Paper Submission Date: 18th August 2013
Paper Acceptance Date: 4th December 2013

Article can be accessed online at http://www.publishingindia.com

Examining the Strength of Comovement of Prices in Futures and Cash Markets: Evidence from India

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Abstract

The present study examines the arbitrage efficiency of the Indian equity market by using the daily closing prices of near month futures contracts and cash market. Substantial and sustained wave like mispricings in two markets have been observed, which provides exploitable arbitrage opportunities to the traders. However, due to mark-to-market these mispricings do not persist over long period. Moreover, it has been observed that are positively correlated with the time-to-maturity of the futures contracts, which suggests that strong arbitrage base is present in the market. Mean reverting behaviour of mispricings also suggest that early liquidation option may be more profitable than holding the positions until the expiry date.

Keywords: Cost of carry model, Mispricings,Mean reversion, Early unwinding of open positions and liquidity.

Introduction

Garbade and Sibler (1983b) mention that risk transfer and price discovery are two contributions of the futures markets and the significance of both dependsupon a close relationship between price movement of futures and cash markets. It is generally agreed that arbitrageurs maintain linkage between prices of the underlying cash market and futures contracts. If this link is maintained effectively, then investors who are committed to trade would recognize these markets as perfect substitutes and their choice between these markets will be dictated by their convenience and transaction costs (Protopapadakis and Stoll,1983;Goodwin,1992).

However, empirical works have often contrasted with theoretical expectations of researchers and provides evidence of substantial and sustained 'wave-like' mispricing between cash and futures markets (Cornell and French,1983a;Figlewski,1984; Bowers and Twite,1985;Ardittiet al., 1986;Mackinlay and Ramaswamy,1988; Yadav and Pope,1990; Heaney,1995; and Neal,1996). One explanation to mispricing between two price series may be the immaturity of the arbitrage sector connecting the both markets. Other possible explanation put forward to explain mispricings, include infrequent trading in underlying asset and non-synchronous trading between two markets (Neal,1996; and Brailsford and Hodgson,1997).

Stoll and Whaley (1990) mentioned that in the presence of perfectly efficient and continuous futures and cash markets and absence of transaction costs, riskless arbitrage profit opportunities should not appear and the cost-of-carry relationship between two markets should be satisfied at every instant time during the futures contract cycle (also see Cornell and French,1983a; and Figlewski,1984). If such were the case, the instantaneous rate of price appreciation in the stock index would equal the net cost-of-carry of the stock portfolio plus the instantaneous relative price change of the futures contract. However, law of one price would hold, if underlying assumptions

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of the estimation model[1] holds true in reality (for detailed discussion, see Jarrow and Oldfield,1981).

Cox et al. (1981), Jarrow and Oldfield (1981), Richard and Sundaresan (1981), French (1983), Ramaswamy and Sundaresan (1985),and Stapleton and Subrahmanyam (1997) observed that the assumptions of cost-of-carry model does not hold true and foundthat forward and futures contracts can be used to create a portfolio, which would give sure return on the maturity date, if interest rates are constant, but not if they are random. Harvey and Whaley (1992) on the other hand observed that since dividends are paid at discrete intervals, therefore, assumptions of constant and continuous dividend yield would often cause overestimation of theoretical futures price. Therefore, empirical literature (see Table 1) has found that the assumptions of the cost-of-carry model i.e. constant interest rate, continuous dividend yield etc. does not hold in reality, hence, actual futures price significantly deviates from the expected futures price[2].

Presence of exploitable deviations between futures and cash prices is not surprising because when an information set travels to the market, it is expected to bring equal price change in two closely substitute speculative asset markets but due to the presence of market frictions, traders prefer to discount such information set first in the market where the transaction cost is lower (Kim et al., 1999). Hence, the speculative asset market, which early discounts the available information set(s) is called dominant market and other one is known as satellite market. Trader's preference to discount the available information set in one market than other is reflected through lead-lag relationship, which highlights the role of arbitrageurs to maintain linkage between two markets because if this link is maintained effectively, then investors who are committed to trade will recognize these markets as perfect substitutes (Mackinlay and Ramaswamy,1988).

In empirical literature, considerable attention has been devoted to study the arbitrage efficiency of (both developed as well as emerging) futures market and its prospective impact upon the price discovery efficiency of the underlying cash market (Table 1). However, to the best of researchers' knowledge, no detailed work on arbitrage efficiency of the Indian equity futures market is available. Therefore, the current study is an attempt to fill the literature gap and to help the stakeholders to improve their understanding about the price discovery mechanism in the Indian capital market.

Thediscussion in the study has been organised into four sections, wherethe first section introduces the issue understudy, the next section discussesdatabase and research design,The subsequent section discusses results and analysis and the last section concludes the discussion.

Database and Research Design

Data employed for investigating the arbitrage efficiency of the Indian equity futures market havebeen downloaded from the Equity and Futures and Options (F&O henceforth) segments from the website of the National Stock Exchange of India (www.nseindia.com) and aresecondary in nature. Universe of the study includes all indices as well as individual stock futures contracts and their respective underlying indices or individual stocks traded in F&O and equity segments respectively on the National Stock Exchange of India (NSE).

Present study examines the arbitrage efficiency of three indices (namely, BANKNIFTY, CNXIT and NIFTY) and eighty four individual stocks futures (Appendix A) permitted for trading in F&O segment of NSE. Eighty four individual stocks futures have been selected out of 150individual stock futures trading as on 31 Dec, 2006 subject to the following individual stock futures selection criterion.

1. In order to avoid the potential bias of corporate action (namely, issue of bonus shares and stock splits) on the information dissemination efficiency of both equity stocks as well as individual stock futures contracts (sincein the literature of Efficient Market Hypothesis[3], it is an established fact that in addition to the price adjustment on record date, these

[1] (i.e. short-term interest rate and dividend yield are known, continuous and constant, coefficients of standard deviation of rates of return in both markets are equal, the contemporaneous rates of return of both markets are perfectly positively correlated, rates of return of both markets are not serially correlated and returns of two markets are not cross correlated)

[2] For instance, see Cornell and French (1983a), French (1983), Mackinlay and Ramaswamy (1988), Yadav and Pope (1990), Twite (1992), Neal (1996), Bae et al., (1998), Hsu and Wang (2004) and Lee (2005).

[3] See Fama (1970 and 1991) and Dimson and Mussavian (1998).

corporate actions affect the portfolio value due to information leakage and other market imperfections prior to the record date as well), the present study examines the weak form efficiency of only those individual stock futures, whose price series during the sample period have not been adjusted due to any corporate action (for example see Lamourex and Lastrapes,1990). The dates of stock split and bonus issue have been checked with Capitaline Database.

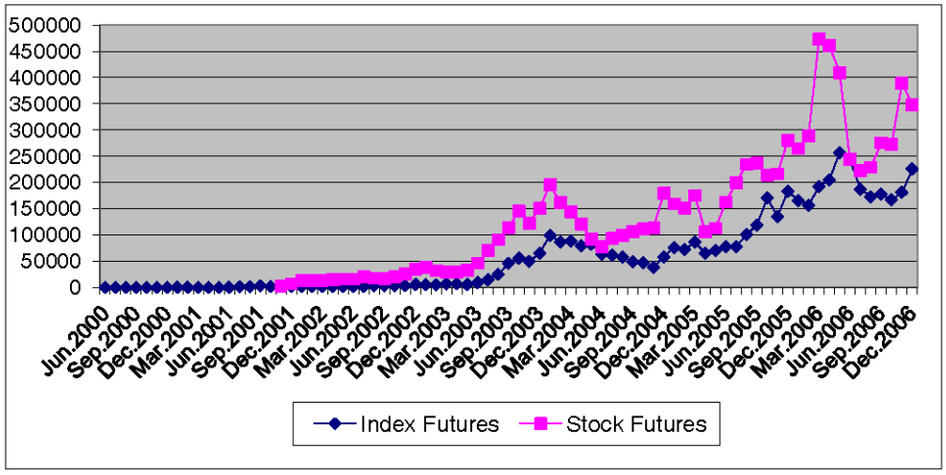
2. All those individual stock futures contracts, whose trading was banned by stock exchange authorities due to any reason[4], won't form part of the sample size. Therefore, this sample selection criterion negates the chances of including those individual stock futures contracts, whose trading was not continuous during sample period, which otherwise could be a potential factor responsible for inefficient price discovery (for example see Campbell *et al.*, 1993).
3. All those stock futures contracts will be out of the scope of study, which do not observe continuous trading history of at least one year as on Dec. 2006. This sample selection criterion would help to secure sufficient data points (Nath,2003) for investigating the information discounting speed of Indian equity futures market.

[4] See Eligibility Selection Criteria for permitting and discontinuing the trading of Indices and Individual Stocks in F&O segment at NSE (www.nseindia.com).

Trading of the Indian index futures contracts commenced in June 2000 and of individual stock futures contracts in Nov. 2001, but initially the activity level in both markets was very low (Figure 1). Therefore, in order to precisely comment upon the arbitrage efficiency of the Indian equity futures market, data for 4 years highly liquid sample period (i.e. from Jan. 2003 to Dec. 2006) havebeen drawn out of the universe, subject to three sample selection criteria as discussed in the first section. The present study employs daily closing prices of near month futures contracts and cash market (downloaded from F&O and Equity segments from www.nseindia.com).

The daily closing price series of mid and far month were also available but due to low trading volume (trading volume in mid and far month futures contracts has been a result of rollovers in the last week of month (for details see Thomas,2006), both contracts observed irregular trading. Thus, the present study does not examine the arbitrage efficiency of distant (i.e. mid and far) month futures contracts because efficient information dissemination efficiency presumes voluminous and continuous trading activity (Campbell *et al.*, 1993). The maximum possible number of observations is 998 for both index as well as individual stock futures contracts, whereas, for futures contracts, which were later allowed for trading, the number of data points will be lesser. In order to secure sufficient data points, the minimum number of observations has been restricted to 250 i.e. normal trading days in one year (Nath,2003).

Figure 1: Trading Activity in Index and Individual Stock Futures Contracts



Source: Plot of Trading Volume of Index and Stock Futures has been drawn on the basis of Business Growth data downloaded from F&O Segment in www.nseindia.com.

Results and Analysis

Law of one price means that at one point of time, two identical products should have identical prices. If law of one price is violated, arbitrageurs will buy the cheaper asset and simultaneously sell the expensive asset, which will lead to rise in the price of the cheaper asset and decline in the price of the expensive asset, hence, the available arbitrage opportunities will disappear. In essence, arbitrage is viewed as the simultaneous purchase of one asset against the sale of the same or equivalent asset from zero initial wealth to secure a riskless profit available because of price discrepancies. Thus, arbitrage is riskless and requires zero wealth.

Empirical literature (Table 1) has found that both overpriced as well as the underpriced futures contracts were equally attractive to arbitrageurs because they can secure risk-free profits by framing appropriate arbitrage strategies irrespective of the fact whether, futures contracts are trading at premium (i.e. Contango state) or at discount (i.e. Backwardation state)[5].

Table 2presents the descriptive statistics of pricing effectiveness of the Indian equity futures market, which suggests that both index as well as individual stocks futures contracts are significantly mispriced and substantial number of arbitrage opportunities are available. Three indices have been found to be significantly underpriced for more than 60% of the total trading days, which suggests that arbitrageurs could earn riskless profits by taking long position in the futures market and short position in the cash market. Furthermore, significant 't' statistics indicates that futures prices significantly deviate from the theoretical futures prices, which implies that mispricings may be exploitable and arbitrageurs might secure risk-free profits. In addition, it has been found that approximately 20% mispricings of the index futures contracts violated the transaction cost bounds[6], which implies that 1/5th of the mispricings are exploitable.

In addition to the index futures contracts, Table 2reports the descriptive statistics of pricing effectiveness of the individual stocks futures contracts, which unlike the index futures contracts are overpriced (except 12individual stock futures contracts, namely; ABB, BAJAJAUTO, BHEL, BPCL, GAIL, HCLTECH, HDFC, HDFCBANK, HEROHONDA, ICICIBANK, JETAIRWAYS, and SUNPHARMA). Overpriced individual stock futures contracts imply that arbitrageurs could earn risk-less profits by taking short position in the futures contract and long position in the cash market (when mispricings violate the transaction cost bounds). Statistically significant 't' statistics (except for ALBK, ALOKTEXT, CANBK, CHAMBALFERT, CORPBANK, GRASIM, IDFC, IOC, MATRIXLABS, NICOLASPIR, and ORIENTBANK) further suggests that mean mispricings are significantly different from zero; hence, these may be economically exploitable. Furthermore, after deducting the transaction cost from the absolute mispricings, it has been observed that similar to the index futures contracts, exploitable arbitrage opportunities are available but the number of available arbitrage opportunities varies from one individual stock futures contract to other. Empirical findings in Table 2suggesting that index futures contracts in India are underpriced and individual stock futures contracts are overpriced are consistent with the findings of Vipul (2005b) and Misraet al., (2006).

In case of 29 individual stocks futures contracts, which are one of the most illiquid futures contracts in the Indian

[5] For instance; if the futures contracts are relatively overpriced, an arbitrageur will take short position in the futures contract (i.e. equity futures) for F_0 and long position in the underlying asset for S_0 (i.e. equity stock). Arbitrageur will borrow the present value of future dividends (D) and will use dividends to repay this loan. The net cost of the shares at the time 0 is S_0-D and the present value of receipts from selling the equity futures contract is $F_0/(1+r)$. Therefore, the profit at time 0, for zero initial capital is $[F_0/(1+r)-(S_0-D)]$ per futures contract. Given the assumptions of certain dividends and a constant riskless rate of interest, these arbitrage profits are riskless, therefore, arbitrageurs will attempt to trade as many futures contracts as possible, which will ensure that the price of an equity futures contract cannot exceed the net cost to take long position in the cash market. However, if the futures contracts are underpriced, then arbitrageurs will buy the futures contract for F_0 and sell the underlying asset for S_0. Arbitrageurs will also invest D at time 0 to provide for subsequent dividends on the underlying equity shares. The net receipts from selling the equity shares are S_0-D, while the present value of the cost of the equity futures contract is $F_0/(1+r)$. Therefore, the riskless profit at the time 0 is $[(S_0-D)- F_0/(1+r)]$ per futures contract.

