



INTRODUCTION OF INDEX FUTURES

Dr. Soumitra Chandra
Associate Professor in Commerce
Veer Bahadur Singh Government Degree College,
Campierganj, Gorakhpur

I. Introduction

A derivative is a financial instrument whose value is benchmarked to another underlying asset, such as a market index, a stock, a commodity, or an interest rate. Derivative products can be in form of futures, options, and swaps, and they have grown to become important tools for portfolio diversification, price discovery, and risk hedging. With economies developing and financial systems becoming increasingly sophisticated and linked globally, the analysis of such parallel markets has become significant. The current study is centred on index futures. A futures contract is an agreement to make an exchange in the future. It does not necessarily involve an exchange of assets in the future; for instance, in the case of index futures, the buyers and sellers of the index settle (or square off) their positions by taking offsetting positions (Beckett and Roberts, 1990). Close to expiration, futures traders may close their positions by squaring off (i.e., by taking a position opposite to the initial one), by physical delivery, or by paying the difference between the futures price and the spot price of the underlying asset. They play a significant role in the market as information is expected to flow from one market (futures) to another (spot). However, these financial instruments are ill famed by the due to the use of speculators. Examining the relationship between index futures and their underlying markets could provide valuable understanding the dynamics of the two markets (Antonioni et al., 2005).

The issue pertaining to the impact of index futures on the volatility of the underlying spot market has been a matter of focus for researchers and policy makers. This is primarily due to the surrounding index futures in the context of several stock market crashes, such as US market crash of 1987, the US flash crash in 2010, and the Indian stock market crash in 2008 (discussed in Section IV). Critics point out that wild, volatility-inducing price swings have occurred in the underlying markets on the expiration day of certain futures. Such expiration-day volatility occurs when stock index arbitrageurs holding cash positions that are related to futures positions unwind their positions at the termination of trading in futures contracts (Edwards, 1988a).

Objective of this paper is to :

1. Examine the theoretical aspects of index futures;
2. Examine the risk element in index futures;
3. Examine the uses of Index based derivatives;
4. Discuss the regulatory and policy implications;
5. Concludes the discussion.



I. Index Futures :

An index is in one sense just a number. A stock index is a number that is computed in order to measure the value of a portfolio of stocks. A stock index is calculated as weighted average of the prices of a particular basket of stocks. Typically the weight of each stock is the value of its outstanding shares, divided by the total value of shares outstanding of all the shares included in the basket. Stock index contracts are not based on a readily deliverable physical commodity or currency or negotiable deposit instrument, but on a concept. The concept is of a mathematically measurable index based on the market movement of a predetermined number of equities. Stock index contracts can be divided into two main types such as: stock index futures (SIFs) and stock index options (SIOs).

Before starting to SIFs let us have a brief discussion on financial futures. Financial futures contract can be defined as, a standardized agreement to deliver or receive a specified amount of a specified financial instruments at a predetermined price and date. Futures are traded in organised exchange, which establish and enforce rules for such trading. Brokers act as intermediaries. A clearing house facilitates the trading process by recording all transactions and guaranteeing timely payments on futures contract. Only the members of a futures exchange can engage in futures transactions on the exchange floor. Traders who request financial futures transaction are required by the exchange to establish a margin deposit with their respective brokers before the transaction can be executed. Futures trading hedging facilities is to protect investments against unpredictable price fluctuations over time. It facilitates arbitrage over space and time that ultimately integrate price structure in underlying assets.

SIFs are futures contracts on a specific stock index. SIFs are meant for hedging and speculation on the general level of stock market prices. These contracts are settled only in cash. Here actual delivery is not possible. the investor simply closes out (or reverse) his position prior to the settlement date. If he doesn't, his account is automatically credited with gain or debited with his losses and the transactions is completed. As other futures contracts the trader's account is adjusted daily to reflect the gains and losses, which is known as marking to market.

