of the product (100 shares), product’s price (Rs.250 per share) and time of delivery (2 months from the date of contract) have been determined and well understood, in advance, by both the parties concerned. Delivery and payment (settlement of the trade) will take place as per the terms of the contract on the designated date and place. This is a simple example of forward contract.

Forward contracts are being used in India on a large scale in the foreign exchange market to cover the currency risk.

Forward contracts, being negotiated by the parties on one to one basis, offer them tremendous flexibility to articulate the contract in terms of price, quantity, quality (in case of commodities), delivery time and place.
Forward contracts are plagued with poor liquidity and default risk (credit risk). Let us understand these risks in detail.

**Liquidity risk**

Liquidity is generally defined as the ability of the operators to buy or sell the asset whenever they want to do so. We extend the definition by saying that while operators are able to execute big orders to buy or sell, their order execution should not result in a substantial movement in the price of asset. Therefore, liquidity is the ability of the operators to buy/sell the assets without moving their prices substantially. If any order moves the price, we may say that markets do not have depth or markets are plagued with poor liquidity.

Forward contracts, being traded on one to one basis, are tailor made contracts and cater to the specific needs of the parties involved. These contracts are not listed and traded on the exchanges. Means, in case of change in perception of either of the parties after entering into contract but before contract’s maturity, if he/she wants to come out of the contract, he/she may find difficult to do so. Therefore, liquidity in these contracts is poor.

**Default risk/Credit risk/Counter-party risk**

Forward contracts, as defined above, are transacted on one to one basis. Therefore, each party is exposed to counter-party’s credit risk i.e. the risk of default exists in case of forward contracts. In case of unfavorable price movement, either of the parties may default.

**Illustration:**

To illustrate the risk of default, let us go back to the example given above where A and B entered into a contract to buy and sell 100 shares of Reliance @ Rs. 250 per share two months down the line from the date of contract. If the Reliance’s price two months down the line goes up substantially, seller B would prefer to go to market and sell his shares instead of selling them to A as contracted; because, market would fetch him better price. Therefore, he may default. Similarly, in case, price of Reliance goes down, buyer may choose to default because he/ she would find it attractive to go to market and buy Reliance at lower price instead of honoring the contract. This way, both A and B are exposed to each other’s risk of default.

**Future contracts**

Future contracts are the organized/standardized contracts in terms of quantity, quality (in case of commodities), delivery time and place for settlement on any date in future. These contracts are traded on the exchanges. In a crude sense, Future markets are the extension of forward markets.
These markets, being organized/standardized, are very liquid by their own nature. Therefore, liquidity problem, which persists in the forward market, does not exist in the futures market.

In Futures market, clearing corporation/house becomes the counter-party to all the trades or provides the unconditional guarantee for their settlement i.e. assumes the financial integrity of the whole system. In other words, we may say that in futures market, the credit risk of the transactions is eliminated by the exchange through the clearing corporation/house.

Illustration:

Let us go back to our earlier example where A and B entered into a contract to buy and sell Reliance shares. Now, assume that this contract is taking place through the exchange, traded on the exchange and clearing corporation/house provides the unconditional guarantee for its settlement, it would be called a future contract.

**Difference between forward and future contracts**

1. Forward contracts, being negotiated by the parties on one to one basis, offer them tremendous flexibility to articulate the contract in terms of the price, quantity, quality (in case of commodities), delivery time and place.

   This flexibility is missing in the case of future contracts as contracts have standard quantity, quality (in case of commodities), delivery time and place.

2. In the forward market, either of the parties may be at an absolute disadvantage in case of non-availability of information on the underlying to him/her. Live example of this is the exploitation of poor farmers in the remote areas. One of the most important reasons, why poor farmers are poor, is the non-availability of the current information on the commodities, to them. Poor farmers lock with zamidaar, through forward, at a price that, generally, is substantially lower than the expected cash price of the produce at the time of its availability in the market.

   In futures market, geographically segmented areas are integrated as futures provide a common platform to all operators to trade in. Therefore, every bit of information gets quickly reflected on the prices of assets. This results in elimination of non-availability of information risk, which exists in the forward market.

3. Further problem in the forward contracts is of the final settlement. To understand the concept, let us go back to our example wherein A and B entered into a contract to buy and sell the shares. Assume, 15 days down the line, A enters into a fresh transaction to sell these Reliance shares to C. It is to be understood that B is stranger to the transaction between A and C. On settlement, A will take delivery of Reliance shares from B and give them to C and then take money from C to give it to B. Similarly, B may enter into a contract with say party D, to which A would be stranger. Now,
assume the situation when there are 4-5 subsequent deals during the life of the contract; each of these subsequent deals would complicate the final settlement of the trade.

\[ \text{Money} \rightarrow \text{A} \rightarrow \text{B} \rightarrow \text{D} \rightarrow \text{Shares} \]

(Settlement of forward contract with one original and two subsequent transactions)

In future markets, clearing corporation/house maintains the accounts of all the operators in the market and so, is in a position to tell on the last trading day of the contract, who two are the counter-parties to each other and provides the solution to the settlement problem which is very acute in the forward market.

We may further understand that the operational risks generated through human errors, frauds, system failure etc., which exist in both the forward and future markets can not be addressed in any way other than by going for insurance.

Based on the above, we may summarize the finer points of differentiation between forward and future contracts as follows:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Forward contracts</th>
<th>Future contracts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational mechanism</td>
<td>Traded directly between two parties (not traded on the exchanges).</td>
<td>Traded on the exchanges.</td>
</tr>
<tr>
<td>Contract specifications</td>
<td>Differ from trade to trade.</td>
<td>Contracts are standardized contracts.</td>
</tr>
<tr>
<td>Counter-party risk</td>
<td>Exists.</td>
<td>Exists. But, assumed by the clearing corporation/house, which becomes the counter-party to all the trades or unconditionally guarantees their settlement.</td>
</tr>
<tr>
<td>Liquidation profile</td>
<td>Low, as contracts are tailor made contracts.</td>
<td>High, as contracts are standardized exchange traded contracts.</td>
</tr>
<tr>
<td>Price discovery</td>
<td>Not Efficient, as markets are</td>
<td>Efficient, as markets are</td>
</tr>
<tr>
<td>Scattered</td>
<td>Centralized and all buyers and sellers come to a common platform to discover the price.</td>
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<td>-----------</td>
<td>----------------------------------------------------------------------------------</td>
<td></td>
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</tbody>
</table>

Examples

| Currency market in India. | Commodities – Pepper futures in India. |

In view of the above, we may conclude that forward contracts, when standardized and traded on the exchange, become future contracts. Therefore, all future contracts are standardized forward contracts.

Future contracts may be settled through physical delivery of asset/assets or only in cash. Settlement features of future contracts are well defined in the contract specifications by the exchanges. For example, all the index based derivatives (index futures and index options), worldwide, are essentially settled in cash. These contracts, to be settled only in cash, are designated as cash settled contracts.

**Option Contracts**

Option is the right given by the option seller to the option buyer to buy or sell a specific asset at a specific price on or before a specific date.

Understand that option buyer has the right and option seller has the obligation i.e. option buyer may or may not exercise the option given, but, if he decides to exercise the option, option seller has no choice but to honour the obligation.

Option to buy is called **Call option** and option to sell is called **Put option**. Similarly, option, if exercisable on or before the expiry date/day, is called **American option** and if it is exercisable only on expiry date/day, is called **European option**. The price at which the option is to be exercised is called **Strike price** or **Exercise price**.

The date/day on which option expires is called the **Expiration date/day** of the option. Similarly, the date/day on which option gets exercised is called the **Exercise date/day** of option. Expiration and exercise date will be same in the case of European option, if option is exercised at all by the option buyer.

When option writer is giving a right to the option buyer, he will charge for that right. The price option buyer pays to the option seller for option/right is called **Option premium**.

This would be better understood with the help of an example:

**Illustration:**

A gives a right/option to B to buy a scrip, say Infosys at Rs. 8,000 (strike price) for settlement 3 months down the line. The right/option can be exercised any time during the life of the contract i.e. option is an American option. Current price of Infosys is also Rs.
8,000 (cash price). Assume A charges Rs. 100 (option premium) from B as price for option/right.

It should distinctly be understood that option premium, once paid to the option writer, will not be received back by the option buyer, irrespective of his exercise or non exercise of option.