[6] The transaction cost involved in an arbitrage activity includes: (i) round-trip commission to buy and sell the contract(s) and stock(s); (ii) one commission to open a position in the futures market; (iii) one market impact cost, i.e. the bid-ask spread, in the cash market and (iv) one market impact cost in the futures market (Cornell and French (1983a) and Chung (1991)).

equity futures market[7], mispricings have been found to be exploitable for more than 0.50 times of the trading days, which suggests that arbitrageurs have key role to play in the price discovery mechanism in the Indian capital market. Nonetheless, the number of exploitable opportunities islower in case of liquid individual stocks futures contracts but it is significantly higher when compared with the index futures contracts, which suggests that arbitrageurs could efficiently maintain the close linkage between futures and the underlying cash market in case of index futures contracts, while the individual stock futures contracts are highly mispriced.

Empirical findings of the presence of exploitable deviations in the prices of the Indian equity futures contract from their theoretical prices are consistent with that of Cornell and French (1983a), Cornell (1985), Ardittiet al., (1986), Merrick (1987), Billingsley and Chance (1988), Mackinlay and Ramaswamy (1988), Morse (1988), Bhatt and Cakici (1990), Yadav and Pope (1990), Klemkosky and Lee (1991), Lim (1992), Twite (1992), Yadav and Pope (1992), Brailsford and Hodgson (1997), Baeet al., (1998), Akin (2003), Hsu and Wang (2004), Lee (2005) and Roll et al., (2007). Findings in the study are also consistent with Vipul (2005a and 2005b) who observed that individual stocks futures contracts are generally overpriced, whereas the index futures contracts are underpriced. Vipul (2005a and 2005b) observed that underpricing in index futures contracts is partially explainable by the restriction on short selling of underlying stocks, which makes it practically difficult to short sell the complete portfolio of index stocks in the exact proportion as that in the index. However, in case of individual stocks, it appears that the market has been over optimistic and inefficient. The downward drag on the individual stock futures contracts due to the restrictions on short selling doesnot show due to this over optimism.

These findings also indicate that traders tend to overreact to information shocks because traders react partially to information shock and then reinforce their opinions when they observe the movements of liquid substitutes, which results into bid-ask bounce, consequently, speculative asset markets observe negative serial correlation (Bianco and Reno,2006). Once the exploitable arbitrage opportunities have been identified, it becomes evident to explore the issues, which cause the actual futures price to deviate from theoretical futures price. One of the most prominent factors responsible for mispriced futures contracts has been the time-to-maturity because it proxies the uncertainties regarding expected cash flows involved during the period involved in the arbitrage activity. Therefore, mispricings in futures contracts are expected to be positively associated with the time-to-maturity, which implies that contracts approaching to the maturity date will be fairly priced and can be successfully used by hedgers for risk transfer (see Cornell and French,1983a and 1983b;Mackinlay and Ramaswamy,1988; Yadav and Pope,1994; Antoniou and Holmes,1995; Neal,1996; Stoll and Whaley,1997; Chow *et al*., 2003; Lien and Yang,2003;Vipul,2005b; and Roll I., 2007).

Table 3 presents the results of Kruskal Wallis 'H' test, which tests the Null hypothesis of no significant difference in mispricings of futures contracts over the trading weeks to maturity during the contract cycle against the alternative hypothesis stating that mispricings of futures contracts over various trading weeks to maturity during the contract cycle are significantly different. Time-to-maturity has been computed by considering last Thursday of the contract month as the maturity date and if last Thursday of the month happens to be a holiday then previous trading day prior to last Thursday has been considered to be the date of maturity. Since, on last Friday of the month, mid-month futures contract turns out to be the near-month futures, thus, the number of days to expiry has been counted from last Friday of the month, which is the reason that the maximum numbers of days to expiry are 34 in certain cases.

Mispricings in the futures contracts have been calculated as deviation between actual futures contract prices and the theoretical futures contract prices, which are computed through equation (1), where; $S_{t,\,T}$ = Theoretical (cost-of-carry) futures price of the underlying asset at time t with maturity date T, S_t = Current market price of the underlying asset, e = Exponential term with value 2.7183, r = Risk free borrowing and lending rate, i.e. 90 days T Bill rate in present case, d = Expected dividend yield, t = Current time period and T = Date of maturity.

$$S_{t,\,T} = S_t e^{(r-d)\,(T-t)} \qquad \ldots(1)$$

[7] (namely; ALBK, ALOKTEXT, ASHOKLEY, AUROPHARMA, BONGAIREFN, CESC, CHAMBLFERT, DIVISLAB, ESCORTS, FEDERALBNK, GNFC, IDBI, IFCI, INDUSINDBNK, IOB, JPHYDRO, JSTAINLESS, KTKBANK, LICHSGFIN, MRPL, NAGARFERT, NDTV, NEYVELILIG, NICOLASPIR, SRF, STAR, SUNPHARMA, VIJAYABANK and WOCKPHARMA).

Following Vipul (2005b), 90 days T Bill rate has been taken as discount rate for the period between the date of transaction and the date of expiry and it has been collected from the official website of Reserve Bank of India (i.e. www.rbi.org.in). In addition, holding of equity stocks involve cash flows in terms of dividend, which is an important determinant of the price of a futures contract. Dividend payments are typically discrete events, which even in case of an index futures contract cannot be approximated with a continuous stream in the Indian equity market. The dividend payments tend to lump together during the second half of the calendar year as most of the companies have their book closing on 31st March. Moreover, since only the near month futures contracts have been studied, it is a fair assumption that the market would know the amount of dividend and its ex-dates with a priori certainty.

Dividend per share on eighty four individual equity stocks under study and their ex-dates have been checked with CAPITALINE DATABASE. The present value of dividend per share is included in equation (1) for the corresponding futures contracts, if the ex-dividend day fell between the date of the transaction and the expiration day of the futures contract. Daily dividend yield for 84 individual equity shares has been computed using daily market capitalization through CAPITALINE DATABASE and in case of index futures contracts, it has been collected from the official website of the National Stock Exchange of India (NSE).

Once the four inputs i.e. cash market price, risk-free rate, daily dividend yield, and time to maturity are available, the theoretical futures contract price has been computed (assuming continuous compounding) through Microsoft Excel sheet. The theoretical futures price is then deducted out of the actual futures price contract and the resulting mispricings have been ranked in ascending order. After ranking the mispricings, the ranks are divided into five series, each representing different weeks to expiry i.e. one week to expiry, two weeks to expiry, three weeks to expiry, four weeks to expiry and five weeks to expiry. Mispricings in the futures contracts over the trading weeks to expiry have been compared by applying the Kruskal Wallis 'H' test (see equation (2)), where; H = estimated test statistics, which follows Chi Square distribution, N= Number of observations, R= Ranks of mispricings and k= Week to expiry and the estimated results have been reported through Table 3.

$$H = \frac{12}{N(N+1)} \sum_{k=1}^{5} R_k^2 - 3(N+1) \qquad \ldots(2)$$

Results in Table3are consistent with the findings of empirical literature, which suggests that mispricings are positively associated with the time-to-maturity. Mispricings in case of both index as well as individual stock futures contracts are statistically different across various trading weeks to maturity in the contract cycle. Detailed scrutiny of the findings suggest that consistent with Cornell and French (1983a and 1983b), Mackinlay and Ramaswamy (1988), Yadav and Pope (1990), Antoniou and Holmes (1995), Neal (1996), Stoll and Whaley (1997), Chow *et al.*, (2003), Lien and Yang (2003), Vipul (2005a and 2005b) and Roll *et al.*, (2007), mispricings in the Indian equity futures contracts disappear when contract approaches the maturity date because mean ranks of one and two weeks to maturity are significantly lesser than that of three, four and five weeks to maturity[8].

These findings further suggest that the basis of futures and cash market prices will be stationery and two markets observe strong long-run relationship. As noted byRoll *et al.*, (2007) trading activity and mispricings significantly cause each other, hence, illiquidity at the time of inception of the contract may be a prominent cause for the presence of exploitable arbitrage opportunities.

[8] Mackinlay and Ramaswamy (1988) argued that larger amount of mispricings violates the transaction cost bounds for longer times until expiration because of three reasons. First, with longer times until expiration, there is increased risk of unanticipated increase or decrease in dividends, which will erode the anticipated profits from an attempt to arbitrage the mispricings, when it violates these limits. Second, mispricings reflect the unanticipated interest earnings or costs from financing the marking-to-market flows from the futures position. An attempt to replicate the futures contract payoff will require trading in stocks and both of these will contribute to a wider limit for mispricings with larger time-to-expiration. Finally, attempts at arbitrage motivated trading, which employs less than the full basket of stocks in the index must allow for a greater margin of error with longer time-to-maturity. This would arise not only because of the possibility that the value of the chosen basket might not track the index accurately but also because costly adjustments would be necessary prior to expiration. Consequently, larger mispricings will be required at longer times-to-expiration in order to induce arbitrageurs to take a position in these markets. These considerations also point out the fact that "arbitrage" strategies are not risk-free.

Furthermore, an attempt has been made to analyze whether the amount of arbitrage profits are seasonal to the trading days of the week as has been identified in case of the returns from a speculative asset. Table 4reports the estimated results of Kruskal Wallis 'H' test, which compares the amount of mispricings over the trading days of the week. In case of index futures contracts, it has been found that the amount of mispricings is not seasonal to the trading days of the week, which suggests that arbitrage profits are randomly available on different trading days of the week and no systematic pattern exists. These findings are consistent with Vipul (2005a and 2005b) but are inconsistent with Brailsford and Hodgson (1997).

However, in case of 49 individual stock futures contracts, mispricings show seasonality for different trading days of the week, which suggests that arbitrageurs can design their trading framework to early exploit the opportunities to secure risk-free profits. Mean ranks of mispricings on Fridays and Mondays are significantly higher than that on other three trading days of the week, which suggests that weekend effect in the daily return of Indian equity futures market and the Indian equity market is reflected into the joint dynamics of both markets. These findings are consistent with those of Brailsford and Hodgson (1997).

In Table 4, mean ranks of mispricings are higher on Fridays, and lower on either Wednesdays or Thursdays, which may be because of the structure of contract cycle in the Indian equity futures market. Since, equity futures contracts trading in India expire on last Thursday of the month, therefore, prices of both futures and cash markets are expected to move very close to each other on Wednesday or Thursday so that price convergence can take place. However, since, last Friday of the month happens to be the first trading day of new futures contract and observes lower trading activity, therefore, future prices on Friday would have naturally deviated apart from the equilibrium price, thus, offered maximum arbitrage profits.

Significantly, higher mean ranks of mispricings on Friday and Monday may also draw its explanation from dynamic human nature, which suggests that positive information is disclosed during the week days and the board of directors wait for the weekend to disclose the news with negative impact, so as to allow the market to absorb the shock on weekend or at the most during morning trading session on Monday (Gupta and Aggarwal,2004). Since, the market discounts the positive news like dividend announcement etc. beforehand; therefore, it does not cause any significant deviations between two price series. However, negative news creates panic among traders, which results into asymmetric reactions. Hence, two price series significantly deviate and violate the transaction bounds on Friday and Monday because negative news is mostly floated on the weekend (for detailed discussion on weekend effect, see Chaudhury,1991;Poshakwale,1996;Anshuman and Goswami,2000; Bhattacharya *et al.*, 2003; and Nath and Dalvi,2004).

Since, it has been found that futures prices significantly deviate from the forward price series; therefore, it becomes important to examine the behaviour of mispricings to information shocks because early exploitation of arbitrage opportunities will enable hedgers to efficiently reduce their portfolio variance. Table 5reports the serial correlation results of mispricings at levels, which suggests that mispricings are significantly predictable. Serial correlation coefficient of mispricings at levels for three indices at first lag ranges in between 0.760 and 0.647, which is very high and it steadily declines to 0.304, 0.390 and 0.435 in case of BANKNIFTY, CNXIT and NIFTY respectively at 10^{th} lag, which implies that mispricings are significantly predictable.

Similar findings are available in case of individual stock futures contracts, where the serial correlation coefficient at first lag ranges in between 0.909 and 0.381 in case of ALBK and MARUTI each and PATNI respectively and it steadily declines over ten lags but remains significant. Presence of statistically significant serial correlation in mispricings of futures contracts is obvious because both futures and cash markets are subject to the common information set and traders in both markets would attempt to discount the information set in the market with competitive advantage. Therefore, trader's preference will cause mispricings, which will sooner be corrected by the supply of arbitrageur's raid. Since, in a liquid market like India, arbitrage opportunities are expected to persist in short-run only, thus, these would be significantly predictable. However, as the present study has employed daily closing prices to examine the arbitrage efficiency of the Indian equity futures market, therefore, no robust statement can be made about the time duration in which arbitrage opportunities disappears from the Indian equity market.

In addition, an attempt has been made to examine the extent of relationship between arbitrage profits available at the time of marking-to-market the futures contracts. Table 6reports the serial correlation results of the first difference of mispricings. Since, the present study has employed daily closing prices, where positions in the futures and cash markets will be marked-to-market and the price difference between two will be credited to the trader's account, if the contract moved in his/her favour and will be debited to trader's account if the contract moved against his/her expectations, therefore, it is expected that marked-to-market profits of subsequent day should not be significantly associated with today's marked-to-market profits. If marked-to-market profits of two subsequent trading sessions are significantly positively correlated then it may be said that arbitrage opportunities are not exploited as early as these become available. On the other hand, if marked-to-market profits of two subsequent trading days are significantly negatively correlated then it indicates that arbitrage opportunities are exploited when these become available. In addition, it also indicates the reversion in market movement due to overreaction to the previous information set, which suggests that option to early liquidate would help arbitrageurs to secure higher amount of risk-free profits than unwinding his/her position(s) at the time of expiration (for detailed discussion see Mackinlay and Ramaswamy,1988; Yadav and Pope,1990[9] and Neal,1996).

As far as the Indian equity futures market is concerned, Trading Rule 4 (as suggested by Yadav and Pope,1990) can be profitable for traders because the sign of the coefficients of serial correlation of first order mispricings as reported in Table 6keep changing, which means that maintaining an arbitrage position until the expiration date may not be profitable. The sign of the coefficient of serial correlation of three indices and all (except MATRIXLABS) individual equity stocks is significantly negative, which implies that between two marked-to-market positions, price reversals might have taken place.

These findings suggest that in India early unwinding may be a valuable option for arbitrageurs and if the sign of mispricings in the far contract is same as the sign of the original mispricings then option to rollover would be more profitable than unwinding at the time of expiration. These findings are consistent with those by Brennan and Schwartz (1990), Yadav and Pope (1990) and Neal (1996). Brennan and Schwartz (1990) mentioned that holding an arbitrage position until expiration would be fruitful only if the arbitrage potentials are not restricted. However, since, in reality, stock exchange authorities (in order to curb against the unwanted fluctuations or price manipulations in the market) put position limit restrictions on the dealing members[10].