The SIFs were introduced in the USA in 1982 with the Commodity Futures Trading Commission (CFTC) approving the introduction of Kansas City Board of Trader's proposal. This resulted in the beginning of trading in the Kansas city Value Line Index Futures (KCVLIF) on 24th February 1982. This was almost immediately followed by the launch of the S&P (Standard and Poor's) 500 index future on the Chicago Mercantile Exchange (CME) in April, and in May the New York Futures Exchange (NYFE) started trading in the New York Stock Exchange Composite Index Future (Millers 1992 p-5). The key SIFs contracts are, the S&P 500 futures index traded on CME, the S&P 100 futures index traded on CME, the NYSE composite futures traded on the NYFE, and the KCVLIF traded on the KCBT (Hirt&Block,1986 p-460). A list of index contracts prevailing in the world market is given in Annex-1. In India the index futures contracts are introduced in two major exchanges those are Bombay Stock Exchange (BSE) and



National Stock Exchange (NSE). The indices on which the trading is allowed are BSE Sensex and NSE-50.

BSE sensitive index number of equity prices (SENSEX) is the most widely used and accepted equity price index in the country. With the base year as 1978-79, it comprises of 30 scrips from the specified and non-specified categories of listed companies on the BSE. The NSE-50 index, NIFTY was launched by NSE of India in April, 1996. It took the closing prices of November 3, 1995 when one year of operations of its capital market segment was completed (Vohra & Bagri, 1998). Thus in India the underlying indices for SIFs are Sensex and Nifty. It is of great help when one wants to bet on the movements of the market. Suppose he feels that the market is very bullish and the Sensex will go high. Here he need not buy the shares that make up the index, rather by taking a position on the index future he can buy the entire market and thus take the advantage of Sensex movements. The investor could either take long¹ or short² position similar to individual shares.

SPECIFICATIONS ON INDEX FUTURES:

A typical index futures contract specifies the asset, the contract size or the amount of asset or its value, the daily price movement limits and the margins that have to be maintained. Since the underlying asset i.e; the index cannot be purchased delivered, the settlement is thus made in cash. Securities Exchange Board of India (SEBI) has recommended a minimum contract value of Rs.2,00,000, a minimum lot size for each BSE Index Futures as 50 and for Nifty Futures as 100. Suppose futures price is 4600 and the minimum lot size is 50, the value of a minimum 50 BSE index futures will be 2.3 Lakh. Hence, an investor would be required to keep a minimum exposure of Rs.2.3 Lakh if he wants to take a position on Sensex futures.

Role of the Exchange: The stock exchange acts as the market maker in case of index futures by offering two-way quotes for buying and selling the index. The exchange will clear the trades daily and match the deals. It reconciles sales and purchases and keeps account of margin payments. The clearinghouse of each exchange will stand between each counterpart of a futures contract to ensure that every contract is honored.

Margins: Margin money is required to be deposited by the investor with his broker or the exchange to mitigate the default risk. The payment of margins ensures that the risk is limited to the previous day's price movement on each outstanding position. Thus it acts like a security deposit or insurance against a future loss of value. Futures trading involve daily settlement of all positions. Every day the open positions are marked to market based of the closing level of the index.

The profit or losses on the index future contracts are settled each day. Let, the investor have bought 50 Sensex futures at 4600 on day 1 (value of the contract is Rs.2,30,000) and the closing value of the contract became (4550.50)Rs.2,27,500. This loss of Rs.2500 at the end of day 1 must be met by further margin payment which is collected daily basis in addition to the initial margins. In case the closing value became 4650.50=Rs.2,32,500, the investor (margin) account



will be credited by the notional profit of Rs.2,500. As a result the risk of trading in derivatives is much less than the normal market due to its feature of marked to market.