If B exercises his option at a time when market price is between Rs. 8,000 and Rs. 8,100, he would incur a loss equivalent to the difference between Rs. 8,100 (strike price + option premium) and then prevailing market price/ sales price of shares. He will break even at market price of Rs. 8,100 and if the market price happens to be above Rs. 8,100, he will make money. For instance, if the market price is Rs. 8,400 at the time of exercising the option, profit to B would be Rs. 300 (8,400-8,000-100). Pay off profile of this call option buyer would be as follows:

```
Profit/loss to 8000
option buyer 8100
100
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Therefore, call option holder would make money only if the price of underlying asset rises above the exercise/strike price plus the option premium. On the contrary, put option holder would make money only if prices of underlying falls below the exercise/strike prices minus option premium. There can be options on commodities, currencies, securities, stock indices, individual stocks and even on future contracts. Option strategies can be highly complicated.

To enumerate the option concept with a simple example, Warrants in the cash market are call options. Warrants provide an option/right to the warrant holders to exercise their warrants to secure a specific number of shares at a specific price after a specific time. This option would generate money to the investors only if the market price of share at the time of exercise of warrant is more than the strike price/exercise price plus cost of acquiring the warrant.

We may construe from the above that both forward and future contracts cast an obligation on both the contracting parties (buyers and sellers) to honour the contract. But, in case of options, buyer/holder of option has a right but no obligation and seller/writer of option has an obligation and no right with regard to honour of the contract.
Problems:

1. Derivative is
   a. a product which derives its value from some underlying.
   b. essentially traded on the exchanges.
   c. is a contract to be performed sometime in the future at the terms decided today.
   d. Both a and c.
   e. All a, b and c.

2. Which of the following is/are true about the forward contracts?
   a. Forward contracts are tailor-made contracts.
   b. Default risk does not exist in the forward contract.
   c. Liquidity profile of these contracts is high.
   d. Both a and b.
   e. Both b and c.

3. Futures address which of the following important problems of the forward contracts?
   a. Liquidity problem.
   b. Credit risk.
   c. Settlement problem.
   d. Both a and c.
   e. All a, b and c.

4. Default risk can also be defined as
   a. Credit risk.
   b. Counter-party risk.
   c. Liquidity risk.
   d. Both a and b.
   e. All a, b and c.

5. Call Option
   a. is the option to purchase.
   b. is the option to sell.
   c. is the option to either buy or sell.
   d. None of the above.

*(For answers, please refer to page number 55)*
Chapter 2

Index Concepts

As the first derivative product introduced in Indian Securities Market is index based (Index Futures), preliminary knowledge of indices is a must for the operators in the market. This chapter discusses the basics of indices.

What is an index

An index is a well-diversified portfolio, created to represent the market sentiments. An index captures the overall behaviour of the market. It reflects the changing expectations of the market about the performance of the corporate sector/economy in the future. Rising index reflects the optimistic expectations and falling index indicates the pessimistic expectations of the market.

A good index should be highly liquid, should have a high hedging effectiveness against a wide variety of portfolios and should be difficult to manipulate.

How is index calculated

Almost all the indices you see in Indian Capital Market (popular ones BSE sensitive index and NSE’s S&P CNX Nifty) are price indices. They are the market capitalization weighted average prices of a specific portfolio of scrips- called index. Scrips in the index are chosen based on certain pre-determined qualitative and quantitative parameters, laid down by the index construction managers.

Who manages these indices

Index construction, maintenance and revision is a specialized job and many a times done by the specialized agencies. For instance, all NSE indices are managed by a separate company called “India Index Services and Products Ltd. (IISPL)”, a joint venture between National Stock Exchange (NSE) and Credit Rating and Information Services of India Ltd. (CRISIL). Bombay Stock Exchange (BSE) manages its own indices.

What do you mean by index construction, maintenance and revision

Index construction is all about choosing the index scrips and deciding on the index calculation methodology. Maintenance is about adjusting the index for corporate actions like bonus, rights, stock split, consolidation, mergers etc. Revision is about changing the composition of index as such i.e. replacing some existing scrips with the new ones because of change in the trading paradigm of the scrips/ interest of operators, in the market.
**Do corporate actions and index revision render the pre and post action indices un-comparable**

Maintenance and revision of the indices are done with the help of mathematical formulae, which ensure that the pre and post corporate action/revision indices are comparable. The revision of the index is a persistent exercise to keep it capable enough to reflect the market sentiments.

**Why do we need indices**

Traditionally, indices have been used as information sources. But, over the period of time, various direct and indirect applications of indices have emerged in the investment field. Major ones among them are index funds and index derivatives. Index based applications, worldwide, are expected to be multi-trillion dollar industry as of now.

**What is an index fund**

Index funds are the funds, which invest in the index (imitate the market index) with an objective to generate returns equivalent to the market return/return on index. In index funds, investment is made in all the index scrips in proportion to their weight in the index going by the market capitalisation at the time of investment. For instance, NIFTY Fund of UTI is an Index Fund. This is the passive form of portfolio management.

**What are index derivatives**

Index derivatives are derivative products for which underlying in the cash market is index. For instance, futures and options on index are index derivatives.

Index derivatives are popularly used to hedge against the market risk. Hedging, using the index derivatives, has become a central part of the risk management in the modern economies.

**What is market risk**

Price risk, in a scrip, results from the volatility in its price. This volatility in price may be attributed to company and/or industry related factors (good/poor performance of company/industry) and economy related factors (social, economical and political factors). Price risk due to the company/industry related factors is called specific/unsystematic risk that cannot be separated from the investment in the scrips. Price risk due to the general factors of economy is called the market/systematic risk. This component of price risk is separable from the investment and tradable in the market with the help of index based derivative products.
Problems:

1. BSE Sensitive index is a portfolio
   a. consisting of 30 scrips, which are equally weighted.
   b. consisting of 30 scrips weighted by their market capitalisation.
   c. consisting of 30 scrips, which are weighted by the number of outstanding shares of these 30 companies.
   d. None of the above.

2. Which of the following is not true
   a) BSE sensitive index is managed by BSE.
   b) S&P CNX Nifty is managed by NSE.
   c) Market risk is also called systematic risk
   d) Option on index is an example of index derivatives.

(For answers, please refer to page number 55)
Chapter 3

Trading mechanism of Index Futures

Index futures are the future contracts where underlying asset is the cash market index. For instance, Bombay Stock Exchange (BSE) and National Stock Exchange (NSE) have introduced future contracts on BSE sensitive index (comprising 30 scrips) and S&P CNX Nifty index (comprising 50 scrips) respectively on June 9, 2000 and June 12, 2000.

[For details on indices, please refer to chapter 2]

Different maturity of future contracts

Index futures of different maturities trade simultaneously on the exchanges. For instance, BSE is trading three contracts on BSE sensitive index with one, two and three month’s maturity. These contracts of different maturities may be called near month (one month), middle month (two months) and far month (three months) contracts. The month in which a contract expires is called the contract month for that particular contract. For example, contract expiring in November 2000 would be called Nov. 2000 contract.

[As per Dr. L. C. Gupta Committee, set up by SEBI to suggest the byelaws for the trading and settlement of derivative contracts, maximum maturity of the contract may be 12 months or as decided by SEBI from time to time]

Each contract has a unique code for representation purpose on the system. All these contracts expire on a specific day of the month (expiration day for the contract). For instance, Both BSE and NSE traded index future contracts expire on last Thursday of the month (if last Thursday of the month is a holiday, contracts expire on the previous business day). As soon as the near month contract expires, middle contract becomes near, far contract becomes middle and a new far contract starts on the exchange from the next business day. Therefore, at every point of time, investors have a choice of three contracts, simultaneously trading on the exchanges.

Contract size and Contract multiplier

Index trades in index points like Dec. 2000 sensex contract (contract maturing in Dec. 2000) trading at 4500. To arrive at the value of contract (contract size), you have to multiply this index with a number called contract multiplier. Contract multiplier is standard for an index future contract and defined by the exchanges in the contract specification before the introduction of contract’s trading. For instance BSE has chosen Rs. 50 as contract multiplier for its BSE Sensitive index future contract. With contract multiplier of Rs. 50, contract size at the index level of 4500 would be Rs. 2,25,000 (4500*50). Therefore, contract multiplier may be viewed as the price per index point.

Different indices may have different contract multipliers. For instance, when contract multiplier for BSE sensitive index futures contract is 50, NSE trades in S&P CNX Nifty
with contract multiplier of 200. Further, same index may trade with different multipliers i.e. two contracts on the same index may appear on the exchange having the different contract sizes (change in multiplier results in the different contract sizes on the same index level). When you take positions in the futures market, you buy or sell specific number of contracts.

**Tick size in index futures**

Tick size, which is the minimum difference between two quotes of similar nature, (two buy or two sell quotes) is determined by the exchange and communicated to the market. As indices trade in index points, tick size in this market is defined in terms of index points, which can always be converted into rupees. BSE has chosen the tick size of 0.1 index point for trading in the BSE Sensitive Index Futures. As every point of index is priced at Rs. 50, 0.1 index point is equivalent to Rs. 5. Therefore, we may say that tick size for BSE sensitive index futures trading is Rs. 5 or 0.1 index point. It means that if you want to improve upon an existing best buy quote of, say, 4500 (contract size Rs. 2,25,000), minimum quote the system would accept is 4500.1 (contract size of Rs. 2,25,005) and not 4500.05 or 4500.07.

Contract specifications of BSE’s and NSE’s Index Future contracts are as follows:

<table>
<thead>
<tr>
<th>FEATURES</th>
<th>BSE’s Index Future Cont.</th>
<th>NSE’s Index Future Cont.</th>
</tr>
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<tbody>
<tr>
<td>Underlying index</td>
<td>BSE sensitive index</td>
<td>S&amp;P CNX Nifty</td>
</tr>
<tr>
<td>Contract Multiplier</td>
<td>50</td>
<td>200</td>
</tr>
<tr>
<td>Tick size or minimum price</td>
<td>0.1 index point of Rs. 5.</td>
<td>.05 index point or Rs. 10.</td>
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<tr>
<td>difference</td>
<td></td>
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<tr>
<td>Last trading day/</td>
<td>Last Thursday of the</td>
<td>Last Thursday of the</td>
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<tr>
<td>Expiration day</td>
<td>expiration month. If it</td>
<td>expiration month. If it</td>
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<td>happens to be a holiday,</td>
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<td>the contract will expire</td>
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<td>on the previous business</td>
<td>on the previous business</td>
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<td>day.</td>
<td>day.</td>
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<tr>
<td>Trading hours</td>
<td>Normal trading hours.</td>
<td>Normal trading hours.</td>
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<tr>
<td>Contract months</td>
<td>3 contracts of 1,2 and 3</td>
<td>3 contracts of 1,2 and 3</td>
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<td>month’s maturity. At the</td>
<td>month’s maturity. At the</td>
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<td>expiry of the nearest</td>
<td>nearest month contract, a</td>
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<td>month contract, a new</td>
<td>new contract with 3 months</td>
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<td>contract with 3 months</td>
<td>maturity will start. Thus,</td>
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<td>maturity will start. Thus,</td>
<td>at any point of time, there</td>
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<td>at any point of time, there</td>
<td>will be 3 contracts</td>
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<td>available for trading.</td>
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<td>Daily settlement price</td>
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<td>Final settlement price</td>
<td>Closing price of the</td>
<td>Closing price of the</td>
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<td>cash index on the expiry</td>
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<td>date of the future</td>
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<tr>
<td></td>
<td>contract.</td>
<td>contract.</td>
</tr>
</tbody>
</table>

12
Price discovery and convergence of cash and future indices on the expiry of the specific future series

When December 2000 contract is trading for settlement on the last Thursday of Dec. month at 4500, it means market expects the cash index to settle at 4500 level at the closure of the market on that Thursday (last trading day of the contract). Understand that every operator in the market is trying to predict the cash index level at a single point in time — at the closure of the market on the last trading day of the contract, which results in price discovery of cash index at a given point in time. In other words, future prices are expected cash prices and so both futures and cash indices converge at the maturity of the futures contract.