[9] Yadav and Pope (1990) by using program trading driven through simple trading rules attempted to simulate the possible profits of arbitrageurs, which assumes continuous trading in the market and that is possible to use the price at time 't' to execute a trade at the same price and at the same time. They compared the efficiency of four trading rules in securing higher amount of risk-less profits for arbitrageurs. **Trading Rule 1:** if mispricings exceeds x%, sell one futures contract, sell Treasury Bills and buy the equivalent underlying basket of stocks and hold the long stock-short futures position until expiration. At expiration, sell the stock bought earlier and reinvest in Treasury Bills. If mispricings is below x%, buy one futures contract, sell the equivalent underlying basket of stocks, use the proceeds obtained to buy Treasury Bills and hold the position until the contract expiration, at which time the position is unwound and investment in stocks reinstated. This is the simple hold-to-expiration trading rule. **Trading Rule 2:** same as Trading Rule 1, except that, instead of waiting until contract expiration, the position is unwound as soon as mispricings change signs. **Trading Rule 3:** Same as Trading Rule 1, except that during the last week before maturity, the position is rolled forward to the next available maturity if the sign of the mispricings in the far contract is the same as was the sign of the original mispricings. **Trading Rule 4:** This is a combination of trading rules 1,2 and 3. The arbitrage position is initiated as in Trading Rule 1, but is unwound early, as per Trading Rule 2 or rolled forward as per Trading Rule 3; whichever option becomes profitable at an earlier date. Yadav and Pope (1990) found that hold-till-expiration trading rule could provide only limited opportunities for booking arbitrage profits, however, options to unwind early or rollover an arbitrage position were valuable and could provide heavy transaction cost discounts, which resulted into "risky" arbitrage strategies being attractive even for arbitrageurs with larger transaction costs.

[10] For instance; in India, the trading member's position limits in equity index futures contracts shall be higher of Rs. 500 crores or 15% of the total open interest level in equity index futures contracts. In addition, for individual stocks having applicable market-wise position limit (MWPL) of Rs. 500 crores or more, the combined futures and options position limit for trading members shall be 20% of applicable MWPL or Rs. 300 crores, whichever is lower and out of which the stock futures position(s) cannot exceed 10% of the applicable MWPL or Rs. 150 crores, whichever is lower. In case of the individual stocks having applicable MWPL less than Rs. 500 crores, the combined futures and options position limit would be 20% of applicable MWPL and futures po-

Therefore, in the light of results reported in Table 6early unwinding of arbitrage positions would have trading value because early liquidation of arbitrage positions will not only make the money available to arbitrageurs but it will also enable them to take new positions, which otherwise may not be possible if arbitrageurs are unwinding their positions on the maturity date. Thus, the mean reverting patterns of mispricings in the Indian equity futures market as reported through Table 6, indicate that arbitrage positions in India are either rolled over to the next contract or are unwound prior to the maturity date. However, examination of the stochastic behaviour of mispricings in the Indian equity futures market by using high frequency data may provide detailed explanations of the timings when early unwindings should be preferred to holding the arbitrage positions until expiration.

Conclusion

The present study has examined the arbitrage efficiency of both index as well as individual stock futures contracts trading in the Indian capital market. Descriptive statistics of mispricings suggest that three index futures contracts are significantly underpriced.However, individual stock futures contracts are significantly overpriced. These results are consistent with the findings of Vipul (2005b) who mentioned that short selling restrictions on the underlying stocks may be a prominent cause for underpricing of index futures contracts. Since, the short selling restrictions will make it practically difficult to short sell the complete portfolio of index stocks in the exact proportion as that in the index.

However, in the case of individual stocks futures contracts, over optimism of traders may be a potential factor for it trading at premium when compared to the expected futures price. These results indicates mean reverting behavior of daily returns of futures contracts and the underlying cash market, which suggest that daily returns of futures and cash markets overreact to an information shock, which is later off-set by counter strategy(ies) undertaken by rational speculators; hence, market equilibrium will be restored.

Furthermore, it has been found that futures contracts with longer time-to-maturity are significantly mispriced and offer exploitable arbitrage opportunities to secure riskless profits requiring zero wealth andthese findings are consistent with the empirical evidences available in other markets of the world. Presence of exploitable arbitrage opportunities draws its explanation from the fact that futures contracts with longer time-to-maturity are highly illiquid. For instance, in India, near month futures contracts are most liquid futures contracts, however, the mid-month and far-month futures contracts do not observe significant trading activity. Hence, when the mid-month futures contract will be rolled over to become near month futures contract, illiquidity will be a major concern, which may cause unexpected variations in the expected dividend yield, thus, prices of futures contract will start deviating from theoretical futures price.

In addition, unlike the daily returns of index futures contracts and underlying index, mispricings are not sensitive to the trading days of the week; however, mispricings of 49 individual stock futures contracts are seasonal over the trading days of the week. Results of Kruskal Wallis 'H' test as reported in Table 6suggests that maximum amount of mispricings were available on Friday and Monday. This may be because the daily returns of equity futures and cash market are significantly different on Friday and Monday when compared to the daily returns on other trading days of the week.

Moreover, mispricings of both index as well as individual stock futures contracts have been found to be significantly predictable because the serial correlation coefficient is very high and statistically significant at first lag and it steadily declines. Predictable mispricings are natural because both futures and cash markets are subject to a common information set and trader will attempt to discount the information through the market which involves lesser transaction cost and the information set will be transmitted to the satellite market through volatility spillover process. Mispricings have further been found to be mean reverting because the sign of serial correlation coefficient of first difference of marked-to-market profits keep changing, which suggests that early liquidation of arbitrage positions would be more profitable than unwinding the positions at expiration date.

sition cannot exceed 20% of applicable MWPL or Rs. 50 crore whichever is lower. Furthermore, the client wise gross open position limits across all the derivative contracts on an underlying, should not exceed 1% of the free float market capitalization (in terms of number of shares) or 5% of the open interest in all derivative contracts in the same underlying stock (in terms of number of shares), whichever is higher (For details, see F&O segment in www.nseindia.com).

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Table 1: Empirical Evidences on Pricing Efficiency of Futures Markets

Author (Year of Study)	*Country Understudy*	*Market Understudy*	*Period Understudy*	*Mispricings*
Cornell and Reinganum (1981)	U.S.A	IMM	1974-1979	No
Cornell and French (1983a)	U.S.A	NYSE and S&P500	June 1982- Sept. 1982	Yes
French (1983)	U.K.	Silver and Copper Futures	1968-1980	Yes
Resnick and Hennigar (1983)	U.S.A	T-Bond Futures	Jan. 1979-May 1981	Yes
Figlewski (1984)	U.S.A	S&P500	1982-1983	No
Gay and Manaster (1984)	U.S.A	T-Bond Futures	1977-1983	Yes
Cornell (1985)	U.S.A	S&P500	1982-1983	No
KlemkoskyamdLasser (1985)	U.S.A	T-Bond Futures	1978-1981	Yes
Ardittiet *al.* (1986)	U.S.A	S&P500	1982-1984	Yes
Merrick Jr. (1987)	U.S.A	NYSE and S&P500	1982-1986	Yes
Billingsley and Chance (1988)	U.S.A	S&P500	1982-1986	Yes
Mackinlay and Ramaswamy (1988)	U.S.A	S&P500	1982-1987	Yes
Morse (1988)	U.S.A	S&P500, NYSE and MMI	1986-1988	Yes
Bhatt and Cakici (1990)	U.S.A	S&P500	1982-1987	Yes

Author (Year of Study)	Country Understudy	Market Understudy	Period Understudy	Mispricings
Diagler (1990)	U.S.A	S&P500 and MMI	1987-1988	No
Harpaz*et al*. (1990)	U.S.A.	USDX	Nov. 1985 to Dec. 1988	Yes
Stulz*et al.* (1990)	Switzerland	OTC Market	Jan. 1989- Oct. 1989	No
Yadav and Pope (1990)	U.K.	FTSE-100	1984-1988	Yes
Yau*et al.* (1990)	Hong Kong	HSI	1986-1988	Yes
Chung (1991)	U.S.A	MMI	1984-1986	Yes
Klemkosky and Lee (1991)	U.S.A	S&P500	1983-1987	Yes
Puttonen and Martikainen (1991)	Finnish	FOX	1988-1990	Yes
Twite (1991)	Australia	AOI	1983-1988	Yes
Lim (1992)	Japan	Nikkei and Simex	1988-1989	No
Twite (1992)	Australia	SPI	1983-1988	Yes
Yadav and Pope (1992)	U.K.	FTSE100	1986-1990	Yes
Strickland and Xu (1992)	U.K.	FTSE-100	1988-1990	Yes
Neal (1996)	America	S&P500	1989	Yes
Brailsford and Hodgson (1997)	Australia	AOI and SPI	1989-1993	Yes
Brailsford and Cusack (1997)	Australia	SPI	1994-1995	Yes
Bae*et al.* (1998)	Hong Kong	HIS	1993-1994	No
Akin (2003)	America	11 commodity contracts traded on CME	1982-2000	Yes
Lee (2005b)	Korea	KOSPI	1996-2001	Yes
Vipul (2005b)	India	NIFTY, ACC, INFOSYS, RIL, SATYAM, TELCO, TISCO	2002-2004	Yes
Gupta and Singh (2007)	India	Nifty	July 2000 to Dec. 2005	Yes
Roll *et al*. (2007)	America	S&P500	1988-2002	Yes

Source: Compiled from various studies.

Table 2: Pricing Efficiency of the Indian Equity Futures Market

Symbol	Pricing of Indian Equity Futures Contracts		T Statistics(p value)	Exploitable Arbitrage
	Underpricing	Overpricing		
BANKNIFTY	60.00%	40.00%	-6.505 (0.000)	20.00%
CNXIT	64.99%	35.01%	-9.685 (0.000)	18.35%
NIFTY	73.37%	26.63%	-20.164 (0.000)	21.22%
ABB	53.43%	46.57%	-7.123 (0.000)	47.75%
ACC	35.24%	64.76%	2.056 (0.040)	35.34%
ALBK	21.51%	78.49%	0.671 (0.502)	53.90%
ALOKTEXT	34.60%	65.40%	0.063 (0.950)	50.25%
ANDHRABANK	22.78%	77.22%	9.262 (0.000)	44.72%
ARVINDMILL	23.22%	76.78%	16.495 (0.000)	42.14%

Continued...

Symbol	*Pricing of Indian Equity Futures Contracts*		*T Statistics(p value)*	*Exploitable Arbitrage*
	Underpricing	*Overpricing*		
ASHOKLEY	21.75%	78.25%	5.329 (0.000)	52.25%
AUROPHARMA	24.82%	75.18%	6.494 (0.000)	54.55%
BAJAJAUTO	51.75%	48.25%	-8.289 (0.000)	38.04%
BANKBARODA	28.30%	71.70%	3.294 (0.001)	45.32%
BANKINDIA	29.50%	70.50%	6.916 (0.000)	38.73%
BEL	28.05%	71.95%	11.834 (0.000)	40.74%
BHEL	56.16%	43.84%	-9.451 (0.000)	33.83%
BILT	27.52%	72.48%	6.691 (0.000)	47.42%
BONGAIREFN	16.22%	83.78%	4.691 (0.000)	54.30%
BPCL	51.05%	48.95%	-8.106 (0.000)	35.54%
CANBK	33.57%	66.43%	0.318 (0.750)	38.61%
CENTURYTEX	20.33%	79.67%	12.359 (0.000)	42.79%
CESC	31.94%	68.06%	5.812 (0.000)	53.56%
CHAMBLFERT	24.57%	75.43%	0.800 (0.424)	59.46%
COLGATE	34.04%	65.96%	3.531 (0.000)	40.90%
CORPBANK	42.51%	57.49%	-0.103 (0.918)	49.14%
CUMMINSIND	25.46%	74.54%	8.427 (0.000)	48.56%
DIVISLAB	20.39%	79.61%	10.273 (0.000)	53.07%
ESCORTS	17.93%	82.07%	15.941 (0.000)	54.80%
ESSAROIL	19.66%	80.34%	15.074 (0.000)	49.39%
FEDERALBNK	28.50%	71.50%	3.403 (0.001)	52.33%
GAIL	50.37%	49.63%	-7.261 (0.000)	45.58%
GLAXO	42.79%	57.21%	-2.549 (0.011)	47.75%
GNFC	19.41%	80.59%	6.659 (0.000)	51.84%
GRASIM	41.74%	58.26%	-0.908 (0.364)	37.44%
HCLTECH	52.20%	47.80%	-6.357 (0.000)	30.09%
HDFC	58.06%	41.94%	-10.480 (0.000)	27.63%
HDFCBANK	62.95%	37.05%	-12.760 (0.000)	34.77%
HEROHONDA	52.30%	47.70%	-8.127 (0.000)	35.72%
HINDUNILVR	41.64%	58.36%	-3.534 (0.000)	27.53%
HINDPETRO	28.43%	71.57%	2.709 (0.007)	36.44%
ICICIBANK	53.94%	46.06%	-10.103 (0.000)	45.14%
IDBI	22.46%	77.54%	7.551 (0.000)	86.05%
IDFC	35.67%	64.33%	-0.067 (0.946)	44.74%
IFCI	13.89%	86.11%	22.742 (0.000)	86.11%
INDUSINDBK	22.36%	77.64%	9.628 (0.000)	55.28%
IOB	26.48%	73.52%	2.804 (0.005)	53.90%
IOC	34.15%	65.85%	0.633 (0.527)	36.98%
IPCL	19.24%	80.76%	6.654 (0.000)	44.93%

Continued...