Closing of Contracts: Since an index cannot be delivered, its futures contract is settled only by cash, not on physical delivery. Here only the difference between the contracted value and the closing index value is settled, depending on whether one has made a profit or loss. For fulfillment of the contract, the investor who had bought the index earlier, would be required to sell at that day's futures price. In case he had sold earlier, he would need to buy back. He would close out his existing buy or sell position and the difference between the buy and sell prices would be his gain or loss. If the contract is held until expiry then the open positions are closed of the last day of trading at a price determined by the spot "cash" value of the index.

Value/pricing of Index Futures: The value of a SIFs may be obtained by using the cost of carry model. In general the futures price = spot price + cost of carry
Cost of carry is the equivalent of interest cost on the financing of SIFs minus the dividend return on the stocks. The cost of carry depends upon on the opportunity cost, cost of storage, insurance etc. Hence in general the futures price is greater than the spot price. The Difference between the spot price and the futures price is called the basis.

Let us assume the financing rate is 11per cent and an average stock yield of 4.5 per cent from the BSE-30Sensex, then at an index level of 4700; the basis and fair value of the Sensex future three months to expiry, can be calculated as follows:

$$\text{Financing costs} = \frac{4700 \times 11 \times 3}{100 \times 12} = 129.5 \text{ points}$$

$$\text{Dividend paid} = \frac{4700 \times 4.5 \times 3}{100 \times 12} = 52.87 \text{ points}$$

$$\text{Basis is} = 129.25 - 52.87 = 76.38 \text{ points}$$

So fair value for the futures contract would be $4700 + 76.38 = 4776.38$

II. Risk Element in Index Futures :

The issue here relates to the case where rational investors dominate the activity at the futures' level. From a theoretical viewpoint, rational investors are attracted to the futures' markets due to the low transaction cost here investors only have to put up a small fraction of the value of the contract as margin. Thus, investors can trade a much larger amount of the asset instead of buying it outright. Low transaction costs facilitate investors' participation and brings higher liquidity, and this is a favourable condition for the participation of rational traders in any market, as it guarantees their ability to enter and exit their positions as and when required. If rational traders end up dominating index futures, their high quality information would be transmitted to the spot market segment through an alternative channelling route (i.e., the futures



market), something that is very necessary to increase the market efficiency (Cox, 1976). However, this also implies that the flow of information from the futures market to the spot market would increase, leading to a rise in the volatility of spot prices (Ross, 1989). From a practical perspective, such an increase in volatility should be welcome, since the dominance of rational investors in futures markets would suggest that any deviations from the fundamentals at the spot level would be arbitrated away, leading to greater stabilisation in capital markets. Another positive effect of this is that the domination of the futures markets by rational investors will lead to a boost in the liquidity of spot markets, thus reducing market frictions (e.g., thin trading) at the spot level. The problem with the hypothesis that volatility increases post-futures because of rational investors is the limitations encountered in actual practice. Although arbitrage is attained through index futures, it may be the case that a market's institutional framework produces obstacles to its smooth practice. It could be, for instance, that there are restrictions in futures trading that limit the activities of those trading in the futures markets. It may also be the case that the spot market is dominated by noise traders for a prolonged period of time, thus rendering any correction of spot prices through futures harder to attain. Empirical evidence for the increase in volatility following the launch of index futures due to information-based trading has been provided in several studies. Antoniou and Holmes (1995) and Antoniou et al. (1998) documented an increase in spot volatility following the introduction of the FTSE 100 index futures contract for the London Stock Exchange. Their results were in line with those presented in Ross (1989), as the increase in volatility following futures trading was due to greater informational efficiency rather than destabilising speculation. Nagaraj and Kumar (2004) studied the impact of index futures trading on spot market volatility using the data from June 2000 to February 2003 of the S&P CNX NSE Nifty. They found that the increase in the spot market volatility was due to the market becoming more efficient and assimilating the information into its prices.