Settlement of index futures

Index based derivatives, worldwide, are cash settled i.e. settlement of these trades takes place only through the settlement of the difference in the buy/sell price and the final settlement price of the contract. They are designated as cash settled derivative contracts.

All the contracts in Index Futures in Indian Capital Market are being settled through the clearing house of the exchange. Clearing house of the exchange becomes the counter-party to all the trades or gives unconditional guarantee for their settlement. Therefore, the counter-party risk, involved in the trading is assumed by the clearing house of the exchange. A separate trade guarantee/settlement fund, independent from the cash market, has been created by the exchanges for this purpose.

In addition, an Investors protection fund for the derivative segment, independent of the cash segment, has been created by the exchanges to protect the interest of the investors in the derivatives market.
Problems:

1. Contract multiplier
   a. is price per index point.
   b. when multiplied with the index gives the contract size for index futures.
   c. Both a and b.
   d. None of the above.

2. Contract size is calculated as
   a) future index level* tick size.
   b) future index level* contract multiplier.
   c) future index level* contract multiplier* tick size.
   d) None of the above.

3. Which of the following is not true with regard to the index futures transactions in India
   a) Clearing corporation/ house gives the unconditional guarantee for settlement of all the trades.
   b) Derivatives segments of the exchanges have a separate settlement guarantee fund.
   c) Derivatives segments of the exchanges have investors’ protection funds, independent of that of cash segments.
   d) All the trades in index futures are settled through physical delivery of the indices.
   e) None of the above.

(For answers, please refer to page number 55)
Chapter 4

Uses of index futures

Economic purpose of introduction of derivatives is to provide a mechanism to the market operators to hedge against the undesirable/unwanted risks. They are essentially meant to facilitate the transfer of a component of price risk/risks from operators who do not want to carry it (hedgers) to the operators who intentionally take it (speculators). Different products in the derivatives market trade different kind of risks. For instance, in case of scrip based futures and options, entire price risk in investment is transferred by hedgers to speculators. But, through index based products (index futures and index options), only a component of price risk is traded. Therefore, derivatives market is the market where risk is traded.

Which risk is traded in the Index futures market

Index Futures trade a component of price risk, comprised in the investment in securities. Price risk is the risk of movement of the price of securities, held by the operator, in an unfavourable direction. This risk is divided into two components- specific risk or unsystematic risk and market risk or systematic risk.

Specific risk or unsystematic risk is the component of price risk generated by the specific events of the company and industry. This risk is inseparable from investing in the securities. This risk can be reduced to a certain extent by taking the well-informed investment decisions based on the research. Further, as the price risk of a portfolio is less than that of a single stock, diversification may be the other way to reduce this risk.

Market risk or systematic risk is the component of scrip’s price risk, which is generated by other than company and industry related factors e.g. economic and political events. Every scrip/portfolio is exposed to market risk. This risk is separable from the investment and tradable in the market with the help of index based derivatives. When this risk is hedged perfectly with the help of index based derivatives, only specific risk of the portfolio remains.

Therefore, we may say

Total price risk in investment in securities

= Systematic risk/ market risk + Unsystematic risk/ specific risk

What are other risks in investment in securities/financial markets

Price risk, elaborated above, is the major risk in investment in the securities. In addition to that, following risks, related to the investment, should be understood by the operators:
Credit risk – This is the default/counter-party risk involved in the securities business. In the cash and derivatives markets, this risk is generally assumed by the exchange’s clearing corporation/house, which provides the unconditional guarantee for the settlement of all trades taking place there.

Liquidity risk – This is the risk related to poor tradability of securities/contracts in the market. In the cash market, liquidity varies from product to product.

Index futures secure business from three streams of activities – hedging, speculation and arbitrage. Worldwide, index futures are highly liquid because of their low transaction cost and leveraged nature. Based on the international experiences, index futures in India are expected to be very liquid. Therefore, liquidity risk in index futures is almost nil.

Operational risks – These are the risks originating from the human errors, frauds, and systems’ failure kind of reasons. These risks exist in all the markets uniformly. They cannot be hedged by any mechanism other than insurance.

Now, we are clear that different mechanisms take care of different risks in the securities business. To manage the systematic/market risk, we use index based products like futures and options on indices.

Who are the operators in the futures market

As mentioned above, derivatives facilitate the transfer of risk from hedgers to speculators. Derivatives market’s capacity to absorb buying/selling by hedgers is directly dependent on the availability of speculators who act as counter-party to hedgers. Hedging will not be possible if speculators are not present in the system. Therefore, for futures market to click, presence of both the hedging participation and speculative appeal is a must.

In addition to hedgers and speculators, to establish a link between cash and derivatives market, we need a third party called arbitrageurs. These arbitrageurs remove mispricing, if any, in either cash or derivatives market and align both the prices through operating in both the markets simultaneously (going long in one market and short in another market, depending on the relative advantages).

Therefore, we may categorize the operators in the derivatives market in to following three categories:

- Hedgers
- Speculators, and
- Arbitrageurs

Why do the speculators and arbitrageurs operate in the futures market

Obvious answer to the question is to make money.
Speculators accept the risk in pursuit of profit. This is a highly specialized business and Speculators’ success is dependent on their ability to forecast the future prices of commodities or financial assets correctly.

Arbitrageurs lock their non-speculative profits by operating in various markets simultaneously (long in one market and short in another market).

These profit hungry speculators and arbitrageurs fetch enormous liquidity to the products, traded on the exchanges. This liquidity in-turn results in better price discovery, lesser cost of transaction and lesser manipulation in the market.

Speculators and arbitrageurs are attracted to the exchange traded derivative products because of latter’s high leverage, high liquidity, low impact cost, low transaction cost and default risk free behaviour.

**How do speculators operate in the futures market**

Speculators take the positions in the futures market without having position in the underlying cash market. They take either naked positions or spread positions.

Naked position is either long or short position in any of the future contracts. In case of a spread, two opposite positions (one long and one short) are taken either in two contracts with same maturity on different products or in two contracts with different maturities on same product. Former is called inter-commodity/ inter-product spread and latter is called calendar spread/time spread or horizontal spread. Presently, our system recognizes only calendar spreads.

Calendar spread, for instance, is a short position in one month contract coupled with a long position in two months contract. Calendar spread position is always computed with respect to the near month series and it becomes an open position when the near month contract expires or either of the legs of spread is closed.

A speculator takes a naked long position when he expects the market to go up. He intends to make money by reversing his position at higher price. Similarly, he takes a short position when he expects the market to go down to book profit by reversing his position at lower price.

For instance, if one month sensex index future is trading at 4500 level and speculator feels that cash index at the maturity of the one month contract should settle at a level higher than this, he would go to market to buy index futures. If his expectation comes true and index on maturity settles beyond 4500, this speculator will make money to the extent of the difference between the buy and sell/ settlement price of the index. Similar example may be taken for short position.
How do we manage the systematic/market risk with the use of index futures

Before we discuss the market risk management with the help of index futures, let us understand one important concept in risk management – Beta.

Beta is a measure of systematic risk (it itself is not the systematic risk). It measures the sensitivity of a scrip/portfolio viz a viz index movement. To interpret, a scrip with beta 2 will give you return of 20%, when index generates return of 10%. Similarly, if index falls by 10%, the scrip will fall by 20%. It means that the scrip is more volatile/risky than the index. Scrips/portfolios having beta more than one are called aggressive and having beta less than one are called conservative scrips/portfolios.

Betas of the individual scrips are used while calculating betas of the portfolios. Calculation of the portfolio’s beta is very simple. It is the weighted average of betas of the individual scrips in the portfolio where weights are based on the investment proportion of the scrips in the portfolio. Means, if there are four scrips in the portfolio with betas 0.75, 0.90, 1.20 and 1.50 having weights 25%, 35%, 40% and 10%, beta of the portfolio would be 1.1325 (0.75*0.25+0.90*0.35+1.20*0.40+1.50*0.10). Information on beta of scrips is available in various financial newspapers, magazines and information vending networks like Bloomberg, Reuters etc.

Beta is calculated on the basis of historic data and is used as an estimate for the future price movement of the scrips and portfolios viz a viz index movement. Belatedly, forecast of future price movement of scrips/portfolios viz a viz index, on the basis of their beta, has been challenged in many empirical studies.

We must understand that beta of a scrip/portfolio is dependent on time frame taken for calculation of beta, index used (beta of a scrip is different viz a viz different indices) and returns used for the calculation like daily returns, weekly returns etc.

Illustration on risk management

Let us assume that you have a portfolio of Rs. 5,00,000 with beta 1.5 viz a viz sensex and expect the market to go down in next one month, you have two choices:

1. Go to the cash market and sell your portfolio to buy the same again after fall in prices.
2. Use index futures to protect the value of your portfolio from the expected fall.

Let us assume, you choose to hedge your downside risk through second option i.e. by using index futures. To hedge your portfolio’s systematic risk, you have to sell or go short in index futures market (calculation of required number of contracts is defined in the next paragraph). Now, if market goes down as expected by you, you would loose on your cash position (long position) but gain on your futures position (short position). Therefore, your losses on the cash position would get compensated partly or fully, depending on your position in futures market, by profits on your futures position.
How many contracts I should sell in the given example and what would be the net impact of my combined position in cash and futures markets

Having decided to hedge, next obvious question is how many future contracts to trade in. The number of contracts, you trade in, would determine up to what extent you are hedged and/or unhedged.

In our example, if the operator wants the complete hedge against the systematic risk with the use of index futures, to arrive at the number of contracts to trade in, we use the following formula:

\[ \text{Hedge Ratio (number of contracts)} = \frac{V_p \times \beta_p}{V_i} \]

\( V_p \) – Value of the portfolio  
\( \beta_p \) – Beta of the portfolio  
\( V_i \) – Value of index future contract  
(Value of index future contract or contract size = futures index level* contract multiplier)

(Readers may note that for simplification purpose, beta of futures index viz a viz cash index is taken as one).

Now, assume one month index futures on BSE Sensitive Index, trading at 5000, is used to hedge the portfolio’s value. Then, hedge ratio is \( = \frac{5,00,000 \times 1.5}{5000} = 3 \) contracts. Means, you have to sell 3 contracts in futures market to hedge your position in the cash market, against the market risk, completely.

To maintain simplicity, in our example, numbers are taken hypothetically to ensure that the hedge ratio comes out to be an integer. It may come out to be fraction say 3.45 or 3.80. In these cases, you can enter into contracts equivalent to either lower or upper integer of fraction and so you would be either slightly over-hedged or under-hedged.

Now, this is for you to decide how many contracts, you would trade in. You may always choose to partly hedge your position by going short in say 1 or 2 contracts in index futures.

Let us assume that you go short in three future contracts at 5000 level to hedge your systematic risk completely.

If 10 days down the line, as expected by you, index comes down to 4500 (goes down by 10%), your position would be as follows

Loss on cash position – 15% of 5,00,000 i.e. Rs. 75,000  
(Beta of portfolio being 1.5, portfolio will loose 15%).  
Profit on the future position – 10% of 2,50,000 on three contracts i.e. Rs. 75,000.
Therefore, losses on your cash position get compensated by profits on your futures position. Here, cash position may move more or less than 15%, as defined above, because of the influence of some company/industry specific news on the scrips in the portfolio; this may result in some mismatch between the loss on one position and profits on other position.

[Readers may note that the numbers taken in the example were hypothetical ones and perfect hedge, as defined above, rarely exists in practical life.]