Symbol	Pricing of Indian Equity Futures Contracts		T Statistics(p value)	Exploitable Arbitrage
	Underpricing	Overpricing		
JETAIRWAYS	54.24%	45.76%	-7.640 (0.000)	39.73%
JINDALSTEL	29.79%	70.21%	8.523 (0.000)	48.46%
JPHYDRO	17.41%	82.59%	17.082 (0.000)	54.82%
JSTAINLESS	21.87%	78.13%	11.120 (0.000)	55.04%
KTKBANK	23.99%	76.01%	2.348 (0.019)	55.81%
LICHSGFIN	22.93%	77.07%	3.830 (0.000)	54.85%
MARUTI	49.20%	50.80%	-4.626 (0.000)	30.57%
MATRIXLABS	31.44%	68.56%	-1.537 (0.125)	43.50%
MRPL	21.99%	78.01%	10.668 (0.000)	56.50%
MTNL	25.63%	74.37%	8.605 (0.000)	36.84%
NAGARFERT	12.88%	87.12%	18.563 (0.000)	68.61%
NATIONALUM	42.68%	57.32%	-4.910 (0.000)	45.75%
NDTV	21.13%	78.87%	15.596 (0.000)	52.09%
NEYVELILIG	23.17%	76.83%	10.479 (0.000)	50.35%
NICOLASPIR	36.17%	63.83%	1.211 (0.227)	50.83%
NTPC	34.02%	65.98%	5.568 (0.000)	31.96%
ORIENTBANK	33.33%	66.67%	1.476 (0.140)	39.93%
PATNI	32.86%	67.14%	3.459 (0.001)	42.55%
PNB	43.41%	56.59%	-5.425 (0.000)	39.57%
POLARIS	15.35%	84.65%	21.180 (0.000)	48.00%
REL	38.86%	61.14%	-3.262 (0.001)	36.00%
RELCAPITAL	19.15%	80.85%	12.798 (0.000)	44.44%
RELIANCE	29.53%	70.47%	9.517 (0.000)	32.13%
SBIN	20.32%	79.68%	11.388 (0.000)	38.14%
SCI	17.91%	82.09%	11.325 (0.000)	43.30%
SRF	21.21%	78.79%	9.348 (0.000)	50.76%
STAR	28.03%	71.97%	1.627 (0.104)	60.86%
SUNPHARMA	85.58%	14.42%	18.109 (0.000)	52.01%
SYNDIBANK	25.68%	74.32%	3.736 (0.000)	47.17%
TATACHEM	32.15%	67.85%	-3.706 (0.000)	45.39%
TATAMOTORS	39.24%	60.76%	-2.613 (0.009)	29.63%
TATAPOWER	39.24%	60.76%	-2.764 (0.006)	35.34%
TATATEA	31.33%	68.67%	5.950 (0.000)	39.04%
TITAN	21.38%	78.62%	9.024 (0.000)	44.47%
TVSMOTORS	30.22%	69.78%	4.126 (0.000)	49.63%
UNIONBANK	29.86%	70.14%	5.579 (0.000)	38.97%
UTIBANK	58.16%	41.84%	-6.668 (0.000)	39.72%
VIJAYABANK	19.37%	80.61%	12.025 (0.000)	54.14%
WOCKPHARMA	22.22%	77.78%	7.674 (0.000)	51.77%

Continued...

Table 3: Testing the Equality of Mean Mispricings Over Various Trading Weeks to Maturity

Symbol	*Weeks → Statistics↓*	*One*	*Two*	*Three*	*Four*	*Five*	*H Value*
BankNifty	Count	73	91	89	69	63	22.49*
	Mean Rank	152.79	179.10	222.08	186.99	225.17	
CNXIT	Count	152	193	191	155	143	42.37*
	Mean Rank	343.28	367.94	446.85	443.52	495.87	
Nifty	Count	184	229	228	188	170	72.67*
	Mean Rank	349.85	479.54	551.21	550.82	565.19	
ABB	Count	81	99	94	77	72	32.04*
	Mean Rank	157.04	200.03	211.48	245.83	254.79	
ACC	Count	184	229	228	188	170	122.64*
	Mean Rank	332.35	436.99	536.68	609.40	596.16	
ALBK	Count	81	99	94	77	72	71.00*
	Mean Rank	148.85	196.54	190.37	238.06	304.67	
ALOKTEXT	Count	73	91	89	73	70	89.89*
	Mean Rank	138.22	149.55	188.07	256.77	277.50	
ANDHRABANK	Count	152	193	191	155	143	123.00*
	Mean Rank	270.48	351.58	449.48	518.11	510.97	
ARVINDMILL	Count	148	188	186	151	141	123.33*
	Mean Rank	272.95	331.80	436.75	489.68	523.06	
ASHOKLEY	Count	81	99	94	77	72	75.86*
	Mean Rank	135.17	173.13	233.64	279.32	251.63	
AUROPHARMA	Count	77	96	91	73	70	57.86*
	Mean Rank	131.16	187.69	205.84	240.63	265.91	
BAJAJAUTO	Count	184	229	228	188	170	72.66*
	Mean Rank	362.77	466.05	526.43	557.69	595.02	
BANKBARODA	Count	152	193	191	155	143	110.09*
	Mean Rank	260.24	389.95	429.84	497.60	518.54	
BANKINDIA	Count	152	193	191	155	143	102.29*
	Mean Rank	287.47	365.32	436.46	467.47	546.65	
BEL	Count	180	225	223	183	166	120.77*
	Mean Rank	311.53	464.29	493.77	593.67	593.13	
BHEL	Count	184	229	228	188	170	59.19*
	Mean Rank	376.01	486.39	510.11	531.39	604.26	
BILT	Count	77	96	91	73	70	43.12*
	Mean Rank	143.51	184.24	206.93	247.01	248.97	
BONGAIREFN	Count	77	96	91	73	70	105.56*
	Mean Rank	112.53	164.94	218.07	259.18	282.36	
BPCL	Count	184	229	228	188	170	104.02*
	Mean Rank	328.20	461.41	555.28	569.85	586.55	
CANBK	Count	152	193	191	155	143	103.30*
	Mean Rank	290.64	357.65	427.20	506.69	523.48	
CENTURYTEX	Count	81	99	94	77	72	81.91*
	Mean Rank	125.62	183.34	223.57	261.83	280.18	

Continued...

Symbol	Weeks → Statistics↓	One	Two	Three	Four	Five	H Value
CESC	Count	77	96	91	73	70	51.45*
	Mean Rank	129.92	196.51	206.97	235.89	258.64	
CHAMBLFERT	Count	77	96	91	73	70	47.30*
	Mean Rank	131.74	189.52	224.75	229.85	249.41	
COLGATE	Count	81	99	94	77	72	15.76*
	Mean Rank	174.07	199.03	221.07	244.29	226.13	
CORPBANK	Count	77	96	91	73	70	17.69*
	Mean Rank	159.32	195.49	217.45	229.96	220.26	
CUMMINSIND	Count	73	91	85	69	63	52.00*
	Mean Rank	118.88	178.59	201.87	231.20	233.79	
DIVISLAB	Count	77	96	91	73	70	47.72*
	Mean Rank	136.13	192.92	202.74	241.99	255.89	
ESCORTS	Count	73	91	89	73	70	100.48*
	Mean Rank	116.97	171.90	178.33	262.45	277.06	
ESSAROIL	Count	77	96	91	73	70	83.81*
	Mean Rank	114.51	181.76	211.14	261.16	264.04	
FEDERALBNK	Count	77	96	91	73	70	32.85*
	Mean Rank	149.56	184.50	217.92	228.84	246.63	
GAIL	Count	148	188	186	151	141	105.53*
	Mean Rank	249.99	383.84	427.34	489.89	489.98	
GLAXO	Count	81	99	94	77	72	36.56*
	Mean Rank	149.70	194.44	231.84	241.35	248.93	
GNFC	Count	77	96	91	73	70	92.02*
	Mean Rank	112.52	178.84	211.80	251.63	279.31	
GRASIM	Count	184	229	228	188	170	111.32*
	Mean Rank	339.76	451.33	518.79	577.42	628.18	
HCLTECH	Count	180	225	223	183	166	47.27*
	Mean Rank	404.88	442.00	502.12	519.49	592.68	
HDFC	Count	184	229	228	188	170	46.98*
	Mean Rank	383.04	486.98	513.44	551.14	569.55	
HDFCBANK	Count	152	193	191	155	143	61.63*
	Mean Rank	314.79	367.84	443.85	485.99	484.27	
HEROHONDA	Count	180	225	223	183	166	62.30*
	Mean Rank	369.96	454.87	501.65	545.80	584.75	
HINDUNILVR	Count	184	229	228	188	170	103.87*
	Mean Rank	349.21	458.70	506.57	564.13	639.10	
HINDPETRO	Count	184	229	228	188	170	114.83*
	Mean Rank	319.38	464.09	548.17	566.49	605.74	
ICICIBANK	Count	180	225	223	183	166	123.49*
	Mean Rank	321.37	431.28	518.65	595.71	591.54	
IDBI	Count	81	99	94	77	72	66.83*
	Mean Rank	135.20	201.65	204.55	242.71	289.51	

Continued...

Symbol	*Weeks →* *Statistics↓*	*One*	*Two*	*Three*	*Four*	*Five*	*H Value*
IDFC	Count	65	81	75	61	60	80.57*
	Mean Rank	109.69	125.75	190.47	234.52	212.43	
IFCI	Count	73	91	89	73	70	84.18*
	Mean Rank	115.73	168.57	200.19	255.23	262.41	
INDUSINDBK	Count	77	96	91	73	70	87.24*
	Mean Rank	115.45	175.41	214.88	265.34	262.50	
IOB	Count	81	99	94	77	72	52.82*
	Mean Rank	139.80	187.85	231.89	254.40	255.11	
IOC	Count	148	188	186	151	141	59.20*
	Mean Rank	290.34	396.47	413.84	454.68	486.28	
IPCL	Count	180	225	223	183	166	245.27*
	Mean Rank	256.54	413.48	513.16	619.05	667.60	
JETAIRWAYS	Count	85	106	98	81	78	27.97*
	Mean Rank	162.64	229.27	242.90	225.09	261.71	
JINDALSTEL	Count	81	99	94	77	72	35.80*
	Mean Rank	154.83	193.77	217.83	254.53	248.29	
JPHYDRO	Count	81	101	94	77	72	95.39*
	Mean Rank	126.20	173.65	226.14	268.68	289.15	
JSTAINLESS	Count	77	96	91	73	70	46.37*
	Mean Rank	140.88	178.86	217.92	240.55	251.69	
KTKBANK	Count	73	91	89	73	70	53.94*
	Mean Rank	132.42	176.14	204.96	221.95	263.81	
LICHSGFIN	Count	81	99	94	77	72	75.88*
	Mean Rank	124.77	187.53	227.40	262.23	269.96	
MARUTI	Count	160	203	198	159	150	53.12*
	Mean Rank	317.91	434.48	466.27	441.84	514.98	
MATRIXLABS	Count	81	99	94	77	72	45.65*
	Mean Rank	139.68	202.45	221.29	245.92	258.08	
MRPL	Count	81	99	94	77	72	88.94*
	Mean Rank	117.16	188.86	223.59	265.77	277.89	
MTNL	Count	184	229	228	188	170	143.24*
	Mean Rank	308.69	449.46	532.58	599.91	620.96	
NAGARFERT	Count	73	91	89	73	70	63.58*
	Mean Rank	127.21	172.68	200.87	237.26	262.99	
NATIONALUM	Count	180	225	223	183	166	123.73*
	Mean Rank	316.71	433.58	527.89	583.96	594.01	
NDTV	Count	77	96	91	73	70	76.54*
	Mean Rank	118.73	179.65	216.23	253.16	264.03	
NEYVELILIG	Count	81	99	94	77	72	66.13*
	Mean Rank	138.35	182.74	226.32	282.75	240.74	
NICOLASPIR	Count	81	99	94	77	72	34.28*
	Mean Rank	159.74	187.96	225.21	235.81	261.14	

Continued...

Symbol	Weeks → Statistics↓	One	Two	Three	Four	Five	H Value
NTPC	Count	100	124	123	98	90	94.31*
	Mean Rank	171.94	225.01	272.63	342.08	346.97	
ORIENTBANK	Count	152	193	191	155	143	110.93*
	Mean Rank	273.62	366.88	440.64	483.48	536.33	
PATNI	Count	81	99	94	77	72	41.85*
	Mean Rank	146.53	203.65	209.77	257.19	251.72	
PNB	Count	152	193	191	155	143	92.63*
	Mean Rank	260.96	424.68	447.72	432.52	517.56	
POLARIS	Count	180	225	223	183	166	224.97*
	Mean Rank	276.42	390.44	543.04	603.03	654.80	
REL	Count	131	163	157	128	121	89.11*
	Mean Rank	208.18	342.54	401.10	398.25	399.14	
RELCAPITAL	Count	81	99	94	77	72	80.38*
	Mean Rank	121.17	192.80	222.37	254.81	281.26	
RELIANCE	Count	184	229	228	188	170	177.11*
	Mean Rank	278.64	458.45	533.35	619.07	619.16	
SBIN	Count	184	229	228	188	170	231.52*
	Mean Rank	272.28	422.60	525.93	630.68	671.44	
SCI	Count	180	225	223	183	166	213.20*
	Mean Rank	289.79	385.73	536.92	604.50	653.28	
SRF	Count	73	91	89	73	70	99.14*
	Mean Rank	102.75	175.32	199.71	251.26	271.93	
STAR	Count	73	91	89	73	70	38.61*
	Mean Rank	147.05	181.99	190.27	226.01	255.39	
SUNPHARMA	Count	81	99	94	77	72	27.64*
	Mean Rank	160.04	201.94	217.45	258.04	227.94	
SYNDIBANK	Count	148	188	186	151	141	97.84*
	Mean Rank	264.05	366.41	437.16	485.97	489.70	
TATACHEM	Count	81	99	94	77	72	37.57*
	Mean Rank	145.95	210.19	211.65	250.61	247.96	
TATAMOTORS	Count	184	229	228	188	170	86.73*
	Mean Rank	349.88	474.37	505.65	583.05	597.58	
TATAPOWER	Count	184	229	228	188	170	113.29*
	Mean Rank	331.78	459.02	516.22	593.62	611.99	
TATATEA	Count	184	229	228	188	170	113.25*
	Mean Rank	319.75	466.72	539.18	594.43	582.94	
TITAN	Count	77	96	91	73	70	78.67*
	Mean Rank	124.17	190.04	188.56	260.59	272.01	
TVSMOTORS	Count	77	96	91	73	70	38.12*
	Mean Rank	140.16	192.93	216.77	224.81	251.11	
UNIONBANK	Count	152	193	191	155	143	83.97*
	Mean Rank	299.28	378.91	414.66	479.82	531.48	

Continued...