Derivative products are used either to hedge some pre-existing risk by taking positions in the derivative markets that offset potential losses in the underlying spot market, or for speculative purposes such as taking positions to profit from anticipated price movements. Volatility is an area of interest for regulators as well as investors, since excess volatility can increase the risk inherent in stock market returns. There are two components to stock market.

volatility: volatility arising due to information-based changes and volatility arising due to noise trading. In the former case, volatility increases due to the rise in the participation of informed investors who rationally process all fundamentals-related information and condition their trades upon it; in the latter case, volatility is the result of uninformed investors trading for reasons other than the fundamentals. This type of trading has been dubbed “noise trading” (Black, 1986; De Long et al., 1990), and involves any trading strategy based on non fundamental indicators, including for example, technical analysis and investor-sentiment. The presence of noise trading can cause prices to deviate substantially from fundamentals (De Long et al., 1990) and give rise to jump-volatility (Beckett and Sellon Jr., 1989), i.e., occasional and sudden extreme fluctuations (“shocks”) in prices. This is certainly of concern to regulators, since such shocks can lead to potentially destabilising outcomes—a highly volatile environment with abrupt price swings would result in a high probability of market bubbles and crashes.



III. USES OF INDEX BASED DERIVATIVES:

The motivation behind the use of stock index futures may be either to speculate or to hedge. A speculator may use SIFs in an attempt to make profit from major movements in the market. The speculator may have developed a prediction or conviction about the next move of the market, through utilizing fundamental or technical analysis which helps him to bet on the market movements.

Most important use of SIFs is for hedging purposes. Portfolio managers who believe that the market will decline, may decide to sell a part or all of the portfolio. But this involves a lot of problems. There are large transaction costs associated with the selling and then repurchasing it at a later point of time. It may be difficult to liquidate a position in certain securities those are thinly traded. Furthermore, there may be the same type of problem in reacquiring the stocks after the overall market decline is over. So, the portfolio manager may follow a more easily executed defensive strategy, which involves selling of one or more stock index futures as a hedge against the portfolio. If stock market goes down, the loss on the portfolio will be partially or fully offset by the profit on the SIFs contract, because they are bought back at a lower price than the initial sales price.

By using index futures portfolio manager can adjust their portfolio beta in keeping with the changes in the risk and return offered by the stock market. When they believe that the stock market will offer a relatively high expected return, for a given level of risk, they would increase the beta values of their portfolio. On the other hand, when they feel greater market risk, they would tend to lower their portfolio beta. The change in portfolio beta can also be effected by selling or buying a part of the portfolio and substituting them by risk free securities. But this may involve significant transaction cost.

There are a number of other uses of hedging with stock index futures besides protecting a long-term investment portfolio. These include:

- An investment banker or underwriter's work is to purchase stocks from the issuing company with the intention of reselling it in the public. Thus they are exposed to the market risk (I.e., fall of the potential resale price below the purchase price). To eliminate such risk, the underwriter could sell SIFs.
- In a retirement plan participant who has accumulated a large sum in an equity fund may feel a need to hedge his position with a SIFs contract in certain time, when liquidation is not possible.
- An investor may have accumulated a large return on a diversified portfolio in a given year. In order to maintain the profitable position, and to defer the taxable gains until the next year the futures contract may be employed.

In addition to the above uses the index derivative has certain added quality due to which it becomes the most desirable instrument for India. Stock index is difficult to be manipulated as compared to individual stock prices, and the possibility of cornering is reduced. This partly because an individual stock has a limited supply which can be cornered. Stock index can also



be manipulated by influencing the cash prices of its component securities. Possibility of such manipulation can be reduced by designing the index appropriately. Stock index being an average, is much less volatile than individual stock prices. This implies much lower capital adequacy and margin requirements in the case of index futures than in the case of derivatives on individual stocks. The lower margins will induce more players to join the market. Regulatory complexity is likely to be less in the case of SIFs than for other kinds of equity derivatives.