Hedge to a large extent depends on the relationship of your portfolio with the index, which is measured by beta. As, your portfolio has different relationships with different indices, the hedge ratio would change with the change in the index, you use to hedge through.

Further, the assumption that the past relationship between the scrip's/ portfolio's movement and the index movement, measured through beta, would continue, is a limitation of the model and may result in some difference between the numbers, you finally arrive at and the numbers you expected to arrive at.

Further, over-hedging, essentially, is speculation. Over-hedged position means, you sell say 10 future contracts when your hedge ratio is only 3. In this case, you are hedged to the extent of 3 contracts and beyond that i.e. for 7 contracts your position is speculative.

**What if market turns up in contrary to my expectations**

In our previous example, if market turns up in contrary to your expectations and goes up by any number, whatever you gain on your cash position that would be fired by losses on your short futures position. Therefore, by virtue of hedging you loose the opportunity to make money. Here, you must understand that when you go for hedging, you lock yourself at a specific price and thereafter any favourable price movement on underlying asset would be unable to create values for you.

**Could not I manage this risk through the cash market itself**

Yes! You could. Recollect the first choice in the above illustration of risk management. You can always sell the portfolio when you expect the market to go down, and buy that again after fall in prices. But, the impact cost and cost of transaction make that option highly uneconomical. The same objective can be accomplished with the help of index futures at much lesser cost and at a very high speed.

Actually, by selling index futures as discussed above, to protect the value to your portfolio, you are expanding your portfolio by adding one short position to this. But, this short position is equally strong and exactly opposite in nature to your existing portfolio. Therefore, the net risk of your portfolio after addition of futures position goes down drastically.
Generally used terms in hedging

Long hedge

Long hedge is the transaction when you hedge your position in cash market by going long in futures market. For instance, assume, you expect to receive some funds in the near future and desire to invest in the securities market. You also expect the market to go up in the near future, which may result in you acquiring the securities at higher price, when you really invest. This risk can be hedged with the help of index futures.

To hedge, you buy index futures today. On receipt of the money, you invest in the cash market and unwind corresponding futures positions. Any loss due to acquisition of securities at higher price, because of upward movement in the market, would be taken care of by your position in index futures.

Further, while investing, suitable securities at reasonable prices may not be immediately available in sufficient quantity. Rushing to invest all money is likely to drive up the prices to your disadvantage. This situation can also be taken care of by use of index futures. You may buy index futures today; gradually invest money in the market and unwind corresponding future positions.

Short hedge

Short Hedge is the hedge accomplished by going short in futures market. For instance, assume, you have a portfolio, which is to be liquidated in near future. Meanwhile, prices of the scrips may go down, which will result in certain disadvantages to you. To protect your portfolio’s value, today, you can sell index futures of equivalent amount. Now, if the market goes down, it does not hurt you. Because, whatever losses you realize on your sales because of downward movement of the market, they get compensated by the profits on your futures positions.

Cross hedge

Generally, when the future contract on an asset is not available, you look forward to an asset that is closely associated with your underlying and trades in the futures market, for hedging purpose. You may trade in futures in this asset to protect the value of your asset in cash market. This is called cross hedge.

For instance, future contracts on the jet fuel are not available in the international markets. Therefore, to hedge the price risk of jet fuel, operators take position in crude oil, gasoline oil or heating oil future contracts to hedge their price risk in jet fuel. These commodities’ prices are closely associated with that of jet fuel.
Hedge contract month

Hedge contract month is the maturity month of the contract through which you hedge your position. For instance, if you use Dec. 2000 contract to hedge your portfolio's market risk, your hedge contract month would be Dec. 2000 contract.

If product is so useful, why are the derivatives called risky

Derivatives are considered risky because of their leveraged nature. A position in derivatives market can be taken with the payment of small margins. Because of high leverage, traders often take up positions beyond their means and on account of any adverse movement of the market, they end up booking huge losses.

To protect the market integrity, stringent risk containment measures have been adopted in the Indian Derivatives market (For details, please refer to chapter 6).

What are other uses of index futures

Index futures are widely used by the operators to hedge against systematic risk and for portfolio restructuring. Concept of systematic risk management has already been elaborated above. Let us understand the concept of portfolio restructuring/re-balancing through use of index futures.

Portfolio re-balancing

Suppose, you have a portfolio containing both debt and equity. You are interested in reducing your equity exposure, say from 40% to 30%. This can be achieved by actually selling the equity holdings. But, such selling entails three problems: first, it is likely to depress equity prices to your disadvantage and the whole market, second, it cannot be achieved speedily and may take some time, and third, it is a costly procedure because of high cost of transaction. The same objective can be accomplished through index futures quickly, at much lesser cost and with much lesser impact on the cash market. In the instant example, you may immediately sell index futures and the actual sale of equity may be undertaken gradually depending on market conditions in order to realize the best possible prices. As unloading of holdings progresses, the index futures positions may be unwound by doing the opposite transactions to the corresponding extent.

Conclusion

From the above, we may conclude that derivatives provide operators with a quick and less expensive mode with leverage facility to alter their portfolio composition to arrive at the desired level of risk. Further, they are the prudent tools for portfolio restructuring.
Problems:

1. Systematic risk
   a. is the market risk.
   b. is the diversifiable risk.
   c. can be managed with the help of futures on indices.
   d. Both a and c.
   e. Both b and c.

2. A portfolio consists of three scrips with weight 0.25, 0.50 and 0.25. The betas of individual scrips are 2.00, 1.20 and 0.80 respectively. The beta of the portfolio is
   a. 1.40
   b. 0.90
   c. 1.30
   d. 2.00
   e. None of the above.

3. The portfolio in the above question will be called
   a. an aggressive portfolio.
   b. a conservative portfolio.
   c. an index portfolio.
   d. None of the above.

4. Beta of an equally weighted portfolio is 2. There are 5 scrips in the portfolio. Beta values of 4 scrips are 1.30, 2.10, 1.80 and 2.50 respectively. Beta of the 5th scrip is
   a. 1.70
   b. 2.30
   c. 2.50
   d. 3.00
   e. None of the above.

5. Beta of a portfolio viz a viz BSE sensitive index is 1.5. One month future contract on BSE 30 is trading at 4500. Find the value of the portfolio, if hedge is to be a perfect one (assume that holder of the portfolio enters into two contracts in index future; contract multiplier for BSE sensitive index future contract is 50).
   a. Rs. 100,000
   b. Rs. 200,000
   c. Rs. 300,000
   d. Rs. 400,000
   e. Rs. 500,000
6. An operator has Rs. 20,000 with him. With this Rs. 20,000, he may go to the cash market and buy scrips worth Rs. 20,000 with beta value of 1.8. Another option open to him is to go to the futures market and buy one contract in BSE 30 index futures at a level of 4800. If market goes up by 10%, what is the difference between the profits he is making at cash and future markets (assume that the future index has beta 1 viz a viz cash index; contract multiplier for BSE sensitive index future contract is 50).

a. Rs. 15,600  
b. Rs. 18,800 
c. Rs. 20,400 
d. Rs. 24,200 
e. Rs. 25,800

7. Beta of Cipla is 1.5 viz a viz BSE sensex. An operator has a long position in Cipla worth Rs. 200,000, coupled with a short sensex position of Rs. 200,000. Which of the following is true for the operator:

a. He has a partial hedge against the market risk in Cipla.  
b. He has a complete hedge against the market risk in Cipla. 
c. He is over-hedged.

8. An investor expects that the rupee will depreciate and hence the profits of export oriented information technology companies will go up. He is long on Infosys to the tune of Rs. 2 Lacs. The beta of Infosys is 1.35 viz a viz BSE sensex. He wants to remove the effect of market movements from his holding. How can he remove his sensex exposure.

a. Short sensex Rs. 2.7 Lacs.  
b. Short sensex Rs. 1.35 Lacs. 
c. Short sensex Rs. 2 Lacs. 
d. Long sensex Rs. 2.7 Lacs.

9. X buys 100 share of HLL at Rs. 2500 and obtains a complete hedge by shorting one futures contract in sensex at 5000 (multiplier Rs. 50). Both of his positions are closed on the next day; HLL has gone down by 2% and sensex has risen by 1%. What is the overall profit/loss to X.

a. Profit of Rs. 7,500  
b. Loss of Rs. 7,500 
c. Loss of Rs. 2,500 
d. Profit of Rs. 2,500

10. On Jan. 1, 2000, an investor has a portfolio worth Rs. 20 Lacs, which has a beta of 0.5 viz a viz sensex. There is a marriage in the family in November 2000 end, so he wants to totally eliminate his market risk. What is the correct hedging strategy.

a. Buy Futures worth Rs. 20 Lacs for November 2000 expiration.
b. Short Futures worth Rs. 10 Lacs for November 2000 expiration.
c. Short Futures Rs. 20 Lacs for November 2000 expiration.
d. He should not do anything and keep the portfolio intact to sell, when he needs money in November.

(For answers, please refer to page number 55)
Chapter 5

Pricing Futures

Pricing of futures contracts is heavily dependent on the characteristics of underlying. As different assets have different demand and supply patterns, different nature (some are carriable and some are not, some generate return and some don’t), there is no single way to price the futures contracts. In other words, pricing of futures contracts on tropical fruit, which is available only once in a year for a day, is drastically different from the pricing of futures contracts on index futures.

Different models for pricing futures are available in the textbooks. Here, we will limit our discussion to cost and carry, and expectancy models of futures pricing.

Cost and Carry / Non arbitrage model of futures pricing

This model assumes that in efficient markets arbitrage opportunities can not exist for long. The moment there is an opportunity to make money because of mis-pricing in the markets, arbitrageurs will start trading to eliminate these opportunities. Let us elaborate the concept.

Futures position in the market can be created in two ways:

➢ Enter into a futures contract available on the exchange.

➢ Create a synthetic futures position/contract by buying in the spot market and carrying the position to future date.

Practically speaking, price of acquiring the asset through both the modes should be the same i.e. cost of synthetic futures contract (spot price + cost of carrying the asset from today to the future date) should be equivalent to the price of readymade futures contract. If it is not so, it will trigger arbitrage and that will continue till the prices in both the markets are aligned.

[Cost of creating the synthetic position may be called fair price i.e. fair price = spot price + cost of carrying the asset from today to the future date].

Let us understand the concept with the help of an illustration from Bullion Market. Assume that gold is available in the cash market at Rs. 4000 per 10 gr. Cost of financing, storage and insurance for carrying the gold for three months is say Rs. 100. Means, if you go to the market, buy gold at Rs. 4000 per 10 gr. and hold it for say three months, at the end of three months, you may say that gold's value (synthetic futures value) is Rs. 4100 per 10 gr.

Now, assume for a moment that 3 months futures contract is available on gold per 10 gram. Further assume that this contract is trading at Rs. 4150. What would you do?
Apparently, you would attempt to exploit the arbitrage opportunity which exists in the gold market by buying gold in the cash market and selling that in the futures market simultaneously. You will borrow money to take delivery of gold in the cash market, hold the gold for three months and then deliver it in the futures market to honour your futures contract. Money received on performance of the futures contract would be used to repay the lender. This will result in the profit of Rs. 50 per 10 gram of gold to you (Assuming there is no other cost involved in the transaction).

Now, as more and more people come to the cash market to buy gold and futures market to sell it, price of gold in the cash market will go up and in the futures market will go down. This arbitrage on gold between the cash and the futures markets will continue till the prices between cash and futures markets are aligned.

*If we call the synthetic forward price as fair price, we can say that if future price > fair price of asset, it will trigger arbitrage, which will continue till the prices in both the markets are aligned.*

Similarly, if three months future on gold is trading at Rs. 4000 per 10 gr., it will trigger the reverse arbitrage. It means, people will start selling gold in the cash market and buying in the future markets. In this deal, people will borrow gold, deliver it to honour the contract in the cash market, invest the cash market sales proceed to earn return and return the gold to the lender on receipt of the same in futures market. This reverse arbitrage will result in reduction of gold’s cash prices and escalation of its futures prices till these prices get aligned as defined above.

*It means, if future prices < fair price of asset, it will trigger reverse arbitrage, which will continue till the prices in both the markets are aligned.*

**Costs of transactions and non-arbitrage bands**

Here, it should be understood that few cost components of futures transaction like margins, transaction costs (commissions etc.), taxes etc. create distortions and take markets away from equilibrium. In fact, these cost components create a non-arbitrage band in the market i.e. if futures price is within that band, arbitrage can not take place.