Symbol	*Weeks →* *Statistics↓*	*One*	*Two*	*Three*	*Four*	*Five*	*H Value*
UTIBANK	Count	81	99	94	77	72	0.48
	Mean Rank	207.52	211.54	208.11	217.95	216.40	
VIJAYABANK	Count	81	99	94	77	72	74.11*
	Mean Rank	126.94	192.99	214.90	267.78	270.39	
WOCKPHARMA	Count	81	99	94	77	72	88.50*
	Mean Rank	133.83	183.66	204.74	253.36	304.15	

* Significant at 1% Level of Significance

Table 4: Testing the Equality of Mispricing Over Trading Days of the Week

Symbol	*Day →* *Statistics↓*	*Mon*	*Tue*	*Wed*	*Thurs*	*Fri*	*H Value*
BankNifty	Count	77	77	76	76	79	6.22
	Mean Rank	195.01	182.97	195.5	174.51	216.19	
CNXIT	Count	166	169	165	166	168	2.83
	Mean Rank	433.51	405.95	412.01	401.24	434.76	
Nifty	Count	199	202	200	199	199	1.85
	Mean Rank	509.52	493.81	486.96	490.33	519.54	
ABB	Count	84	84	84	84	87	8.18***
	Mean Rank	235.52	209.13	204.98	185.73	224.21	
ACC	Count	199	202	200	199	199	12.52**
	Mean Rank	509.16	487.75	464.65	480.71	558.09	
ALBK	Count	84	84	84	84	87	8.01***
	Mean Rank	208.70	214.45	215.42	184.12	236.44	
ALOKTEXT	Count	79	79	78	78	82	1.40
	Mean Rank	195.91	192.15	194.79	197.77	211.33	
ANDHRABANK	Count	166	169	165	166	168	5.38
	Mean Rank	424.30	414.14	400.85	396.94	450.83	
ARVINDMILL	Count	162	165	161	62	164	17.83*
	Mean Rank	441.56	381.71	388.26	369.31	456.41	
ASHOKLEY	Count	84	84	84	84	87	3.69
	Mean Rank	216.70	207.25	200.30	203.39	231.66	
AUROPHARMA	Count	81	81	80	81	84	11.95**
	Mean Rank	213.58	197.99	180.14	189.57	237.20	
BAJAJAUTO	Count	199	202	200	199	199	10.11**
	Mean Rank	521.61	504.89	485.04	452.73	535.74	
BANKBARODA	Count	166	169	165	166	168	4.43
	Mean Rank	431.30	396.10	410.89	405.40	443.84	
BANKINDIA	Count	166	169	165	166	168	11.38**
	Mean Rank	452.07	395.04	392.16	396.37	451.71	

Continued...

Symbol	Day → Statistics↓	Mon	Tue	Wed	Thurs	Fri	H Value
BEL	Count	195	198	195	194	195	17.88*
	Mean Rank	507.56	470.24	459.54	452.42	555.34	
BHEL	Count	199	202	200	199	199	6.71
	Mean Rank	503.68	514.32	484.14	464.74	532.99	
BILT	Count	81	81	80	81	84	5.88
	Mean Rank	209.15	191.80	187.46	203.31	227.21	
BONGAIREFN	Count	81	81	80	81	84	12.90**
	Mean Rank	212.89	193.99	193.95	178.62	239.13	
BPCL	Count	199	202	200	199	199	10.96**
	Mean Rank	505.50	468.27	487.42	483.62	555.73	
CANBK	Count	166	169	165	166	168	9.85**
	Mean Rank	431.83	389.59	399.58	404.82	461.55	
CENTURYTEX	Count	84	84	84	84	87	5.95
	Mean Rank	227.01	201.05	201.24	198.19	231.80	
CESC	Count	81	81	80	81	84	7.85***
	Mean Rank	223.96	208.28	179.98	190.32	216.69	
CHAMBLFERT	Count	81	81	80	81	84	7.04
	Mean Rank	223.09	194.52	191.06	188.41	222.10	
COLGATE	Count	84	84	84	84	87	3.85
	Mean Rank	219.81	199.98	201.27	207.95	230.33	
CORPBANK	Count	81	81	80	81	84	3.61
	Mean Rank	212.05	205.21	193.58	189.49	218.99	
CUMMINSIND	Count	76	76	75	75	79	8.91***
	Mean Rank	192.62	172.67	178.24	189.36	220.75	
DIVISLAB	Count	81	81	80	81	84	5.87
	Mean Rank	211.77	204.11	201.35	179.75	222.31	
ESCORTS	Count	79	79	78	78	82	7.27
	Mean Rank	198.89	189.56	198.78	178.78	225.23	
ESSAROIL	Count	81	81	80	81	84	14.03*
	Mean Rank	205.88	185.22	185.95	197.10	244.14	
FEDERALBNK	Count	81	81	80	81	84	7.20
	Mean Rank	220.14	204.64	194.76	179.36	220.38	
GAIL	Count	162	165	161	162	164	15.02*
	Mean Rank	424.69	409.84	393.46	356.53	452.30	
GLAXO	Count	84	84	84	84	87	6.83
	Mean Rank	220.79	214.39	195.83	193.55	234.63	
GNFC	Count	81	81	80	81	84	8.94***
	Mean Rank	205.67	201.86	188.99	186.98	235.17	

Continued...

Symbol	*Day → Statistics↓*	*Mon*	*Tue*	*Wed*	*Thurs*	*Fri*	*H Value*
GRASIM	Count	199	202	200	199	199	9.57**
	Mean Rank	515.36	497.55	471.26	470.57	545.45	
HCLTECH	Count	195	198	195	194	195	3.27
	Mean Rank	502.56	501.61	461.57	500.48	478.64	
HDFC	Count	199	202	200	199	199	4.66
	Mean Rank	496.20	479.16	498.46	489.36	537.15	
HDFCBANK	Count	166	169	165	166	168	7.40
	Mean Rank	422.30	402.31	402.13	400.66	459.78	
HEROHONDA	Count	195	198	195	194	195	8.74***
	Mean Rank	490.99	493.29	463.44	461.69	535.38	
HINDUNILVR	Count	199	202	200	199	199	13.59*
	Mean Rank	531.45	483.51	464.22	472.51	548.75	
HINDPETRO	Count	199	202	200	199	199	13.14**
	Mean Rank	529.25	467.35	480.67	473.51	549.81	
ICICIBANK	Count	195	198	195	194	195	5.01
	Mean Rank	503.15	499.90	469.71	460.08	511.84	
IDBI	Count	84	84	84	84	87	8.52***
	Mean Rank	236.80	216.21	195.74	189.19	221.71	
IDFC	Count	68	68	67	68	71	3.80
	Mean Rank	174.26	171.50	157.01	165.46	188.31	
IFCI	Count	79	79	78	78	82	8.22***
	Mean Rank	199.34	197.66	192.81	175.15	226.12	
INDUSINDBK	Count	81	81	80	81	84	6.49
	Mean Rank	209.31	196.48	194.84	188.38	229.92	
IOB	Count	84	84	84	84	87	10.93**
	Mean Rank	211.38	211.49	204.70	185.42	245.80	
IOC	Count	162	165	161	162	164	10.56**
	Mean Rank	428.24	392.27	404.19	368.18	444.43	
IPCL	Count	195	198	195	194	195	18.35*
	Mean Rank	521.92	466.72	466.19	443.56	546.71	
JETAIRWAYS	Count	90	90	89	88	91	5.45
	Mean Rank	233.80	226.04	204.25	213.34	244.37	
JINDALSTEL	Count	84	84	84	84	87	3.23
	Mean Rank	205.33	215.67	207.30	200.38	230.66	
JPHYDRO	Count	85	85	84	84	87	9.57**
	Mean Rank	221.18	197.04	203.52	197.27	244.94	
JSTAINLESS	Count	81	81	80	81	84	11.52**
	Mean Rank	208.02	184.73	191.46	194.43	239.87	

Continued...

Symbol	Day → Statistics↓	Mon	Tue	Wed	Thurs	Fri	H Value
KTKBANK	Count	79	79	78	78	82	10.98**
	Mean Rank	211.33	194.84	181.56	175.94	227.24	
LICHSGFIN	Count	84	84	84	84	87	8.59***
	Mean Rank	217.96	213.31	193.83	193.67	240.22	
MARUTI	Count	173	176	173	174	174	7.17
	Mean Rank	456.84	429.25	404.74	420.49	466.20	
MATRIXLABS	Count	84	84	84	84	87	8.79***
	Mean Rank	227.99	217.52	202.83	182.07	228.98	
MRPL	Count	84	84	84	84	87	8.91***
	Mean Rank	224.98	211.31	197.11	188.65	237.06	
MTNL	Count	199	202	200	199	199	14.16*
	Mean Rank	530.75	474.79	455.93	491.13	548.00	
NAGARFERT	Count	79	79	78	78	82	9.18***
	Mean Rank	203.95	187.66	192.03	178.69	228.70	
NATIONALUM	Count	195	198	195	194	195	12.87**
	Mean Rank	500.79	469.10	465.25	462.36	547.67	
NDTV	Count	81	81	80	81	84	6.46
	Mean Rank	206.94	194.05	199.34	188.34	230.43	
NEYVELILIG	Count	84	84	84	84	87	6.35
	Mean Rank	223.83	203.36	200.62	196.46	234.91	
NICOLASPIR	Count	84	84	84	84	87	5.00
	Mean Rank	230.15	200.51	203.06	199.86	225.92	
NTPC	Count	107	108	106	106	108	16.83*
	Mean Rank	302.36	240.32	249.81	246.99	300.11	
ORIENTBANK	Count	166	169	165	166	168	21.82*
	Mean Rank	445.32	418.12	388.85	362.40	471.96	
PATNI	Count	84	84	84	84	87	1.81
	Mean Rank	209.50	210.23	215.80	199.90	224.14	
PNB	Count	166	169	165	166	168	10.19**
	Mean Rank	456.30	396.80	399.02	392.42	442.92	
POLARIS	Count	195	198	195	194	195	18.46*
	Mean Rank	511.52	473.49	450.77	455.44	553.85	
REL	Count	140	142	138	140	140	11.19**
	Mean Rank	360.41	343.98	333.76	319.92	394.29	
RELCAPITAL	Count	84	84	84	84	87	9.29***
	Mean Rank	222.98	200.70	188.54	206.55	240.23	
RELIANCE	Count	199	202	200	199	199	15.17*
	Mean Rank	519.52	499.75	499.11	436.98	544.65	

Continued...

Symbol	*Day → Statistics↓*	*Mon*	*Tue*	*Wed*	*Thurs*	*Fri*	*H Value*
SBIN	Count	199	202	200	199	199	18.28*
	Mean Rank	526.33	489.78	472.14	451.27	560.78	
SCI	Count	195	198	195	194	195	7.27
	Mean Rank	507.06	483.72	470.61	458.10	525.44	
SRF	Count	79	79	78	78	82	11.30**
	Mean Rank	211.86	176.32	195.23	180.33	227.39	
STAR	Count	79	79	78	78	82	4.62
	Mean Rank	213.41	195.03	193.82	179.23	210.27	
SUNPHARMA	Count	84	84	84	84	87	5.39
	Mean Rank	212.98	219.67	209.87	187.71	229.16	
SYNDIBANK	Count	162	165	161	162	164	10.16**
	Mean Rank	405.69	377.49	394.07	404.37	455.76	
TATACHEM	Count	84	84	84	84	87	8.54***
	Mean Rank	232.12	213.36	190.67	193.64	229.59	
TATAMOTORS	Count	199	202	200	199	199	12.47**
	Mean Rank	520.90	493.32	474.77	460.73	550.51	
TATAPOWER	Count	199	202	200	199	199	11.28**
	Mean Rank	510.49	480.42	474.71	478.87	555.93	
TATATEA	Count	199	202	200	199	199	18.67*
	Mean Rank	538.37	506.98	476.74	436.52	541.41	
TITAN	Count	81	81	80	81	84	7.09
	Mean Rank	203.63	191.17	189.40	202.22	232.35	
TVSMOTORS	Count	81	81	80	81	84	7.76
	Mean Rank	211.33	189.56	181.13	211.00	225.89	
UNIONBANK	Count	166	169	165	166	168	3.64
	Mean Rank	439.64	397.79	411.99	405.92	432.31	
UTIBANK	Count	84	84	84	84	87	2.22
	Mean Rank	220.05	195.07	217.73	215.19	211.97	
VIJAYABANK	Count	84	84	84	84	87	9.13**
	Mean Rank	213.11	216.80	195.14	192.10	241.79	
WOCKPHARMA	Count	84	84	84	84	87	3.44
	Mean Rank	212.64	216.42	214.33	191.49	224.67	

* Significant at 1% Level of Significance, ** Significant at 5% Level of Significance and *** Significant at 10% Level of Significance.

Table 5: Serial Correlation in Joint Dynamics (i.e. Basis) of Indian Equity Future and Cash Market

Symbol	*Lag → Statistics↓*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
BankNifty	AC	0.647*	0.570*	0.435*	0.416*	0.431*	0.432*	0.447*	0.412*	0.325*	0.304*
	PAC	0.647*	0.261*	-0.011	0.114***	0.172**	0.091***	0.102***	0.026	-0.101***	0.020
	LB	162.463*	288.994*	362.961*	430.524*	503.429*	576.838*	655.738*	722.784*	764.744*	801.373*
Cnxit	AC	0.674*	0.599*	0.529*	0.507*	0.468	0.451	0.392	0.395	0.391	0.390
	PAC	0.674*	0.265*	0.106***	0.123***	0.056	0.065	-0.028	0.069	0.067	0.052
	LB	380.154*	680.868*	915.625*	1131.875*	1316.326	1487.416	1617.151	1748.845	1878.310	2007.162
Nifty	AC	0.760*	0.683*	0.590*	0.554*	0.509*	0.502*	0.467*	0.470*	0.452*	0.435*
	PAC	0.760*	0.251*	0.028	0.103***	0.044	0.098***	0.012	0.087***	0.034	0.009
	LB	578.180*	1046.377*	1396.275*	1704.882*	1965.885*	2219.832*	2439.460*	2662.611*	2868.537*	3059.538*
ABB	AC	0.745*	0.717*	0.638*	0.571*	0.522*	0.467*	0.441*	0.419*	0.406*	0.366*
	PAC	0.745*	0.364*	0.070***	-0.010	0.018	-0.004	0.047	0.056	0.052	-0.039
	LB	236.333*	455.701*	629.683*	769.550*	886.812*	980.768*	1064.817*	1140.878*	1212.501*	1270.764*
ACC	AC	0.790*	0.693*	0.620*	0.560*	0.510*	0.487*	0.465*	0.453*	0.442*	0.413*
	PAC	0.790*	0.181*	0.079***	0.041	0.030	0.079***	0.046	0.056	0.040	-0.017
	LB	625.737*	1106.849*	1492.637*	1807.274*	2068.432*	2307.325*	2525.403*	2732.695*	2929.721*	3102.089*
ALBK	AC	0.909*	0.869*	0.828*	0.791*	0.752*	0.715*	0.665*	0.634*	0.600*	0.557*
	PAC	0.909*	0.243*	0.056	0.023	-0.015	-0.007	-0.096***	0.042	0.009	-0.063
	LB	352.331*	674.902*	968.665*	1237.372*	1480.682*	1701.376*	1892.659*	2066.578*	2222.678*	2357.839*
AOKTEXT	AC	0.729*	0.637*	0.538*	0.474*	0.371*	0.364*	0.277*	0.228*	0.196*	0.131*
	PAC	0.729*	0.226*	0.031	0.043	-0.080***	0.119***	-0.086***	-0.027	0.034	-0.095***
	LB	211.958*	374.244*	490.109*	580.334*	635.679*	689.181*	720.235*	741.278*	756.888*	763.890*
ANDHRABANK	AC	0.699*	0.598*	0.520*	0.446*	0.379*	0.292*	0.261*	0.204*	0.170*	0.104*
	PAC	0.699*	0.215*	0.084***	0.021	-0.002	-0.066	0.037	-0.030	0.006	-0.073***
	LB	408.687*	708.659*	935.188*	1102.080*	1222.843*	1294.637*	1352.065*	1387.146*	1411.643*	1420.827*
ARVINDMILL	AC	0.605*	0.520*	0.489*	0.382*	0.321*	0.304*	0.226*	0.208*	0.197*	0.128*
	PAC	0.605*	0.244*	0.174**	-0.019	-0.007	0.050	-0.044	0.023	0.028	-0.057
	LB	298.673*	519.913*	715.483*	835.279*	919.706*	995.638*	1037.744*	1073.250*	1105.287*	1118.871*
ASHOKLEY	AC	0.722*	0.604*	0.420*	0.318*	0.215*	0.177*	0.130*	0.071*	0.074*	0.091*
	PAC	0.722*	0.173**	-0.141**	0.008	-0.018	0.051	-0.003	-0.081***	0.081***	0.086***
	LB	221.959*	377.677*	453.199*	496.713*	516.583*	530.092*	537.392*	539.601*	541.951*	545.533*
AUROPHARMA	AC	0.419*	0.297*	0.335*	0.270*	0.258*	0.214*	0.201*	0.176*	0.166*	0.188*
	PAC	0.419*	0.147**	0.207*	0.067	0.088***	0.016	0.040	0.007	0.027	0.059
	LB	72.093*	108.374*	154.523*	184.597*	212.228*	231.296*	248.144*	261.034*	272.536*	287.398*

Continued...