IV. AVAILABLE REGULATORY MEASURES :

The impact of the introduction of index futures on the underlying stock markets is of primary concern for regulatory agencies, exchanges, and investors. These newly engineered financial instruments play a crucial role in market completion and the price discovery process. But there is always a market risk involved with it. Lack of proper regulatory framework may lead to further market crashes like the dot-com bubble in 2000 and the US housing bubble and credit crisis (2007–2009). However, as was discussed earlier, volatility per se need not be detrimental, if its roots can be traced. Therefore, the issue here is to devise adequate policy to take into account not only volatility in itself, but also the sources underlying it.

The existing regulatory response includes a series of measures, such as transaction taxes, increased margins, and circuit breakers in order to curb volatility; the rationale underlying these measures is explained in below:

A) Transaction Taxes :

Stiglitz (1989) and Summers and Summers (1989) argued that transaction taxes help reduce noise trading (which is a significant source of price fluctuations), hence decreasing volatility. However, it has been observed that transaction taxes prevent instant price adjustment according to new information, and cause price jumps and higher volatility. Umlauf (1993) found that the introduction of (or increase in) transaction taxes in Sweden led to an increase in stock market price volatility. This issue is rather hard to assert either way, and is subject to speculation. In general, if trading taxes rise, those with less funds available for investment—traditionally, retail investors, who are according to Barber et al. (2009) the prime candidates for noise trading would be expected to refrain from frequent trading. From this perspective, therefore, increasing the cost of trading through higher taxes would lead to less noise in the markets, improving their efficiency and reducing volatility. The problem, however, is that transaction taxes are also unwelcome from the perspective of informed investors. They would view such taxes as a market friction disallowing their at-will trade, suggesting that they may end up not trading any time their information would urge them to do so (Romano, 2007).

Financial transactions taxes (FTT) are currently receiving considerable attention from policymakers. Advocates for FTTs claim that they will help raise revenue, discouraging speculation, and improve the informational efficiency of financial markets. Thus a prudent transaction tax should be levied so that it may not hurt the market players and maintain liquidity



in the market is sustained as well as it can able to curb excessive trading which may lead to volatility.

B) Increased Margins

Futures margins are like security deposits that ensure traders honour their contractual obligations. The US Securities and Exchange Commission (SEC) calls for higher margins on index futures as low margins lead to increased speculative trading (Edwards, 1988b). The smaller the margin in relation to the cash value of the futures contract, the higher is the leverage. As a result, a slight downward movement in the price of the futures contract will result in huge losses compared to the margin deposit. Thus, lower margins may contribute to an increase in concentrated institutional trading, resulting in greater price volatility. Higher margin requirements lead to higher transaction costs, and help to limit the volume of futures trading, reduce speculation, and increase market stability (Beckett and Roberts, 1990). However, it is not clear that less speculative trading will diminish the magnitude of price movements in either direction. Therefore, there is no reason to believe that higher margins will reduce price instability in either the stock or the futures markets. The only certainty is that they will impose higher costs on investors and traders, and reduce trading volume and liquidity.

C) Short Selling Restrictions:

Short selling is the selling of a stock that the seller doesn't own. More specifically, a short sale is the sale of a security that isn't owned by the seller, but that is promised to be delivered. The shares are sold and the proceeds are credited to the account. Sooner or later seller must "close" the short by buying back the same number of shares (called "covering") and returning them to the broker. If the price drops, seller can buy back the stock at the lower price and make a profit on the difference. If the price of the stock rises, the seller have to buy it back at the higher price, and lose money. Under normal market conditions, short selling contributes to price efficiency and adds liquidity to the markets. However, during crisis like market crash the policy makers can ban short selling transactions. By doing this speculative selling in stock market can be stopped. it helps to stabilise the market from further decline. Unrestrained short selling contributes to sudden price declines in securities that are unrelated to their true price valuation. Short sellers sell borrowed shares with plans to buy them back later at a lower price. In the absence of restrictions on short sales in the derivative markets, the greater leverage of futures creates a potential for greater speculative selling in the stock market.