For instance, if the transaction cost of buying/selling the gold in the cash market is say Rs. 10 per 10 gram and the transaction cost of buying/selling the contract on 10 gram gold in futures market is Rs. 5, this will create a non-arbitrage band of Rs. 15 around the prevailing futures prices. It means as long as future prices are within the band of fair prices +/- Rs. 15, arbitrage will not take place. Similarly, every component of cost contributes towards widening this non-arbitrage band. We should also understand that wider the non-arbitrage band, farther the markets are away from the equilibrium.

It means, for markets to be efficient, different costs of operating in the markets should be as low as possible. Lower costs would narrow the non-arbitrage band which in-turn would ensure the efficient price alignment across the markets.
Further, as the transaction cost, financing cost, taxes are different for the different operators in the market, non arbitrage band is different for the different people.

**Extension of concept to the assets generating returns**

Let us extend the concept of cost and carry by adding the inflows on holding assets. For instance, if underlying asset is securities (equity or bonds), there may be certain inflows (dividend on equity and interest on debt instruments) during the holding period. To adjust this factor, we have to slightly modify the formula of fair price as follows:

\[
\text{Fair price} = \text{cash price} + \text{cost of carry} - \text{inflows}
\]

For instance, if you buy BSE sensitive index in cash market at 5000 level, when cost of financing is say 12% and return on index is say 4% per annum (spread uniformly over the year), fair price of index three months down the line should be

\[
= \text{Spot price} + \text{Spot price (cost of financing – holding period return)}/\text{time to expiration / 365.}
= 5000+ 5000(0.12-0.04)*90/365
= 5098.63
\]

If index futures for three months from now are trading at a level above 5098.63, you can buy cash index and simultaneously sell index futures to lock the gains equivalent to the futures price - fair price (Understand that the cost of transaction, taxes, margins etc. are not taken into consideration while calculating the fair value).

Similarly, if index is at a level below fair value, it will trigger reverse arbitrage. This arbitrage between the cash and the future markets will continue till the prices between both the markets get aligned.

We must note that as the cost of borrowing funds and securities, return expectations on the held asset etc. are different for the different operators, there can be as many fair values of futures as many operators in the market. In fact, this difference among the fair values of futures contracts for the different operators only moves the market.

**Assumptions in the cost and carry model of futures pricing**

Cost and carry model of futures pricing works under certain assumptions. Few of them are stated below:

- Underlying asset is available in abundance in cash market.
- No seasonal demand and supply in the underlying asset.
- Storability of underlying asset is not a problem (asset is carriable).
Underlying asset can be sold short.

No transaction cost.

No taxes.

No margin requirements.

[It is not the exhaustive list of the assumptions of the model]

Assumption that asset is available in the cash market in abundance i.e. we can buy and sell as much asset as we want does not work in many a cases especially when underlying commodities have seasonal pattern of demand and supply. Prices of these seasonal assets vary drastically in different demand-supply zones. When supplies arrive to the market, prices are generally low and immediately before the supply, prices are generally high.

Further, if the asset is not storable, you just cannot carry the asset to the future. So, there is no question of you following the cost and carry model of futures pricing. For instance in the case of tropical fruit, which is available only once in a year for a day. Similarly, many times, underlying may not be sold short.

This simple form of cost and carry model does not discount for transaction cost, taxes etc. also. In fact, we can upgrade the formula to reflect the impact of these factors in the model.

Further, this model does not take the margins (initial, daily or special) into consideration while delivering the fair value. That is the reason, it is more fit for forward contracts pricing than for futures contracts.

Therefore, based on the assumptions of the cost and carry model and characteristics of index futures, we may say that in the normal market, relationship between cash and futures indices is described by the cost and carry model of futures pricing.

**Concept of Convenience Yield**

Let us get back to the formula of fair price again:

Fair price = cash price + cost of carry – inflows.

Cost of carry includes the cost of financing the transaction, storage cost and the cost of insurance. Inflows may be tangible as defined above (dividend on equity and interest on debt) or intangible. What does intangible mean. Intangible inflows may be in terms of convenience the holder of asset derives from holding the asset.
For instance, there is flood in a region. People start hoarding the essential commodities like grains, vegetables and energy products (heating oil) etc. In fact, by human nature, we do hoard more than what is required for real consumption over the expected period of crisis. This creates paucity of asset in the cash market and pushes the prices up. In this kind of situation, people are deriving convenience, just by holding the asset. This is termed as convenience return or convenience yield.

Note that convenience return for a commodity is likely to be different for different people further it will vary over time. Convenience is a subjective issue and very difficult to be priced. In fact, there are ways to price this convenience yield/return, which is beyond the scope of this work.

Sometimes, this inflow in terms of convenience yield may dominate over the cost of carry and so futures may trade at discount to the cash market. In this case reverse arbitrage is also not possible because no one is ready to lend speculators the assets to short sell in the cash market.

*Breaking link between cash and futures markets (Expectancy model of futures pricing)*

One more situation which may result in the futures being at discount to the cash is when asset is not carryable. In this situation there is no link between the cash and futures prices and they are governed by purely the demand and supply factors during the prevailing times.

Now, if futures trade on these assets, how are they priced. Expectancy model provides the answer. Philosophy of the model says that it is not the relationship of cash and future prices but the relationship of expected spot and future prices which moves the market specially in cases when the asset can not be sold short or can not be stored.

*Expectancy model argues that futures price is nothing but the expected spot price of an asset in the future.*

According to this model, if futures is trading above cash price, we say markets expect cash price to go up in the future. Similarly, if futures is trading below the cash price, we say markets expect the cash price to go down in the future. In other words, futures prices give us an indication of the expected direction of movement of the cash prices in the future.
Chapter 6

Margining of Index Future Contracts

In futures market, clearing corporation/house is the centerpiece as it assumes the financial integrity of the entire market by guaranteeing the settlement of all the trades taking place on the exchange. You may wonder, how does clearing corporation/house manage it. Simply, by collecting the potential losses on the positions of both buyers and sellers before they commit any position in the market and then by collecting all the daily losses on their positions on day-to-day basis before the markets open for trading on the subsequent day. This money collected by clearing corporation/house is called margin.

Clearing corporation/house collects margins from its member brokers called “Clearing Members”. Clearing Members in turn collect it from their associated trading members and clients.

In the cash market, trading and clearing rights are conferred on the members, simultaneously, by the exchanges i.e. in cash market, a member with trading right always has the clearing right as well. But, in index futures market, trading and clearing rights have been segregated i.e. broker members may have only trading right (become Trading Members- TMs), only clearing right (become Clearing Members - CMs) or both trading and clearing rights (become Trading cum Clearing Members – TCMs). Only Trading Members i.e. members with only trading right are dependent on the Clearing Members for clearance of their trades.

Your positions as a client/constituent, irrespective of your dealing with either Trading Member or Clearing Member with trading rights, are subject to the same margins as elaborated below. To avoid the ambiguity by use of terms like TMs, CMs or TCMs, simple term broker member is used throughout the chapter.

Initial margins on index future contracts

In index futures market, broker members charge initial margin from the clients for their trades in the derivatives exchange/segment. Initial margin is charged by broker members to cover the worst case one day potential losses on clients' positions, assuming that the daily margins/ marking to market margins are collected by them from their clients before trading starts on the very next day.

In index futures market, all open positions whether long or short, are deemed to be settled at the end of the day on daily settlement price. Losses, if any, on these positions are called for by the exchanges and/or clearing corporation/house. This margin call is known as daily margin/marking to market margin.

Both buyers and sellers have to deposit initial margin with their brokers. Minimum initial margin on different contracts shall be prescribed by the clearing corporation/ house and/or SEBI from time to time, based on the specified risk algorithm. This minimum
initial margin on index future contracts is calculated on the basis of value at risk at 99% confidence level i.e. worst case one day loss during 99% of the previous trading days.

Your broker may charge more than what is minimum required by the clearing corporation/ house based on his risk perception in dealing with you as a client. But, whatever money/ securities are deposited by you as initial margin with your broker, are deposited by him with the clearing corporation/ house. Clearing corporation/house keeps the initial margin from clients in trust for them.

Initial margin can be paid in the form of cash, fixed deposit receipts, bank guarantees, government securities and other dematerialized securities (equity and/or debt).

Initial margin requirement in the index futures market is different for the naked long and short positions and calendar spread positions.

*Naked and calendar spread positions*

Naked position in futures market simply means, a long or short position in any future contract without having any cash position in the underlying. Calendar spread position is a position in one maturity future contract, which is hedged, by an offsetting position in a different maturity future contract. Only opposite positions can offset each other. For instance, a short position in one month contract coupled with a long position in two months contract is calendar spread position. Calendar spread position is always computed with respect to the near month series and becomes an open position when the near month contract expires or either of the off-setting positions is closed.

A calendar spread should always be defined with regard to the relevant months i.e. spread between 1 and 2 months, between 1 and 3 months or between 2 and 3 months.

*Initial margin on calendar spreads*

Margins on the calendar spreads are levied at a flat rate of 0.5% per month of spread on the farther month contract of spread, subject to a minimum of 1% and a maximum of 3% on the spreads with legs upto 1 year apart. Means, a spread with two legs three months apart attracts a margin of 1.5% on the far month contract.

A calendar spread is treated as a naked position in the far month contract, as the near month contract approaches expiry. This change is affected in gradual steps over the last five trading days of the near month contract. The following percentages of a calendar spread are treated as a naked position in the far month contract:

<table>
<thead>
<tr>
<th>Equivalent to “x”% open position</th>
<th>No. of days before expiry of the near month series.</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>40</td>
<td>3</td>
</tr>
<tr>
<td>60</td>
<td>2</td>
</tr>
</tbody>
</table>
All long and short positions of a client in a contract are netted for the margining purpose (all clients are identifiable by the systems through their unique IDs). But, the positions of a client are not setoff against the positions of other client/client, while arriving at the position of member broker. Therefore, we may say that member broker’s position is his clients’ net positions on gross basis.

**Daily margins or marking to market margins on index future contracts**

In index future contracts, all open positions whether long or short are deemed to have been settled on daily basis at the daily settlement price and all the settlements – payments of profits and collection of losses, as the case may be, is done by the exchange and/or clearing corporation/house on daily basis (daily settlement price is the closing price of the futures contracts for the day). After making the settlement with the clearing corporation/house, such positions are deemed open, on the subsequent trading day, at the daily settlement price. This daily settlement obligation called daily margin or marking to market margin is payable only in cash. Pay-in and Pay-out in the index futures market are on T+1 basis i.e. all the losses are payable and profits are receivable on T+1 basis.

Let us understand daily margining with the help of an example. Suppose you have bought a future contract at 4500 BSE sensex index level. At the end of the day, this future index settles/closes at 4450. It means, you have lost money equivalent to 50 points of sensex i.e. Rs. 2500 (50*50). This money in cash is to be deposited by you to your broker. Next day your position is treated as open on 4450. In contrary, if the market goes up by say 25 points and closes on 4525, you would receive Rs. 1250 (25 points *Rs. 50) and next day your position would be treated as open on 4525. This process is called marking to market or daily settlement of all open trades.

For the purpose of the administrative convenience with regard to the payment of the daily margins on clients’ behalf, your broker may maintain a daily settlement margin balance upto a pre-agreed level with you to avoid collection from and payment to you of daily settlement amount on day-to-day basis. This amount will be kept by the broker in a separate account called clients’ account. No payment for the transactions in which the broker member has position as principal, shall be allowed to be made from the clients’ account. Further, broker cannot utilize the funds of one client for or on behalf of another client/clients except on specific authorization from the client whose funds are being utilized. For this purpose, a broker may open a single account for all his clients or separate account for each one of them.