Symbol	Lag → Statistics↓	1	2	3	4	5	6	7	8	9	10
BAJAJAUTO	AC	0.796*	0.691*	0.630*	0.592*	0.553*	0.520*	0.481*	0.457*	0.420*	0.391*
	PAC	0.796*	0.156**	0.117***	0.097***	0.041	0.038	0.002	0.033	-0.020	0.005
	LB	634.530*	1112.812*	1510.991*	1863.613*	2171.290*	2443.471*	2677.100*	2887.449*	3065.236*	3219.441*
BANKBARODA	AC	0.706*	0.586*	0.540*	0.452*	0.415*	0.400*	0.401*	0.360*	0.370*	0.356*
	PAC	0.706*	0.175**	0.153**	-0.013	0.066	0.070***	0.098***	-0.021	0.091***	0.014
	LB	417.704*	705.935*	950.321*	1122.119*	1267.082*	1402.071*	1537.906*	1647.213*	1762.963*	1870.385*
BANKINDIA	AC	0.657*	0.554*	0.472*	0.419*	0.347*	0.272*	0.250*	0.207*	0.157*	0.146*
	PAC	0.657*	0.216*	0.082***	0.063	-0.011	-0.044	0.043	-0.008	-0.036	0.033
	LB	361.490*	619.005*	805.939*	953.330*	1054.473*	1116.565*	1169.441*	1205.755*	1226.623*	1244.649*
BEL	AC	0.642*	0.541*	0.495*	0.433*	0.372*	0.330*	0.295*	0.299*	0.250*	0.222*
	PAC	0.642*	0.220*	0.147**	0.051	0.008	0.014	0.013	0.077***	-0.027	-0.004
	LB	403.999*	691.617*	931.910*	1116.530*	1252.994*	1360.435*	1446.220*	1534.671*	1596.335*	1644.925*
BHEL	AC	0.635*	0.545*	0.451*	0.409*	0.372*	0.372*	0.351*	0.351*	0.315*	0.289*
	PAC	0.635*	0.238*	0.065	0.079***	0.055	0.095***	0.045	0.063	0.000	0.000
	LB	403.442*	701.253*	905.442*	1073.803*	1212.670*	1352.372*	1476.740*	1600.992*	1701.283*	1785.537*
BILT	AC	0.617*	0.479*	0.365*	0.323*	0.259*	0.213*	0.208*	0.196*	0.151*	0.107*
	PAC	0.617*	0.159**	0.030	0.079***	0.003	0.005	0.062	0.031	-0.034	-0.031
	LB	156.278*	250.728*	305.662*	348.629*	376.358*	395.184*	413.139*	429.206*	438.739*	443.515*
BONGAIREFN	AC	0.878*	0.792*	0.699*	0.613*	0.514*	0.422*	0.336*	0.251*	0.179*	0.142*
	PAC	0.878*	0.090***	-0.056	-0.028	-0.108***	-0.047	-0.028	-0.056	-0.005	0.109***
	LB	316.240*	573.950*	775.314*	930.735*	1039.969*	1113.748*	1160.678*	1186.943*	1200.335*	1208.794*
BPCL	AC	0.696*	0.622*	0.544*	0.505*	0.443*	0.397*	0.345*	0.320*	0.304*	0.265*
	PAC	0.696*	0.268*	0.085***	0.088***	0.004	0.006	-0.016	0.024	0.043	-0.020
	LB	484.692*	872.941*	1170.220*	1427.011*	1624.579*	1783.677*	1903.814*	2006.964*	2100.376*	2171.512*
CANBK	AC	0.710*	0.643*	0.573*	0.475*	0.435*	0.359*	0.312*	0.261*	0.238*	0.185*
	PAC	0.710*	0.280*	0.098***	-0.043	0.043	-0.038	-0.001	-0.020	0.040	-0.048
	LB	422.379*	769.382*	1044.519*	1234.350*	1393.279*	1501.846*	1583.729*	1641.293*	1689.336*	1718.244*
CENTURYTEX	AC	0.621*	0.513*	0.453*	0.426*	0.374*	0.330*	0.341*	0.320*	0.280*	0.296*
	PAC	0.621*	0.208*	0.122***	0.110***	0.030	0.016	0.092***	0.032	-0.012	0.078***
	LB	164.023*	276.247*	363.945*	441.820*	501.951*	549.023*	599.346*	643.829*	677.857*	716.096*
CESC	AC	0.561*	0.465*	0.434*	0.397*	0.353*	0.298*	0.238*	0.252*	0.277*	0.230*
	PAC	0.561*	0.220*	0.165**	0.097***	0.047	-0.003	-0.037	0.062	0.097***	-0.005
	LB	128.876*	217.815*	295.480*	360.534*	412.209*	449.144*	472.774*	499.339*	531.521*	553.757*

Continued...

Symbol	Lag → Statistics↓	1	2	3	4	5	6	7	8	9	10
CHAMBLFERT	AC	0.868*	0.807*	0.725*	0.675*	0.614*	0.564*	0.512*	0.463*	0.412*	0.350*
	PAC	0.868*	0.215*	-0.048	0.064	-0.018	-0.003	-0.013	-0.024	-0.028	-0.086***
	LB	309.159*	576.714*	793.465*	981.643*	1137.854*	1270.066*	1379.251*	1468.599*	1539.686*	1590.984*
COLGATE	AC	0.559*	0.368*	0.317*	0.191*	0.189*	0.129*	0.093*	0.146*	0.157*	0.068*
	PAC	0.559*	0.080***	0.121***	-0.064	0.095***	-0.044	0.018	0.093***	0.057	-0.103***
	LB	133.166*	190.965*	233.889*	249.580*	264.906*	272.092*	275.816*	284.995*	295.633*	297.646*
CORPBANK	AC	0.712*	0.565*	0.422*	0.319*	0.256*	0.220*	0.167*	0.112*	0.072*	0.059*
	PAC	0.712	0.118***	-0.035	-0.005	0.034	0.040	-0.036	-0.044	-0.007	0.033
	LB	207.957*	339.292*	412.745*	454.668*	481.772*	501.916*	513.530*	518.743*	520.908*	522.367*
CUMMINSIND	AC	0.561*	0.483*	0.366*	0.349*	0.262*	0.223*	0.202*	0.231*	0.197*	0.172*
	PAC	0.561*	0.247*	0.037	0.102***	-0.018	0.001	0.038	0.095***	0.007	-0.010
	LB	120.646*	210.637*	262.348*	309.549*	336.233*	355.607*	371.458*	392.290*	407.521*	419.160*
DIVISLAB	AC	0.450*	0.429*	0.300*	0.265*	0.238*	0.252*	0.217*	0.246*	0.223*	0.233*
	PAC	0.450*	0.284*	0.047	0.049	0.061	0.093***	0.028	0.079***	0.042	0.052
	LB	82.891*	158.401*	195.573*	224.617*	248.081*	274.491*	294.030*	319.203*	339.993*	362.839*
ESCORTS	AC	0.450*	0.354*	0.206*	0.097*	0.063*	0.093*	0.103*	0.054*	0.080*	0.022*
	PAC	0.450*	0.191*	-0.012	-0.055	0.010	0.085***	0.052	-0.048	0.036	-0.033
	LB	80.659*	130.890*	147.855*	151.607*	153.220*	156.712*	160.974*	162.141*	164.756*	164.953*
ESSAROIL	AC	0.454*	0.319*	0.241*	0.226*	0.208*	0.160*	0.133*	0.115*	0.148*	0.083*
	PAC	0.454*	0.142**	0.068	0.086***	0.062	0.007	0.011	0.013	0.069	-0.046
	LB	84.654*	126.424*	150.437*	171.578*	189.474*	200.159*	207.497*	213.048*	222.172*	225.027*
FEDERALBNK	AC	0.631*	0.537*	0.446*	0.369*	0.331*	0.363*	0.342*	0.247*	0.265*	0.250*
	PAC	0.631*	0.232*	0.070***	0.016	0.049	0.153**	0.048	-0.118***	0.074***	0.054
	LB	163.038*	281.650*	363.693*	419.832*	465.126*	519.715*	568.269*	593.802*	623.174*	649.302*
GAIL	AC	0.803*	0.725*	0.641*	0.591*	0.530*	0.451*	0.397*	0.331*	0.285*	0.240*
	PAC	0.803*	0.224*	0.029	0.069	-0.007	-0.082***	-0.001	-0.047	-0.005	0.003
	LB	526.909*	956.343*	1293.268*	1580.044*	1810.469*	1977.903*	2107.917*	2197.644*	2264.451*	2312.219*
GLAXO	AC	0.691*	0.640*	0.503*	0.466*	0.435*	0.373*	0.309*	0.290*	0.212*	0.192*
	PAC	0.691*	0.311*	-0.033	0.075***	0.103***	-0.035	-0.063	0.064	-0.080***	-0.015
	LB	203.220*	377.919*	486.414*	579.592*	661.071*	721.181*	762.331*	798.710*	818.274*	834.320*
GNFC	AC	0.829*	0.748*	0.679*	0.612*	0.541*	0.476*	0.424*	0.348*	0.309*	0.243*
	PAC	0.829*	0.194*	0.060	0.007	-0.039	-0.025	0.007	-0.092***	0.042	-0.078***
	LB	281.832*	511.776*	701.526*	856.424*	977.549*	1071.577*	1146.357*	1196.892*	1236.710*	1261.516*

Continued...

Symbol	Lag → Statistics↓	1	2	3	4	5	6	7	8	9	10
GRASIM	AC	0.727*	0.620*	0.533*	0.484*	0.437*	0.400*	0.364*	0.327*	0.287*	0.261*
	PAC	0.727*	0.194*	0.064	0.078***	0.037	0.030	0.018	-0.002	-0.014	0.010
	LB	529.124*	914.117*	1199.136*	1434.682*	1627.003*	1788.014*	1921.891*	2029.607*	2112.769*	2181.587*
HCLTECH	AC	0.480*	0.397*	0.307*	0.265*	0.256*	0.320*	0.281*	0.346*	0.222*	0.223*
	PAC	0.480*	0.216*	0.073***	0.061	0.079***	0.169**	0.046	0.149**	-0.076***	0.024
	LB	226.122*	380.722*	473.110*	542.101*	606.405*	707.334*	785.310*	903.224*	951.827*	1001.076*
HDFC	AC	0.627*	0.508*	0.440*	0.381*	0.336*	0.334*	0.316*	0.314*	0.291*	0.278*
	PAC	0.627*	0.189**	0.108***	0.052	0.038	0.086***	0.046	0.061	0.017	0.028
	LB	394.245*	653.070*	847.596*	993.319*	1107.173*	1219.379*	1320.167*	1419.369*	1504.804*	1583.003*
HDFCBANK	AC	0.603*	0.552*	0.474*	0.412*	0.395*	0.384*	0.333*	0.322*	0.278*	0.273*
	PAC	0.603*	0.296*	0.106***	0.041	0.082***	0.085***	-0.006	0.030	-0.013	0.034
	LB	304.721*	560.069*	748.827*	891.561*	1023.019*	1147.344*	1241.011*	1328.603*	1394.027*	1457.288*
HEROHONDA	AC	0.824*	0.722*	0.635*	0.556*	0.493*	0.425*	0.360*	0.294*	0.227*	0.188*
	PAC	0.824*	0.134**	0.032	-0.003	0.017	-0.034	-0.027	-0.047	-0.048	0.033
	LB	665.120*	1176.044*	1572.549*	1876.874*	2116.157*	2293.705*	2421.759*	2506.953*	2558.088*	2593.215*
HINDUNILVR	AC	0.827*	0.734*	0.643*	0.570*	0.494*	0.435*	0.370*	0.317*	0.259*	0.210*
	PAC	0.827*	0.159**	0.004	0.016	-0.030	0.012	-0.033	-0.011	-0.037	-0.016
	LB	685.142*	1225.795*	1641.214*	1967.484*	2212.508*	2402.880*	2541.229*	2642.314*	2709.910*	2754.490*
HINDPETRO	AC	0.751*	0.639*	0.517*	0.437*	0.399*	0.344*	0.307*	0.279*	0.222*	0.178*
	PAC	0.751*	0.171**	-0.023	0.029	0.085***	-0.012	0.011	0.031	-0.062	-0.029
	LB	565.444*	974.830*	1242.907*	1435.247*	1595.317*	1714.398*	1809.308*	1887.820*	1937.478*	1969.412*
ICICIBANK	AC	0.712*	0.592*	0.487*	0.446*	0.453*	0.454*	0.435*	0.438*	0.377*	0.348*
	PAC	0.712*	0.174**	0.030	0.101***	0.152**	0.092***	0.035	0.092***	-0.054	0.004
	LB	496.378*	840.641*	1073.076*	1268.313*	1470.502*	1673.618*	1860.554*	2049.968*	2190.968*	2310.300*
IDBI	AC	0.700*	0.609*	0.506*	0.485*	0.433*	0.368*	0.333*	0.295*	0.228*	0.214*
	PAC	0.700*	0.232*	0.034	0.131**	0.029	-0.040	0.029	0.001	-0.080***	0.043
	LB	208.996*	367.226*	476.901*	577.894*	658.482*	716.751*	764.678*	802.250*	824.855*	844.720*
IDFC	AC	0.797*	0.695*	0.593*	0.497*	0.412*	0.335*	0.246*	0.218*	0.189*	0.182*
	PAC	0.797*	0.163**	0.000	-0.035	-0.021	-0.024	-0.077***	0.093***	0.033	0.057
	LB	219.099*	386.031*	508.192*	594.042*	653.415*	692.689*	713.964*	730.732*	743.341*	755.126*
IFCI	AC	0.401*	0.291*	0.186*	0.147*	0.173*	0.132*	0.108*	0.128*	0.117*	0.110*
	PAC	0.401*	0.155**	0.031	0.037	0.095***	0.018	0.008	0.061	0.031	0.018
	LB	64.265*	98.088*	111.984*	120.667*	132.686*	139.779*	144.512*	151.159*	156.736*	161.683*

Continued...