D) Circuit Breaker :

A circuit breaker is set up to ensure that there is no extreme price movement and investors are protected from any unwanted surprises. A circuit breaker refers to a price band - it includes a lower limit called a lower circuit and an upper limit called an upper circuit, at which the stock can be traded in the market on a given trading day. In India, the circuit limits are set by the Securities and Exchanges Board of India (SEBI). Indian stock exchanges implemented index-based market-wide circuit breakers with effect from July 2, 2001. Some modifications were also made in September 2013.



The circuit breaker system applies at three stages of the index movement. If an index jumps or falls 10 percent, 15 percent, or 20 percent, the circuit breaker is triggered, followed by a coordinated trading halt in all equity and equity derivative markets nationwide.

When CB triggered - The trading then resumes after a period of time depending on the rise or fall when it was halted. The markets then re-open with a pre-open call auction session of 15 minutes post the duration of the halt.

Effects of touching the upper and lower limit by the stock price - The highest price a stock can reach on a particular day is the upper circuit limit. When this limit is touched, there will be only buyers and no sellers. Likewise, the lowest price that a stock can hit is the lower circuit limit and when a stock hits this limit, there will be only sellers and no buyers.

It is believed that suspending trading prevents growth of panics, and gives traders sufficient time to re-evaluate market conditions so that they can bolster their liquidity and credit (Morris, 1990). However, there is another side to the story. Clearing houses face increased credit risk by implicitly extending margin credit to loss-making traders who need to make additional margin payments (Moser, 1990). A halt in trading due to a circuit breaker makes the true market price change substantially, which creates extreme losses for traders, causing them default on their contracts and forcing clearing houses to assume the obligations of failed traders.

V. CONCLUSION AND SUGGESTIONS :

Since 1995 several efforts have been taken for the establishment of India's exchange traded derivatives market. In December 1995 the NSE submitted its proposal to the SEBI for the introduction of futures and options in Indian market. SEBI appointed L.C.Gupta committee by a board resolution in November 1996 to develop appropriate regulatory framework for derivatives trading in India. The committee submitted its report in March 1998 and it was approved by SEBI's governing board, in May 1998. The Gupta committee survey revealed that there was wide recognition of the need for all the three major types of financial derivatives namely, equity derivatives, interest rate derivatives and currency derivatives. The survey findings showed that stock index futures ranked as the most popular and preferred type of equity derivatives, the second being stock index option and third being options on individual stocks.

The series of crises in the 1990s following the October 1987 US market crash and in the early years of the twenty-first century established the idea among regulatory bodies and policymakers that index futures play a key role in the outbreak of such episodes. On the one hand, index futures are found to increase volatility, due to the impact of either rational or noise investors. On the other hand, extensive evidence suggests that the dominance of rational traders in the futures markets may reduce spot volatility, as rational trading renders futures pricing more efficient, with this efficiency carried forward to the spot markets due to the linkages between the spot and the futures markets. While the issue remains far from being resolved, we would like to point out that a shift in attention on the part of regulators may be necessary in this context. Volatility in itself is not necessarily undesirable, especially if it is the product of improved market efficiency; indeed, as the market grows in efficiency, the flow of information in the market will increase, and this is bound to render prices more volatile.



The real issue here is not about tackling volatility but about understanding the causes of volatility that stem from the linkage between the spot and the futures markets and about trying to minimise the effect of these causes that are least encouraging to market stability.