If a client fails to give his daily margin to his broker by a given deadline, the broker may liquidate a part or whole of client’s position. In this case, client would be liable for the losses, if any, on such closing out of his positions by his broker.
Final settlement of index future contracts

On the maturity day of the contract, all open positions in that contract are marked to market to the closing value of the underlying index (final settlement price of the contract) and the resulting losses/profits are settled in cash with the operators.

Final settlement of the index futures contract is similar to the mark to market process/daily settlement process except for the settlement price. Till second last day, settlement price is the closing price of future index, but on the last day, it is the settlement price of the underlying cash index.

Notes

1. Operators may note that in order to maintain the fabric of market intact/protect the financial integrity of the market, change in the margining may take place at any time during the life of the contract. New margining may be made applicable to the existing positions along with the new positions. Consequently, if already deposited margins fall below the required level, the shortfall must be provided by the clients, promptly, within a given time.

2. In case of future contracts settled by physical deliveries, such contracts shall be settled as per the procedures prescribed in the contract or as prescribed by the clearing corporation/house and/or exchange.

3. For more details on margining, please refer to Prof. J. R. Varma Committee report on “Risk containment measures in the Indian Stock Index Futures Market”. It is available on web sites www.derivativesindia.com and www.sebi.gov.in.

Illustrations on margining in index futures

Few illustrations, with an objective to make the concepts of margining clear, are elaborated below:

Question 1:
A member has two clients C1 and C2. C1 has purchased and sold 100 and 200 contracts respectively and C2 has purchased and sold 400 and 200 contracts respectively in sensex Future November series. C1 has purchased and sold 100 and 100 contracts respectively and C2 has purchased and sold 100 and 100 contracts respectively in sensex Future December series. What are the open positions of the clients C1 and C2 in number of contract for sensex Future November and December series?

Solution:
Open position means the outstanding/unsettled long or short position of an operator.
<table>
<thead>
<tr>
<th></th>
<th>NOVEMBER SERIES</th>
<th></th>
<th>DECEMBER SERIES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Purchase</td>
<td>Sold</td>
<td>Net Exp.</td>
<td>Purchase</td>
</tr>
<tr>
<td>C1</td>
<td>100</td>
<td>200</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>C2</td>
<td>400</td>
<td>200</td>
<td>200</td>
<td>100</td>
</tr>
</tbody>
</table>

You may note that this benefit of netting will not be available to the investors if they are operating through more than one intermediary. Open positions of an investor with one broker cannot be netted against his open positions with other broker. Therefore, it is always advisable to operate through one intermediary in the market.

**Question 2:**
A client has an open position of 75 contracts in sensex Future January Series. If the rate of initial margin is 9% and the price of the January Series is 4500, what is the initial margin requirement for the member?

**Solution:**

Open position of client in Jan sensex series is 75 contracts.

Thus Initial Margin = 0.09 * 4500 * 50 * 75 = Rs. 15,18,750

[Multiplier for the sensex is Rs. 50 in all the examples]

**Question 3:**
An investor had an open position of 5 contracts long in a sensex futures one month series that was marked to market at previous day’s closing price at Rs. 8,75,000. Today, the closing price of the series is 3650. What is the settlement variation margin (in Rs.) for the investor?

**Solution:**

The investor has an open position of 5 contracts long at the previous day’s closing Rs. 8,75,000.

Therefore, previous day’s closing price of the series is 8,75,000 / (5 * 50) i.e. 3500

Today’s closing price of series is 3650 (given). Hence, settlement variation = (3650 - 3500) * 50 * 5 = Rs. 37,500

**Question 4:**
An investor has an open position of 10 contracts long, 10 contracts long and 10 contracts short in sensex future November, December and January series respectively. What are her spreads across November-December, November-January and December-January respectively?
Solution:

A spread is a position at one maturity, which is hedged, by an offsetting position at a different maturity. Only opposite positions can offset each other, e.g. a short position in one month contract coupled with a long position in two months contract. A spread position is always computed with respect to the near month series. Hence, the sequence November-December, November-January and December-January will hold. The spread position becomes an open position when the near month contract expires.

Spread positions in the instant question may be computed as follows:

<table>
<thead>
<tr>
<th>Futures Series</th>
<th>Spread Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>+10</td>
</tr>
</tbody>
</table>

Question 5:

An investor has an open position of 10 contracts long and 20 contracts short in sensex future November and December series respectively. The rate of initial margin is 9% and prices of November and December series are 4700 and 4730 respectively. Take initial margin for one month spread contract as 1%. It is beginning of the November series, what is his initial margin obligation (in rupees) towards the clearing corporation?

Solution:

Margins on the calendar spreads are levied at a flat rate of 0.5% per month of spread on the far month contract of spread, subject to a minimum of 1% and a maximum of 3% on the spreads with legs upto 1 year. Means a spread with two legs three months apart attracts a margin of 1.5% on the far month contract.

A calendar spread is treated as a naked position in the far month contract, as the near month contract approaches expiry. This change is affected in gradual steps over the last five trading days of the near month contract. The following percentages of a calendar spread are treated as a naked position in the far month contract:

<table>
<thead>
<tr>
<th>Equivalent to “x” % open position</th>
<th>No. of days before expiry of the near month series.</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>40</td>
<td>3</td>
</tr>
<tr>
<td>60</td>
<td>2</td>
</tr>
<tr>
<td>80</td>
<td>1</td>
</tr>
<tr>
<td>100</td>
<td>0 i.e. on the day of expiry</td>
</tr>
</tbody>
</table>
With respect to the question given, since the time period for computation of margin is given to be the beginning of the November Series, Therefore, open positions would be counted as follows:

<table>
<thead>
<tr>
<th>Data Given</th>
<th>November</th>
<th>December</th>
<th>Positions for margins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positions in terms of no. of contracts</td>
<td>+10</td>
<td>-20</td>
<td>10 spread positions and 10 open positions in December series.</td>
</tr>
<tr>
<td>Price</td>
<td>4700</td>
<td>4730</td>
<td></td>
</tr>
</tbody>
</table>

Total initial margin = margin on spread position + margin on open position

Margin on spread position is:
0.01 \times (4730 \times 50) calculated on price of far month series \times 10 (spread position) = Rs. 23,650

Margin on open position is:
0.09 \times (4730 \times 50) \times 10 since, there are 10 contracts open in the December series = Rs. 2,12,850
Total initial margin obligation is = 23,650 + 2,12,850 = Rs. 2,36,500

Question 6:
An investor has an open position of 10 contracts short and 20 contracts long in sensex future November and December series respectively. The rate of initial margin is 9% and prices of November and December series are 4700 and 4730 respectively. The initial margin for one month spread contract is 1%. One day before the expiry day of the November series, what is her initial margin obligation (in rupees) towards the clearing corporation?

Solution:

On the basis of the explanations given above on the spread trade, we may calculate the positions for the margining purpose as follows:

<table>
<thead>
<tr>
<th>Data Given</th>
<th>November</th>
<th>December</th>
<th>Positions for margins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positions in terms of no. of contracts</td>
<td>-10</td>
<td>+20</td>
<td>10 spread positions and 10 open position in December series</td>
</tr>
<tr>
<td>Price</td>
<td>4700</td>
<td>4730</td>
<td></td>
</tr>
</tbody>
</table>

Margin on Open Position:
0.09 \times (4730 \times 50) \times 10 = Rs. 2,12,850

Margin on Spread Position:
We are calculating the Initial margin obligation of the operator one day before the expiry of the near leg of the spread position. One day before expiry of the November series the spread position of 10 contracts is considered to be a spread only to the extent of 20% i.e. it is considered to be an open position for the remaining part (80%). Hence, the margin will be calculated as follows:

\[ 0.01 \times (4730 \times 50) \times 10 \times 0.20 \] + \[ 0.09 \times (4730 \times 50) \times 10 \times 0.80 \]

\[ = 4,730 \times 170,280 = \text{Rs. 1,75,010} \]

Total initial margin obligation is \[ = 2,12,850 + 1,75,010 = \text{Rs. 3,87,860} \]

[A word of caution: You may note that if the future prices move against the operator, he may loose a part of or whole initial margin in a very short period of time.]
Chapter 7

Regulatory structure and investors’ protection in Index Futures

Index futures in the Indian Capital market are introduced under the auspices of the Securities and Exchange Board of India (SEBI). Both the premier exchanges of the country i.e. BSE and NSE have started trading in derivatives with Index Futures on June 9 and 12, 2000 respectively.

While operating in the market, we should be clear about division of regulatory responsibilities between the exchanges and SEBI. In the derivatives business, the exchanges are envisaged to operate as competent and effective Self Regulatory Organizations (SROs). They, being in touch with the day-to-day market, are in a better position to spot the problems and take immediate corrective actions. Role of SEBI is limited to provide the overall supervision and guidance to exchanges and to act as the regulator of last resort.

Broadly speaking, SEBI has three points regulatory agenda for the derivatives market:

- To ensure the financial integrity of the market,
- Creation of an open, fair, competitive and equally accessible market to all, and
- Protection of Investors’ interest.

Financial integrity of the market is ensured through adequate margining (initial and daily margins) on open positions of the operators. The concept of value at risk is being used to calculate the required levels of initial margin. Further, daily settlement margins are collected on all open positions on day-to-day basis. Daily settlement margins are collected only in cash and are deposited by the members of the clearing corporation/ house before the markets open for trading on the very next day.

This crafted robust risk management system would ensure that any failure of client/member does not have any cascading effect on the market as a whole.

(For details on margining, please refer to chapter 6).

Other provisions created to accomplish the second and third objectives, enumerated above, are elaborated below:

- Settlement of all the derivative trades is guaranteed by the clearing corporation/ house of the derivative exchange/ segment of the exchange. Separate settlement guarantee fund for derivatives segment (independent of the cash segment) has been created by the exchanges to ensure the timely settlement of all the trades in the market.
• Investors protection fund for the derivatives segment (independent of the cash segment) has been created by the exchanges to protect the interest of the investors in the derivatives market.

• Compulsory collection of the daily margins by clearing corporation/house from its members before the opening of the market on the next trading day is required, to ensure the financial integrity of the system.

• Availability of the risk disclosure document to each investor/client at the time of his signing the agreement with the broker to operate in the derivative segment/exchange, to facilitate the availability of the information on the risks involved in the derivatives trades, to him.

• Certification requirement for all the approved users/authorized persons and sales persons of brokers (Trading members) to ensure that intermediaries possess minimum required knowledge on the subject.

• Provision of redressal of investors' complaint and arbitration by exchanges from all the four regions of the country to ensure the easy access to the redressal mechanism to the investors and quick solutions to their problems.

• Dissemination of index related information (prices and trades) on-line through at least two information vending networks to enable the investors to take an informed decision.

• Contract note issued to the client bears the order entry time, order execution time and execution prices to ensure the transparency in the operations of the intermediaries.

• Trading by broker members on their personal account is totally segregated from that of their clients. Clearing corporation/house segregates the client/clients' and broker's initial margins. A client's money cannot be utilized by clearing corporation/house to make good the default by broker himself or by his other client/clients. This would provide the complete protection to the clients' money paid as initial margin to the broker.

• Derivative exchange/segment and clearing corporation/house continuously monitors the position of the broker members at both the cash and derivatives segment to deter any price manipulation attempt.

Therefore, the main responsibility of the regulations in the derivatives business is casted upon the exchanges, with SEBI having the overall regulatory responsibility. This division of regulatory responsibility is undertaken with an objective to have multi-fold advantages of flexibility in regulations, maximum regulatory effectiveness and minimum regulatory cost.
Further, we may say that the operators have adequate protection for their money and have access to all the information relevant for their trading decisions in derivatives market. But, this all works as supplementary to their being cautious while operating in the market.

**Notes**

1. Operators may note that all Acts, rules and regulations applicable to the securities trading would be applicable to the derivatives trading as well, as derivatives are defined as securities in the Securities Contract Regulations Act.

2. In case of any dispute/difference between the members and the clients arising out of the trading or in relation to trading/settlement, the party/parties thereto shall resolve such claim, complaint, dispute or difference by arbitration procedure as defined in the rules, regulations and/or bye-laws of the respective exchanges.