Symbol	Lag → Statistics↓	1	2	3	4	5	6	7	8	9	10
INDUSINDBK	AC	0.646*	0.540*	0.459*	0.408*	0.346*	0.295*	0.266*	0.221*	0.155*	0.126*
	PAC	0.646*	0.210*	0.086***	0.067	0.008	0.002	0.027	-0.017	-0.064	-0.005
	LB	171.055*	290.839*	377.686*	446.581*	496.176*	532.359*	561.913*	582.265*	592.341*	598.996*
IOB	AC	0.737*	0.595*	0.455*	0.397*	0.340*	0.332*	0.298*	0.274*	0.258*	0.259*
	PAC	0.737*	0.114***	-0.038	0.097***	0.022	0.087***	0.004	0.012	0.044	0.052
	LB	231.084*	382.142*	470.753*	538.521*	588.370*	635.784*	674.182*	706.604*	735.430*	764.624*
IOC	AC	0.671*	0.603*	0.554*	0.477*	0.429*	0.392*	0.344*	0.297*	0.265*	0.238*
	PAC	0.671*	0.277*	0.149**	0.016	0.020	0.028	-0.004	-0.022	-0.001	0.008
	LB	368.162*	665.179*	916.449*	1103.128*	1253.912*	1380.306*	1477.779*	1550.510*	1608.635*	1655.455*
IPCL	AC	0.859*	0.760*	0.654*	0.547*	0.461*	0.371*	0.298*	0.253*	0.210*	0.187*
	PAC	0.859*	0.082***	-0.063	-0.070***	0.010	-0.054	-0.005	0.067	-0.005	0.036
	LB	723.509*	1289.794*	1709.192*	2002.950*	2211.673*	2347.193*	2434.549*	2497.789*	2541.383*	2576.087*
JETAIRWAYS	AC	0.583*	0.522*	0.477*	0.440*	0.441*	0.354*	0.344*	0.345*	0.326*	0.384*
	PAC	0.583*	0.276*	0.157**	0.098***	0.120***	-0.038	0.032	0.065	0.034	0.149**
	LB	153.330*	276.535*	379.503*	467.358*	555.668*	612.959*	666.991*	721.388*	770.075*	838.047*
JINDALSTEL	AC	0.570*	0.507*	0.445*	0.371*	0.338*	0.333*	0.311*	0.325*	0.274*	0.326*
	PAC	0.570*	0.269*	0.129***	0.030	0.046	0.081***	0.048	0.084***	-0.019	0.119***
	LB	138.494*	248.138*	333.030*	392.136*	441.315*	489.222*	531.055*	576.922*	609.640*	655.951*
JPHYDRO	AC	0.546*	0.460*	0.326*	0.253*	0.122*	0.041*	0.025*	0.007*	0.002*	-0.015*
	PAC	0.546*	0.230*	0.011	0.010	-0.097***	-0.071***	0.031	0.021	0.016	-0.016
	LB	127.696*	218.306*	264.129*	291.656*	298.138*	298.852*	299.117*	299.141*	299.144*	299.240*
JSTAINLESS	AC	0.518*	0.371*	0.267*	0.206*	0.142*	0.177*	0.147*	0.153*	0.212*	0.146*
	PAC	0.518*	0.140**	0.040	0.032	-0.008	0.103***	0.012	0.045	0.123***	-0.050
	LB	109.863*	166.371*	195.685*	213.261*	221.637*	234.618*	243.621*	253.386*	272.122*	281.029*
KTKBANK	AC	0.862*	0.804*	0.757*	0.736*	0.716*	0.673*	0.633*	0.602*	0.563*	0.532*
	PAC	0.862*	0.236*	0.103***	0.130**	0.083***	-0.047	-0.027	0.007	-0.050	-0.010
	LB	296.488*	554.816*	784.931*	1002.454*	1208.944*	1392.006*	1554.542*	1701.951*	1831.147*	1946.830*
LICHSGFIN	AC	0.822*	0.747*	0.673*	0.616*	0.546*	0.493*	0.445*	0.380*	0.323*	0.279*
	PAC	0.822*	0.219*	0.044	0.039	-0.038	0.004	0.004	-0.069	-0.035	0.003
	LB	287.770*	525.761*	719.524*	882.253*	1010.608*	1115.512*	1200.907*	1263.320*	1308.573*	1342.391*
MARUTI	AC	0.658*	0.568*	0.497*	0.446*	0.410*	0.391*	0.372*	0.372*	0.364*	0.346*
	PAC	0.658*	0.238*	0.104***	0.067	0.054	0.065	0.049	0.070***	0.049	0.020
	LB	377.674*	659.548*	875.797*	1050.394*	1197.555*	1331.849*	1453.689*	1575.617*	1692.658*	1798.248*

Continued...

Symbol	Lag → Statistics↓	1	2	3	4	5	6	7	8	9	10
MATRIXLABS	AC	0.909*	0.809*	0.745*	0.681*	0.613*	0.542*	0.447*	0.332*	0.253*	0.196*
	PAC	0.909*	-0.095***	0.153**	-0.065	-0.014	-0.074***	-0.177**	-0.191*	0.107***	-0.001
	LB	351.820*	631.534*	869.402*	1068.182*	1229.960*	1356.503*	1442.998*	1490.652*	1518.479*	1535.148*
MRPL	AC	0.734*	0.620*	0.547*	0.481*	0.434*	0.359*	0.317*	0.305*	0.283*	0.256*
	PAC	0.734*	0.175**	0.096***	0.035	0.041	-0.050	0.016	0.064	0.021	-0.001
	LB	229.559*	393.560*	521.617*	620.705*	701.561*	757.245*	800.668*	841.023*	875.750*	904.256*
MTNL	AC	0.750*	0.630*	0.530*	0.436*	0.328*	0.264*	0.209*	0.188*	0.142*	0.085*
	PAC	0.750*	0.154**	0.036	-0.016	-0.080***	0.016	0.003	0.057	-0.035	-0.076***
	LB	562.957*	960.421*	1242.407*	1433.440*	1541.635*	1612.055*	1656.215*	1691.813*	1712.317*	1719.625*
NAGARFERT	AC	0.442*	0.327*	0.299*	0.236*	0.195*	0.181*	0.188*	0.187*	0.207*	0.113*
	PAC	0.442*	0.164**	0.136**	0.046	0.029	0.040	0.063	0.054	0.076***	-0.071***
	LB	77.977*	120.811*	156.782*	179.249*	194.533*	207.735*	222.083*	236.288*	253.715*	258.893*
NATINALUM	AC	0.792*	0.741*	0.664*	0.647*	0.583*	0.541*	0.489*	0.470*	0.420*	0.382*
	PAC	0.792*	0.307*	0.043	0.140**	-0.025	-0.010	-0.017	0.047	-0.040	-0.027
	LB	614.057*	1152.877*	1585.986*	1997.511*	2332.388*	2621.158*	2857.219*	3075.605*	3249.529*	3393.842*
NDTV	AC	0.456*	0.338*	0.280*	0.236*	0.240*	0.106*	0.152*	0.083*	0.035*	0.069*
	PAC	0.456*	0.165**	0.098***	0.060	0.091***	-0.099***	0.081***	-0.047	-0.044	0.045
	LB	85.280*	132.359*	164.647*	187.678*	211.623*	216.261*	225.817*	228.691*	229.213*	231.203*
NEYVELILIG	AC	0.537*	0.494*	0.385*	0.324*	0.298*	0.236*	0.217*	0.221*	0.195*	0.151*
	PAC	0.537*	0.289*	0.063	0.030	0.061	-0.007	0.021	0.066	0.016	-0.041
	LB	122.813*	227.082*	290.541*	335.655*	373.793*	397.762*	418.161*	439.331*	455.911*	465.781*
NICOLASPIR	AC	0.619*	0.558*	0.489*	0.443*	0.418*	0.381*	0.367*	0.348*	0.309*	0.254*
	PAC	0.619*	0.284*	0.117***	0.072***	0.075***	0.034	0.051	0.037	-0.012	-0.058
	LB	163.019*	296.116*	398.632*	482.714*	557.878*	620.507*	678.836*	731.381*	772.913*	801.014*
NTPC	AC	0.678*	0.498*	0.434*	0.432*	0.330*	0.230*	0.169*	0.140*	0.118*	0.086*
	PAC	0.678*	0.071***	0.135**	0.147**	-0.088***	-0.054	-0.026	-0.011	0.023	0.000
	LB	246.999*	380.516*	482.366*	583.228*	642.202*	670.830*	686.459*	697.202*	704.851*	708.884*
ORIENTBANK	AC	0.737*	0.611*	0.508*	0.402*	0.325*	0.274*	0.261*	0.227*	0.197*	0.177*
	PAC	0.737*	0.148**	0.036	-0.040	0.001	0.028	0.079***	-0.008	-0.011	0.009
	LB	454.674*	767.160*	984.032*	1119.450*	1208.209*	1271.593*	1328.935*	1372.513*	1405.194*	1431.829*
PATNI	AC	0.381*	0.273*	0.176*	0.117*	0.084*	0.132*	0.201*	0.185*	0.147*	0.152*
	PAC	0.381*	0.149**	0.037	0.012	0.011	0.092***	0.139**	0.055	0.005	0.048
	LB	61.956*	93.699*	106.982*	112.902*	115.942*	123.418*	140.850*	155.698*	165.030*	175.076*

Continued...

Symbol	Lag → Statistics↓	1	2	3	4	5	6	7	8	9	10
PNB	AC	0.839*	0.751*	0.690*	0.651*	0.635*	0.590*	0.531*	0.478*	0.448*	0.425*
	PAC	0.839*	0.158**	0.094***	0.089***	0.118***	-0.033	-0.072***	-0.031	0.034	0.018
	LB	589.374*	1061.970*	1461.899*	1817.508*	2156.204*	2449.807*	2687.092*	3049.340*	3202.143*	3334.478*
POLARIS	AC	0.721*	0.627*	0.570*	0.445*	0.380*	0.330*	0.306*	0.282*	0.261*	0.252*
	PAC	0.721*	0.223*	0.127***	0.039	-0.001	-0.029	-0.010	0.038	0.029	0.024
	LB	509.260*	894.472*	1213.298*	1466.269*	1660.998*	1803.375*	1910.781*	2003.027*	2081.362*	2148.602*
REL	AC	0.757*	0.631*	0.543*	0.493*	0.490*	0.499*	0.4880*	0.489*	0.465*	0.366*
	PAC	0.757*	0.136**	0.066	0.082***	0.140**	0.119***	0.049	0.086***	0.018	-0.170**
	LB	402.610*	682.661*	890.389*	1061.731*	1231.154*	1407.175*	1575.853*	1745.484*	1899.210*	1994.390*
RELCAPITAL	AC	0.580*	0.490*	0.419*	0.383*	0.347*	0.328*	0.299*	0.253*	0.232*	0.220*
	PAC	0.580*	0.232*	0.105***	0.088***	0.055	0.057	0.029	-0.017	0.010	0.023
	LB	143.211*	245.926*	321.125*	383.980*	435.625*	481.992*	520.667*	548.298*	571.601*	592.637*
RELIANCE	AC	0.796*	0.696*	0.627*	0.557*	0.510*	0.447*	0.415*	0.379*	0.325*	0.293*
	PAC	0.796*	0.170**	0.091***	0.010	0.047	-0.036	0.049	0.005	-0.051	0.010
	LB	634.420*	1119.792*	1514.767*	1826.602*	2088.743*	2290.235*	2463.584*	2608.498*	2715.130*	2801.767*
SBIN	AC	0.798*	0.729*	0.657*	0.597*	0.537*	0.490*	0.435*	0.413*	0.360*	0.328*
	PAC	0.798*	0.254*	0.060	0.028	-0.006	0.014	-0.026	0.062	-0.048	0.001
	LB	637.609*	1170.251*	1603.268*	1961.962*	2252.164*	2493.911*	2684.382*	2856.482*	2987.506*	3096.427*
SCI	AC	0.734*	0.641*	0.533*	0.426*	0.337*	0.279*	0.219*	0.180*	0.120*	0.094*
	PAC	0.734*	0.220*	0.009	-0.051	-0.032	0.023	-0.008	0.008	-0.060	0.013
	LB	528.689*	931.791*	1210.835*	1389.598*	1501.533*	1578.138*	1625.577*	1657.565*	1671.706*	1680.474*
SRF	AC	0.666*	0.567*	0.472*	0.355*	0.318*	0.251*	0.222*	0.205*	0.227*	0.211*
	PAC	0.666*	0.221*	0.059	-0.059	0.060	-0.015	0.031	0.031	0.103***	0.002
	LB	176.929*	305.354*	394.770*	445.325*	486.184*	511.569*	531.607*	548.735*	569.753*	587.994*
STAR	AC	0.547*	0.514*	0.430*	0.446*	0.377*	0.408*	0.400*	0.415*	0.336*	0.355*
	PAC	0.547*	0.307*	0.106***	0.161**	0.033	0.120**	0.100***	0.095***	-0.040	0.044
	LB	119.290*	225.132*	299.420*	379.285*	436.726*	504.093*	569.050*	638.993*	684.957*	736.337*
SUNPHARMA	AC	0.592*	0.423*	0.370*	0.278*	0.255*	0.339*	0.319*	0.248*	0.214*	0.173*
	PAC	0.592*	0.113***	0.126***	-0.007	0.072***	0.203*	0.039	-0.039	-0.011	-0.007
	LB	149.138*	225.662*	284.138*	317.370*	345.436*	395.005*	439.009*	465.575*	485.456*	498.444*
SYNDIBANK	AC	0.816*	0.700*	0.599*	0.565*	0.531*	0.473*	0.406*	0.305*	0.221*	0.169*
	PAC	0.816*	0.102***	0.007	0.163**	0.047	-0.058	-0.040	-0.151**	-0.076***	0.008
	LB	544.203*	945.181*	1238.573*	1500.794*	1732.518*	1916.631*	2052.331*	2128.824*	2169.285*	2192.771*

Continued...