References :

- Abhyankar, A. H. (1995). "Return and Volatility Dynamics in the FTSE 100 stock index and stock index futures market." *Journal of Futures Market*, 15(4), pp. 457-488.
- Alexakis, P. (2007). "On the Effect of Index Future Trading on Stock Market Volatility." *International Research Journal of Finance and Economics*, 11, pp. 7-20.
- Antoniou, A. and Holmes, P. (1995). "Futures Trading, Information and Spot Price Volatility: Evidence for the FTSE-100 Stock Index Futures Contract using GARCH." *Journal of Banking and Finance*, 19(1), pp. 117-129.
- Antoniou, A., Holmes, P. and Priestley, R. (1998). "The Effects of Stock Index Futures Trading on Stock Index Volatility: An analysis of the asymmetric response of volatility to news." *Journal of Futures Markets*, 18(2), pp. 151-166.
- Antoniou, A., Koutmos, G. and Pericli, A. (2005). "Index Futures and Positive Feedback Trading: Evidence from major stock exchanges." *Journal of Empirical Finance*, 12, pp. 219-238.
- Beckett, S. and Roberts, D. -J. (1990). "Will Increased Regulation of Stock Index Futures Reduce Stock Market Volatility." *Economic Review*, Federal Reserve Bank of Kansas City, pp. 33-46.
- Beckett, S. and Sellon Jr., G. H. (1989). "Has Financial Market Volatility Increased?" *Economic Review*, Federal Reserve Bank of Kansas City. pp. 17-30.
- Bologna, P. and Cavallo, L. (2002). "Does the Introduction of Stock Index Futures Effectively Reduce Stock Market Volatility? Is the 'Futures Effect' Immediate? Evidence from the Italian Stock Exchange Using GARCH." *Applied Financial Economics*, 12, pp. 183-92.
- Chan, K., Chan, K. C. and Karolyi, A. G. (1991). "Intraday Volatility in the Stock Index and Stock Index Futures Markets." *The Review of Financial Studies*, 4(4), pp. 657-684.
- Cox, C. C. (1976). "Futures Trading and Market Information." *Journal of Political Economy*, 84, 1215-1237.
- Darrat, A. F. and Rahman, S. (1995). "Has Futures Trading Activity Caused Stock Price Volatility?" *Journal of Futures Markets*, 15, pp. 537-557.
- DeLong, J. B., Shleifer, A., Summers, L. H. and Waldmann, R. J. (1990). "Noise Trade Risk in Financial Market." *Journal of Political Economy*, 45, pp. 375-395.
- Edwards, R. F. (1988a). "Does Futures Trading Increase Stock Market Volatility?" *Financial Analyst Journal*, 44, pp. 63-69.
- Edwards, R. F. (1988b). "Policies to Curb Stock Market Volatility." *Columbia University Working Papers*, pp. 141-184.
- Faff, R. W. and McKenzie, M. D. (2002). "The Impact of Stock Index Futures Trading on Daily Returns Seasonality: A Multi-country study." *Journal of Business*, 75(1), pp. 95-126.
- Froot, K. A. and Perold, A. F. (1995). "New Trading Practices and Short-run Market Efficiency." *The Journal of Futures Markets*, 15(7), pp. 731-765.
- Goldstein, M. A. and Kavajecz, K. A. (1990). "Liquidity Provision during Circuit Breakers and Extreme Market Movements." *Rodney L. White Center for Financial Research Working Papers*.