**Problems:**

Select true or false of the following statements-

1. The concept of value at risk is being used to calculate the required levels of initial margin in index futures market (T/F).

2. Daily settlement margins on index future positions are collected by the Clearing Corporation/House only in cash (T/F).

3. Settlement of all the derivative trades is guaranteed by the clearing corporation/house of the derivative exchange/segment of the exchange (T/F).

4. Contract note issued by the broker to the client bears the order entry time, order execution time and execution price/prices (T/F).

5. Trading by broker members on their personal account is totally segregated from that of their clients (T/F).

*(For answers, please refer to page number 55)*
Chapter 8

Barings episode – Learnings for the market

With introduction of index options, derivatives market is all set to shift to a multi-product environment from a single product market. At this juncture, it would be prudent to revise the learning from Barings experience to prevent the occurrence of similar episodes in Indian Market.

Options are leveraged products used by market participants to manage the risk in the underlying market. Many people have the perception of options being very risky. This sort of perception is created by the well-publicised debacles like Barings. At this juncture, when options are being introduced in the Indian Capital Market, it would be prudent to revise the learning from the Barings’ experience to prevent the occurrence of similar events in Indian Market.

Barings Episode

The man behind the debacle, Nicholas Leeson, had well established track record of being a savvy operator in the derivatives market and was the darling of the top management at the Barings’ headquarters at London. He was the head - derivatives trading, responsible for both trading and clearing functions of Barings Futures, Singapore (BFS), a subsidiary of Barings Plc., London.

Leeson engaged himself in proprietary trading on Tokyo Stock Exchange Index, Nikkei 225. He was operating simultaneously on Singapore Exchange – Derivatives Trading Ltd., (SGX – DT) (erstwhile Singapore International Monetary Exchange, SIMEX), Singapore and Osaka Securities Exchange (OSE), Japan in Nikkei 225 futures and options. A major part of Leeson’s trading strategy involved the sale of options on Nikkei 225 index futures contracts. He had sold large number of options straddles (a strategy that involves simultaneous sale of both call and put options) on Nikkei 225 index futures. As we discussed in previous chapters that this straddle position results in loss, if market moves in either direction (up or down) drastically. His strategy amounted to a bet that Japanese Stock Market would neither fall nor go up, substantially i.e. he had the stable price perspective towards Japanese Market.

The Japanese stock markets started falling on the news of a violent earthquake in Kobe, Japan. With futures on Nikkei 225 going down, his straddle position started incurring loss. In pursuit of profit from his straddles, he started supporting the index by building up extraordinarily huge long positions in Nikkei 225 futures on both the said exchanges SGX – DT and OSE. However, the management of Barings was made to understand that Leeson was doing Nikkei 225 index futures arbitrage between SGX-DT and OSE.

When OSE authorities warned him about his huge long positions on the exchange in Nikkei 225 futures, he claimed that he had built up exactly opposite positions in Nikkei 225 on SGX - DT i.e. if his positions in Nikkei 225 at OSE suffer losses, these losses
would get compensated by the profits of his positions at SGX - DT. Similar impression was given to the SGX - DT authorities, when they enquired about Leeson’s positions.

Leeson kept giving misleading information to both the exchanges and neither of the exchanges bothered to crosscheck Leeson’s positions on the other exchange because they were competing for business in Nikkei 225. Both the exchanges were more concerned about the protection of their financial integrity than anything else and so, allowed even the exceptionally large positions to Leeson after securing adequate margins.

The result is known to everyone. Single operator could not take the market in his desired direction and market fell down drastically. Resultantly, Barings blasted by registering losses on Leeson’s both futures and straddle positions. But, we may see that its fire did not touch the financial integrity of either of the markets, SGX – DT or OSE because markets were absolutely safe through proper margining.

**Issues behind the debacle & learning from the experience**

1. **Single operator can’t move the market:** Leeson was trying to drive the prices in upward direction by buying index futures on Nikkei 225, but could not succeed as market was gripped in the negative sentiments generating from earthquake in Kobe. The point here is that single operator can not change the direction of the market and it is always prudent to live with the market movement, strategically. In the instant case, better strategy for Leeson would have been the dynamic management of his portfolio. For instance, with decreasing value of index, his put leg of the straddle started incurring losses (call was to expire worthless), and he had the choice to square his put options off at the pre-determined level (cut off loss strategy). Leeson, instead of squaring off his short put option position chose to support the index price through buying futures on Nikkei 225 and failed.

2. **Traders should have clearly defined and well-communicated position limits:** Position limits mean the limits set by the top management for each trader in the trading organisation. These limits are defined in various forms like with regard to a product, a market or trader’s total exposure in the market etc. Any laxity at this front may result in unbearable consequences to the trading organisation. These limits should be clearly defined and well communicated to all traders in the organisation.

3. **Meticulous monitoring of the position limits is must:** We may note that Leeson too had position limits set by the top management, but, he crossed all of them. This attempt of outpacing limits by Leeson did not come to the notice of top brass at Barings as he himself was supervising the back office operations at BFS. It is understood that he had sent fictitious reports concerning his trading activities to the Barings’ headquarters in London. Had the top management known the real position, probably, the disaster could have been avoided.

Therefore, scrupulous monitoring of the position limits is as important as setting them. Top management’s job of monitoring the positions of each dealer in the dealing room
may be facilitated by bifurcating the front and back office operations. Different people should be in charge of front and back office operations so that any exposure of dealers, over and above the limits set for them, can be detected immediately. This is the issue of having proper checks and balances at various levels to ensure that everyone in the organisation has disciplinary approach and work within the set limits. In fact, trading systems should be capable enough to automatically disallow traders any enhancement in their exposures as soon as they touch their pre-determined limits.

4. Exchanges should compete professionally: Both the competing exchanges SGX – DT and OSE were not concerned about checking Barings’ position at the other exchange. Well, both the exchanges were safe through margins, but everyone would appreciate that the effect of a big failure, like Barings, goes much beyond the financial integrity of a system. The Point is that the Exchanges should compete but at the same time co-operate and share the information, which may shake the entire financial system. Further, it is important from the point of view of deterring any price manipulation effort, which a member of two exchanges can make by using two independent systems.

5. Big Institutions are as prone to risk as individuals: One broad issue from the overall market’s perspective is that big Institutions are as prone to incurring losses in the derivatives market as any other individual. Therefore, irrespective of the entity, margins should be collected by the Clearing corporation/ house and/ or exchange that too on time. Only, timely collection of the margins can protect the financial integrity of the market as seen in the Barings case.

Above-mentioned points 1 to 3 are relevant to the trading organisations in derivatives market. They have to intelligently work in-house to avoid any mishappening like Barings at any point in time. Point 4 is relevant to the exchanges and they should work in collaborative manner and improve inter exchange communication and co-ordination. With regard to the point 5, SEBI has done a good job in the Indian derivatives market by making margins universally applicable to all categories of participants including Institutions. This provision will go a long way to create a financially safe derivatives market in India.

Conclusion

In view of the above, we may summarise Barings episode by stating that “Barings’ failure was not the derivatives failure, it was management’s failure”. After the enquiries in Barings case, the Board of Banking Supervision’s report also placed responsibility for the Barings’ debacle on poor operational controls at Barings rather than the use of derivatives. Important learning from the entire episode is that we all have to have a disciplinary and self-regulatory approach. The moment, we go against this fundamental rule, this leveraged market may threaten our very existence and reduce us to absolute ashes.
Chapter 9

Getting started to trade index futures

Registration with the broker

When you decide to trade in the derivatives market, pre-requisite is to choose a broker and get yourself registered with him/her. Make sure to deal with SEBI registered intermediaries only. Do sign the agreement with your broker and take your unique identification number (ID). This identification number would be keyed in the system at the time of broker placing the order on your behalf. This ID is broker specific i.e. if you choose to deal with different brokers, you need to sign the agreement with each one of them and resultantly, you would have different IDs.

In futures market, brokers are required to give a risk disclosure document to their clients when they enter into an agreement with him/her to trade in the derivatives market. Do insist upon the receipt of risk disclosure document from your broker. Read this risk disclosure document carefully to understand the risks involved in the derivatives trading before committing any position in the market.

Placing order with the broker

Do insist upon the trade/order confirmation slip from your broker. The trading system automatically generates a unique order identification number at the time of order entry itself. Every trading member is required to specify buy or sell orders as either an open order or a close order.

Open/close orders

Buy or sell order is open order when new positions are being created. These orders would be close orders when by virtue of execution of these orders, existing positions get closed. For instance, when you place the first order to buy say two, 1 month future contracts, it would be treated as open buy. But, when with this long position (outstanding purchase position) in two, 1 month contracts, you place order to sell two, 1 month contracts, it would be treated as close sell order. Therefore, we may say:

- Opening a position means
  - Buying a contract with nil position or existing long position.
  - Selling a contract with nil position or existing short position.

- Closing a position means
  - Buying a contract with short position.
  - Selling a contract with long position.
[Long position means outstanding/unsettled purchase position; short position means outstanding/unsettled sell position; either long or short position is called open position].

You should also ask for the contract note from your broker. This contract note should be time (order receipt and order execution) and price stamped. Execution prices, brokerage and other charges, if any, should be separately mentioned in the contract note.

If desired, you may change your order anytime before the same is executed on the exchange.

Problems:

1. Opening a position means

   a. buying a contract with nil position or existing long position.
   b. selling a contract with nil position or existing short position.
   c. buying or selling a contract with nil position.
   d. None of the above.
   e. All a, b and c.

2. Long position means

   a. outstanding purchase position.
   b. outstanding sales position.
   c. either outstanding purchase or sell position.
   d. None of the above.

(For answers, please refer to page number 55)
Chapter 10

Important terms in the derivatives market

American option. An option exercisable anytime on or before a specified date.

Arbitrage. Simultaneous purchase of one asset against the sale of the same or equivalent asset, from zero initial wealth, to create a riskless profit due to price discrepancies.

Backwardation. This occurs when the spot price exceeds the current price of a futures contract. This is opposite to contango.

Basis. Basis is defined as the difference between the cash and future prices i.e.

\[
\text{Basis} = \text{Cash price} - \text{Future price}.
\]

If future price of an asset is higher than its cash price, basis for the asset is negative. In contrary, if cash price of an asset is higher than its future price, basis for the asset is positive. For example, if cash BSE sensitive index is at 5500 level and 3 months future is trading at 5800, basis is negative 300 points. Similarly, if future index is trading at 5200, basis is positive 300 points.

Basis for one month contract would be different from the basis for two or three month contracts. Definition of basis is incomplete until we define the basis viz a viz a futures contract i.e. basis for one month contract, two months contract etc.

Negative basis reflects the upward expectations about the market i.e. cash market is expected to go up in future. In contrary, positive basis shows the downward expectations about the market i.e. cash market is expected to go down in future.

With change in the expectations of the market, futures contract, which is trading at 5200 may turn to 5600 or vice versa i.e. positive basis may become negative or negative basis may become positive anytime during the life of the contract with change in the expectations of the market.

Further, whatever the basis is, positive or negative, it turns to zero at maturity of the futures contract i.e. there can not be any difference between one month future price and cash index at the time of maturity/expiry of this one month contract.

We must understand that when current price of December 2000 BSE sensitive index futures contract is 5000, it means market expects the cash index to settle at 5000 at the closure of the market on last Thursday of Dec. 2000 (last trading day of the contract). Today, every operator in the market is trying to predict the cash index at a single point – at closure of the market on last trading day of the contract. As the futures price is the expected cash price, both futures and cash indices converge at maturity/expiry of the futures contract.
Indeed, on last day of trading of the futures contract, closing cash market prices are taken as settlement prices to close/settle all open positions at the maturity/expiry of the contract.

**Bear market.** A market in which prices are falling.

**Beta.** A measure of sensitivity of the movement of a security or portfolio viz a viz stock market as a whole. It is a measure of systematic risk.

**Broker.** A person who acts as an agent for others in buying and selling future contracts in return for a commission.

**Bull market.** A market in which prices are rising.

**Calendar spread.** The simultaneous purchase and sale of future contracts for different delivery months on the same asset. It is also called intracommodity spread/ horizontal spread or time spread.

**Call option.** An option that gives the option buyer a right to buy.

**Cash market.** Cash market is synonymous with the spot market. It is a market where the asset, underlying futures/option contracts, is traded.

**Cash Settled Derivative Contract.** A derivative contract that is essentially settled in cash i.e. only the difference between the buy/sell and the settlement price is given to or taken from the operators. These contracts are designated as cash settled contracts.

**Clearing corporation/house.** An organization connected with a futures exchange through which all contracts are settled. Its function is to manage the margins, delivery systems and to guarantee the settlement of all the trades taking place on the exchange.

**Clearing member.** A member of the clearing corporation/house.

**Closing buy transaction.** A buy transaction, which will have the effect of partly or fully offsetting a short position.

**Closing sell transaction.** A sell transaction, which will have the effect of partly or fully offsetting a long position.

**Contango.** This exists when the spot price is less than the current price of a futures contract. This is opposite to backwardation.

**Contract month.** Month in which a future/option contract will be finally settled. It is also called expiration month.
**Contract multiplier.** The monetary value, which is multiplied by the index value to determine the market value of the futures contract in rupee terms.

**Contract specification.** Salient features of the futures contract to be traded on the exchanges, e.g. contract multiplier, trading time, delivery procedures etc.

**Convergence.** The movement to equality of the spot and futures prices as the expiry of futures contract approaches.

**Counterparty.** The other party (buyer or seller) to a transaction.

**Counterparty risk.** The risk that the counterparty will not fulfil the terms of the contract. This is also called the credit risk or default risk.

**Cross hedge.** Hedging the risk in one asset by initiating a position in a different but related asset.

**Day order.** An order to trade futures contracts that automatically expires, if not executed, at the end of that day’s trading session.

**Day trades.** Trades that are opened and closed on the same day.

**Default risk.** See counterparty risk.

**Derivative contracts.** The term derivative indicates that it has no independent value i.e. it derives its value from some underlying. Underlying can be securities, commodities, bullion, currency, live stock or anything else. In other words, Derivative means forward, future, option or any other hybrid contract of pre determined fixed duration, linked for the purpose of contract fulfillment to the value of specified real or financial asset or index.

**Expiration day.** The day on which any futures contract (or option) ceases to exist. It is the last trading day of the contract.

**European option.** An option exercisable only on a specified date/ at its maturity.

**Far contract.** Future contract with the longest maturity.

**Forward contract.** Forward contract is a one to one bipartite contract, which is to be performed in future at the terms decided today.

**Front running.** Brokers trade on their own behalf, ahead of their customers’ orders.

**Futures contract.** A legally enforceable, exchange traded standardized contract that represents an agreement to buy or sell a quantity of asset at a predetermined delivery date.
**Futures option.** An option written on a futures contract.

**Hedge.** A mix/blend of spot asset and futures position that reduces risk.

**Hedging.** The purchase or sale of futures contracts to offset possible changes in the value of assets or cost of liabilities currently held, or expected to be held at some future date.

**Horizontal spread.** See calendar spread.

**Index fund.** An investment portfolio that aims to replicate/clone the performance of a chosen market index.

**Index option.** An option written on a stock index.

**Initial margin.** It is ‘good faith’ deposit of cash or securities, which a user of futures markets must make with his or her broker when purchasing or selling futures contracts, as a guarantee of contract fulfillment.

**Insider trading.** Dealing on the basis of inside information.

**Intercommodity spread.** The simultaneous purchase and sale of future contracts in different commodities/assets.

**Kerb trading.** Unofficial trading when the market is closed.

**Limit order.** An order to buy or sell at a specific price (or better), to be executed when and if the market price reaches the specified price. It is also called market-if-touched order.

**Limit order book.** A list of the outstanding limit orders.

**Liquidation.** Any transaction that offsets or closes out a previously established long or short position. It is also known as covering or offsetting.

**Liquidity.** The degree to which a market can accommodate a large volume of business without moving the prices substantially.

**Long.** Outstanding/unsettled purchase position. It is opposite to short.

**Long hedge.** A hedge involving a long futures position.

**Margin.** A deposit of funds and securities to provide collateral for an investment position. See initial and variation margins.

**Margin call.** A request for the payment of additional funds into a person’s margin account.
Market capitalization. Market capitalization of a company is calculated by multiplying the outstanding number of its shares by its share price. Market capitalization of an exchange is the total market capitalization of the scrips listed on it.

Market order. An order to buy or sell immediately at the best obtainable price.

Market risk. The possibility of loss on investment due to movements in the general level of the market.

Marking to market. The daily revaluation of open positions to reflect profits and losses based on closing market prices at the end of trading day.

Maturity. The length of time to expiry of contract.

Minimum price movement. The minimum possible difference between two quotes of similar nature i.e. buy-buy or sell-sell, allowed by exchange. It is also called tick size.

Near contract. Futures contract with the shortest maturity.

Net position. The difference between long and short open positions in any one future contract, held by an individual/operator.

Novation. The legal word for the conversion of a futures contract between a buyer and a seller into two separate contracts, each with the clearing corporation/house as counterparty.

Offset. See liquidation.

Open interest. Open interest is a crucial dynamic measure of the derivatives market. It reflects the hedging interest of operating community in the product. It is calculated as the number of outstanding/unsettled positions in the market as a whole at a specific point in time. As total long positions for the market would be equal to total short positions, for calculation of open Interest, only one side of the contracts is counted. Worldwide, open interest in various contracts is disclosed on-line, by the exchanges.

Open positions. Any long or short position in the market.

Opening buy transaction. Means a buy transaction, which will have the effect of creating or increasing long position.

Opening sell transaction. Means a sell transaction, which will have the effect of creating or increasing short position.

Option buyer/holder. One who buys the option. He has the right to exercise the option but no obligation with regard to the contract.
**Option contract.** Option is a right given by the option writer/seller to the option buyer/holder to buy/sell the underlying asset at a predetermined price within or at the end of a specified period.

**Option premium.** Price for option/right paid by the option buyer to the option seller. Irrespective of the exercise of option, this is retained by the seller.

**Option writer/seller.** One who writes/sells the option to option buyer. He has the obligation to perform the contract, if option buyer desires so.

**Over-the-counter market.** A market where trading does not take place at an organized exchange.

**Perfect hedge.** A hedge where the change in the value of the futures contracts is identical to the change in the value of the hedged asset or liability.

**Physical delivery.** Settlement of a futures contract by the supply or receipt of the asset, underlying the contract.

**Position.** A market commitment.

**Position limit.** A restriction on the maximum number/amount of contracts that can be held by a single operator at any point in time.

**Price limits.** Maximum and/or minimum price limits specified by the exchange, for the movement of securities’ price during a single trading session.

**Price range.** The difference between the highest and the lowest prices during a given period.

**Put option.** An option, which gives the option buyer a right to sell.

**Risk disclosure document.** A document, which explains the risks inherent in the derivatives trading.

**Settlement.** The process by which clearing members settle their positions.

**Short.** An outstanding/unsettled sold position. It is opposite to long.

**Short hedge.** A hedge involving a short futures position.

**Speculation.** Trading on anticipated price changes, where the trader does not hold another position that will offset any such price movements.

**Spot market.** See cash market.
**Spot price.** Cash/spot market price of a commodity/asset.

**Spread.** The simultaneous purchase of one futures contract and sale of another, in the expectation that the price relationship between the two will change so that the subsequent offsetting sale and purchase will yield a net profit.

**Spread margin.** A reduced margin payment for the holder of a spread position.

**Stop order.** A market order to buy when the market price has touched a specified level above the current price, or a market order to sell when the market price has touched a specified level below the current price. It is also know as stop-loss order. This is opposite to market-if-touched order or limit order.

**Strike price.** Strike price is the price at which the commodity/security/currency/any other underlying is contracted to be bought or sold in an option contract. It is also called exercise price.

**Systematic risk.** A component of price risk in securities generated by the general movement of market. This risk cannot be reduced through diversification. It is measured by beta value of a security.

**Tick size.** See minimum price movement.

**Time spread.** See calendar spread.

**Trading cycle.** A period, as notified by the Exchange/Derivative Segment of the exchange from time to time, during which the contract will be available for trading.

**Trading limit.** The maximum number of contracts that an operator can trade in a single day.

**Trading member.** A member of the Derivative Exchange/segment.

**Underlying asset.** An asset like security, stock, commodity, live stock or index on which a futures/option contract is based.

**Unsystematic risk.** A component of price risk of securities generated by company and industry related factors. This risk can be reduced to a large extent by holding a well-diversified portfolio.

**Variation margin.** The gains or losses on open contracts, which are calculated with reference to the settlement price at the end of each trading day and are credited or debited by the clearing corporation/house to the clearing member’s margin accounts. Clearing members in turn credit/debit the appropriate customers’ margin accounts.
**Volatility.** A market is volatile when it is changeable and lively. Volatility of a variable is generally measured by its variance.

**Volume.** Volume provide the static picture of the market with regard to a specific contract, over a period of time; volume during the day, during the week or during the life of the contract. Different markets worldwide define the volume in different ways. Some define that in terms of the number of contracts traded during a specific period of time; some define that in terms of the value of these contracts traded. Further, some exchanges count both the legs of the contract (buy and sell) in volume and some count only one leg. Therefore, you should be clear about what you are looking at while toying with the numbers on volume.
Answers to the Problems

Chapter 1: 1-d, 2-a, 3-e, 4-d, 5-a

Chapter 2: 1-b, 2-b

Chapter 3: 1-c, 2-b, 3-d

Chapter 4: 1-d, 2-c, 3-a, 4-b, 5-c, 6-c, 7-a, 8-a, 9-b, 10-b

Chapter 7: 1-True, 2-True, 3-True, 4-True, 5-True

Chapter 9: 1-e, 2-a
Important dos in the derivatives market

- Insist on the risk disclosure document from your broker while entering into an agreement with him. Read this document carefully to understand the risks involved in the derivatives, because, understanding of the risks involved in the products/mechanisms will facilitate your decision making.

- Don’t be carried away by the persuasion of the broker/selling agent. Take your decisions independently and discreetly. Be doubly sure about the suitability of the product/products/contracts to you before placing any order.

- Derivatives trading inherently involves high leverage and so gives a temptation to speculate. Do analyze the risks involved in the product/position and your capability to absorb that risk before placing any order.

- Seek advice from an expert, if required, before committing any position in the market.

- It is advisable to operate with single broker. Do ask for his registration details with SEBI to ensure that you are dealing with the SEBI registered intermediary.

- Do ask for trade/order confirmation slip and/or contract note from your broker.

- Maintain the records of all your communication with your broker to resolve any dispute which may arise out of your dealing with him/her.

Disclaimer clause

This book is designed to impart the basic knowledge on derivatives trading to the operators in the market. Readers may appreciate that this book cannot cover all the dimensions of futures trading; therefore, they are advised to refer to specific material on the subject, including relevant acts, rules and regulations for exact details and clarifications before committing any position(s) in the market. While every effort has been made to ensure the accuracy of information contained in this book, the authors assume no liability for any error or omission.