- Gulen, H. and Mayhew, S. (2000). "Stock Index Futures Trading and Volatility in International Equity Markets." *The Journal of Futures Market*, 20(7), pp. 661–685.
- Harris, L. (1989). "S&P 500 Cash Stock Price Volatilities." *Journal of Finance*, 44, pp. 1155–1176.
- James, W. (2011). "Euro Govt: Bund Futures Volatility briefly Halts Trading." *Reuters* (January 7, 2011). <http://uk.reuters.com/article/2011/01/07/markets-bonds-euroidUKLDE7061A420110107>
- Kamara, A. (1982). "Issues in Futures Markets: A survey." *Journal of Futures Market*, 2, pp.261–294.
- Kawaller, I. G., Koch, P. D. and Koch, T. W. (1987). "The Temporal Price Relationship between S&P 500 Futures and the S&P Index." *Journal of Finance*, 42, pp. 1309–1329.
- Kumar, K. K. and Mukhopadyay, C. (2007). "Impact of Futures Introduction on Underlying Index Volatility: Evidence from India." *Journal of Management Science*, 1(1), pp. 26-42.
- Lee, S. -B. and Ohk, K. -Y. (1992). "Stock Index Futures Listing and Structural Change in Time-varying Volatility." *Journal of Futures Markets*, 12(5), pp. 493–509.
- Morris, C. S. (1989). "Managing Stock Market Risk with Stock Index Futures." *Economic Review*, Federal Reserve Bank of Kansas City, 74, pp. 3-16.
- Morris, C. S. (1990). "Coordinating Circuit Breakers in Stock and Futures Markets." *Economic Review*, Federal Reserve Bank of Kansas City, March/April 75(2) pp. 35-48.
- Moser, J. T. (1990). "Circuit Breakers." *Economic Perspectives*, Federal Reserve Bank of Chicago, September/October 14(5) pp. 2-13.
- Nagraj, K. S. and Kumar, K. K. (2004). "Index Futures Trading and Spot Market Volatility: Evidence from an emerging market." *The ICAI Journal of Applied Finance*, 10(8), pp. 5–15.
- Perieli, A. and Koutmos, G. (1997). "Index Futures and Options and Stock Market Volatility." *Journal of Futures Markets*, 18(8), pp. 957–974.
- Raju, M. T. and Karande, K. (2003). "Price Discovery and Volatility on NSE futures Market." *SEBI Bulletin*, 1(3), pp. 5–15.
- Rao, R. S. (2007). "Impact of Financial Derivatives Products on Spot Market Volatility: A study of Nifty." *The ICAI Journal of Derivatives Market*, 4(1), pp. 7–16.
- Ross, S. A. (1989). "Information and Volatility: The no-arbitrage martingale approach to timing and resolution irrelevancy." *Journal of Finance*, 44, pp. 1–17.
- Schwert, G. W. (1990). "Stock Volatility and the Crash of '87." *Review of Financial Studies*, 3, pp. 77–102.
- Sentana, E. and Wadhvani, S. (1992). "Feedback Traders and Stock Return Autocorrelations: Evidence from a century of daily data." *Economic Journal*, 102, pp. 415–425.
- Shah, A. (2008). "Massive Unwinding Seen in Futures." January 21, 2008. http://www.moneycontrol.com/news/market outlook/massive-unwinding-seenstockfutures_322319.html
- Spyrou, S. I. (2005). "Index Futures Trading and Spot Price Volatility: Evidence from an Emerging Market." *Journal of Emerging Market Finance*, 4(2), pp. 151–167.



- Srinivasan, P. and Bhat, S. K. (2008). "The Impact of Futures Trading on the Spot Market Volatility of Selected Commercial Banks in India." *European Journal of Economics, Finance and Administrative Sciences*, 14, pp. 29-41.
- Stein, J. (1987). "Informational Externalities and Welfare-Reducing Speculation." *Journal of Political Economy*, 95, pp. 1123–1145.
- Stiglitz, J. E. (1989). "Using Tax Policy to Curb Speculative Short-term Trading." *Journal of Financial Services Research*, 3, pp. 101–115.
- Subrahmanyam, A. (1994). "Circuit Breakers and Market Volatility: A theoretical perspective." *Journal of Finance*, 59(1), pp. 237–254.
- Summers, L. H. and Summers, V. P. (1989). "When Financial Markets Work too well: A cautious case for a security transaction tax." *Journal of Financial Services Research*, 3, pp. 261–286.
- Thenmozhi, M. (2002). "Futures Trading, Information and Spot Price Volatility of NSE-50 Index Futures Contract." *NSE Research Paper, National Stock Exchange of India Ltd.*
- Umlauf, S. R. (1993). "Transaction Taxes and the Behavior of the Swedish Stock Market." *Journal of Financial Economics*, 33, pp. 227–240.