Symbol	Lag → Statistics↓	1	2	3	4	5	6	7	8	9	10
TATACHEM	AC	0.895*	0.834*	0.772*	0.770*	0.747*	0.721*	0.674*	0.631*	0.587*	0.541*
	PAC	0.895*	0.161**	0.011	0.281*	0.012	-0.018	-0.048	-0.059	-0.059	-0.093***
	LB	341.487*	638.210*	893.616*	1148.229*	1388.243*	1612.081*	1808.159*	1980.720*	2130.415*	2257.664*
TATAMOTORS	AC	0.747*	0.733*	0.683*	0.636*	0.603*	0.565*	0.527*	0.498*	0.449*	0.425*
	PAC	0.747*	0.395*	0.151**	0.042	0.038	0.014	-0.008	0.007	-0.047	0.003
	LB	559.396*	1098.121*	1566.409*	1972.722*	2338.876*	2660.459*	2940.298*	3190.497*	3393.856*	3576.847*
TATAPOWER	AC	0.783*	0.660*	0.559*	0.532*	0.486*	0.473*	0.441*	0.421*	0.372*	0.358*
	PAC	0.783*	0.120***	0.025	0.160**	0.014	0.092***	0.015	0.032	-0.040	0.049
	LB	614.843*	1051.785*	1365.164*	1649.380*	1886.756*	2112.456*	2308.222*	2486.897*	2626.700*	2756.335*
TATATEA	AC	0.788*	0.690*	0.623*	0.548*	0.509*	0.455*	0.417*	0.401*	0.343*	0.300*
	PAC	0.788*	0.183**	0.094***	-0.004	0.069	-0.014	0.026	0.058	-0.074***	-0.025
	LB	621.802*	1099.537*	1489.202*	1790.657*	2051.060*	2259.243*	2434.648*	2596.870*	2715.674*	2806.651*
TITAN	AC	0.628*	0.473*	0.410*	0.358*	0.317*	0.301*	0.313*	0.329*	0.268*	0.276*
	PAC	0.628*	0.131**	0.117***	0.060	0.044	0.062	0.092***	0.089***	-0.045	0.073***
	LB	161.485*	253.504*	322.787*	375.612*	417.166*	454.837*	495.733*	540.832*	570.943*	602.972*
TVSMOTORS	AC	0.637*	0.498*	0.484*	0.438*	0.312*	0.277*	0.263*	0.210*	0.206*	0.196*
	PAC	0.637*	0.155**	0.202*	0.074***	-0.097***	0.029	0.026	-0.016	0.070***	0.010
	LB	166.329*	268.142*	364.613*	443.956*	484.178*	516.125*	544.974*	563.345*	581.092*	597.242*
UNIONBANK	AC	0.716*	0.576*	0.500*	0.425*	0.330*	0.271*	0.217*	0.192*	0.168*	0.134*
	PAC	0.716*	0.131**	0.100***	0.019	-0.056	0.006	-0.014	0.039	0.014	-0.018
	LB	429.052*	707.536*	917.682*	1069.501*	1161.022*	1222.751*	1262.450*	1293.638*	1317.363*	1332.519*
UTIBANK	AC	0.526*	0.409*	0.356*	0.292*	0.309*	0.261*	0.278*	0.261*	0.217*	0.197*
	PAC	0.526*	0.183**	0.120***	0.044	0.118***	0.020	0.089***	0.038	-0.004	0.001
	LB	117.853*	189.406*	243.731*	280.461*	321.380*	350.837*	384.137*	413.608*	434.110*	451.058*
VIJAYABANK	AC	0.517*	0.406*	0.296*	0.259*	0.209*	0.199*	0.158*	0.121*	0.146*	0.097*
	PAC	0.517*	0.189**	0.039	0.066	0.023	0.050	0.000	-0.015	0.071***	-0.033
	LB	114.056*	184.527*	221.986*	250.786*	269.531*	286.682*	297.407*	303.705*	313.009*	317.086*
WOCKPHARMA	AC	0.600*	0.601*	0.459*	0.483*	0.426*	0.387*	0.361*	0.342*	0.322*	0.290*
	PAC	0.600	0.376*	0.014	0.150**	0.073***	-0.014	0.040	0.038	0.013	-0.005
	LB	153.498*	307.724*	397.752*	497.935*	576.148*	640.600*	697.055*	747.694*	792.726*	829.304*

AC=Coefficient of Autocorrelation, PAC=Coefficient of Partial Autocorrelation, LB= Box Ljung Q Statistics, * Significant at 1% Level of Significance,

** Significant at 5% Level of Significance and *** Significant at 10% Level of Significance.

Table 6: Serial Correlation in First Difference of Mispricings

Symbol	*Lag→ Statistics↓*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
BANKNIFTY	AC	-0.491*	0.187*	-0.225*	0.086*	-0.017*	0.003*	-0.003*	-0.005*	0.024*	-0.033*
	PAC	-0.491*	-0.072***	-0.215*	-0.149**	-0.049	-0.068	-0.054	-0.036	-0.002	-0.036
	LB	102.472*	117.314*	139.018*	142.170*	142.301*	142.305*	142.309*	142.322*	142.568*	143.049*
CNXIT	AC	-0.385*	-0.007*	-0.074*	0.027*	-0.033*	0.063*	-0.094*	0.010*	-0.003*	0.073*
	PAC	-0.385*	-0.182**	-0.179**	-0.101***	-0.103***	-0.007	-0.103***	-0.095***	-0.075***	0.019
	LB	123.893*	123.933*	128.571*	129.171*	130.092*	133.443*	140.958*	141.039*	141.046*	145.553*
NIFTY	AC	-0.342*	0.034*	-0.117*	0.019*	-0.079*	0.059*	-0.082*	0.045*	-0.002*	0.030*
	PAC	-0.342*	-0.094***	-0.156**	-0.088***	-0.135**	-0.044	-0.116***	-0.060	-0.031	-0.011
	LB	116.893*	118.065*	131.829*	132.175*	138.443*	141.912*	148.675*	150.735*	150.740*	151.632*
ABB	AC	-0.444*	0.100*	-0.024*	-0.035*	0.013*	-0.060*	-0.004*	-0.021*	0.059*	-0.081*
	PAC	-0.444*	-0.120***	-0.034	-0.061	-0.036	-0.087***	-0.087***	-0.080***	0.018	-0.068
	LB	83.636*	87.921*	88.163*	88.683*	88.759*	90.324*	90.330*	90.514*	92.029*	94.913*
ACC	AC	-0.265*	-0.062*	-0.030*	-0.024*	-0.067*	0.000*	-0.024*	-0.002*	0.042*	-0.006*
	PAC	-0.265*	-0.142	-0.094	-0.076	-0.120	-0.079	-0.086	-0.067	-0.007	-0.023
	LB	70.101*	73.953*	74.840*	75.416*	79.878*	79.878*	80.461*	80.464*	82.269*	82.307*
ALBK	AC	-0.265*	-0.001*	-0.021*	0.006*	0.001*	0.072*	-0.101*	0.011*	0.047*	0.011*
	PAC	-0.265*	-0.077***	-0.045	-0.013	-0.033	0.077***	-0.065	-0.031	0.040	0.033
	LB	29.833*	29.834*	30.021*	30.038*	30.039*	32.283*	36.721*	36.769*	37.713*	37.766*
AOKTEXT	AC	-0.331*	0.015*	-0.066*	0.071*	-0.178*	0.150*	-0.072*	-0.031*	0.061*	-0.036*
	PAC	-0.331*	-0.106***	-0.108***	0.015	-0.178**	0.034	-0.030	-0.086***	0.042	-0.052
	LB	43.559*	43.645*	45.366*	47.412*	60.209*	69.321*	71.401*	71.787*	73.285*	73.800*
ANDHRABANK	AC	-0.333*	-0.036*	-0.007*	-0.007*	0.028*	-0.093*	0.046*	-0.046*	0.060*	-0.103*
	PAC	-0.333*	-0.165**	-0.087***	-0.053	0.003	-0.099***	-0.025	-0.067	0.020	-0.101***
	LB	92.833*	93.888*	93.924*	93.963*	94.644*	101.969*	103.787*	105.561*	108.605*	117.586*
ARVINDMILL	AC	-0.393*	-0.066*	0.098*	-0.059*	-0.056*	0.080*	-0.078*	-0.010*	0.072*	-0.103*
	PAC	-0.393*	-0.261*	-0.047	-0.059	-0.108***	-0.009	-0.078***	-0.078***	0.006	-0.093***
	LB	126.283*	129.826*	137.676*	140.501*	143.069*	148.297*	153.331*	153.420*	157.724*	166.420*
ASHOKLEY	AC	-0.285*	0.117*	-0.146*	0.004*	-0.119*	0.019*	0.019*	-0.112*	-0.026*	0.023*
	PAC	-0.285*	0.039	-0.112***	-0.076***	-0.137**	-0.068	0.006	-0.154**	-0.140**	-0.034
	LB	34.634*	40.492*	49.630*	49.637*	55.740*	55.902*	56.005*	61.48*6	61.777*	62.013*

Continued...

Symbol	Lag→ Statistics↓	1	2	3	4	5	6	7	8	9	10
AUROPHARMA	AC	-0.393*	-0.138*	0.089*	-0.046*	0.028*	-0.027*	0.012*	-0.014*	-0.028*	0.043*
	PAC	-0.393*	-0.346*	-0.162**	-0.162**	-0.077***	-0.094***	-0.054	-0.070***	-0.097***	-0.049
	LB	63.313*	71.112*	74.339*	75.200*	75.528*	75.823*	75.879*	75.960*	76.287*	77.050*
BAJAJAUTO	AC	-0.242*	-0.109*	-0.058*	0.006*	-0.016*	0.013*	-0.033*	0.028*	-0.017*	-0.016*
	PAC	-0.242*	-0.179**	-0.145**	-0.080***	-0.074***	-0.035	-0.064	-0.011	-0.032	-0.040
	LB	58.685*	70.684*	74.025*	74.059*	74.309*	74.468*	75.574*	76.370*	76.650*	76.897*
BANKBARODA	AC	-0.292*	-0.127*	0.072*	-0.089*	-0.039*	-0.024*	0.076*	-0.090*	0.041*	0.077*
	PAC	-0.292*	-0.232*	-0.047	-0.124***	-0.118***	-0.134**	-0.005	-0.118***	-0.036	0.030
	LB	71.303*	84.705*	89.110*	95.761*	97.027*	97.530*	102.409*	109.274*	110.665*	115.669*
BANKINDIA	AC	-0.351*	-0.028*	-0.041*	0.029*	0.005*	-0.080*	0.032*	0.011*	-0.059*	0.031*
	PAC	-0.351*	-0.173**	-0.133**	-0.051	-0.018	-0.102***	-0.047	-0.017	-0.086***	-0.031
	LB	103.183*	103.849*	105.252*	105.938*	105.957*	111.348*	112.195*	112.303*	115.247*	116.063*
BEL	AC	-0.359*	-0.075*	0.020*	-0.001*	-0.026*	-0.009*	-0.055*	0.075*	-0.030*	-0.047*
	PAC	-0.359*	-0.234*	-0.118***	-0.068	-0.069	-0.063	-0.120***	-0.013	-0.037	-0.084***
	LB	126.031*	131.559*	131.952*	131.952*	132.626*	132.705*	135.736*	141.255*	142.160*	144.372*
BHEL	AC	-0.378*	0.005*	-0.072*	-0.005*	-0.053*	0.031*	-0.029*	0.048*	-0.012*	-0.002*
	PAC	-0.378*	-0.160**	-0.156**	-0.118***	-0.146**	-0.087***	-0.100***	-0.034	-0.032	-0.036
	LB	142.900*	142.928*	148.181*	148.205*	151.003*	151.998*	152.854*	155.186*	155.343*	155.345*
BILT	AC	-0.319*	-0.028*	-0.092*	0.027*	-0.024*	-0.056*	0.012*	0.045*	-0.005*	-0.040*
	PAC	-0.319*	-0.145**	-0.169**	-0.080***	-0.076***	-0.127***	-0.082***	-0.013	-0.022	-0.063
	LB	41.556*	41.883*	45.374*	45.672*	45.905*	47.218*	47.275*	48.133*	48.142*	48.827*
BONGAIREFN	AC	-0.139*	0.023*	-0.029*	0.056*	-0.031*	-0.025*	-0.005*	-0.054*	-0.143*	0.026*
	PAC	-0.139**	0.004	-0.025	0.049	-0.016	-0.034	-0.010	-0.061	-0.162**	-0.014
	LB	7.958*	8.176*	8.511*	9.797*	10.196*	10.451*	10.460*	11.683*	20.238*	20.527*
BPCL	AC	-0.380*	0.010*	-0.065*	0.040*	-0.028*	0.012*	-0.046*	-0.016*	0.039*	-0.055*
	PAC	-0.380*	-0.157**	-0.144**	-0.053	-0.052	-0.027	-0.067	-0.082***	-0.015	-0.074***
	LB	144.454*	144.548*	148.749*	150.320*	151.081*	151.225*	153.315*	153.576*	155.091*	158.105*
CANBK	AC	-0.385*	0.010*	0.048*	-0.101*	0.062*	-0.049*	0.009*	-0.052*	0.056*	-0.056*
	PAC	-0.385*	-0.162**	-0.011	-0.099***	-0.015	-0.051	-0.026	-0.089***	0.005	-0.055
	LB	123.848*	123.936*	125.887*	134.487*	137.711*	139.734*	139.797*	142.071*	144.759*	144.379*
CENTURYTEX	AC	-0.353*	-0.062*	-0.045*	0.035*	-0.013*	-0.072*	0.042*	0.022*	-0.074*	0.063*
	PAC	-0.353*	-0.213*	-0.175**	-0.081***	-0.064	-0.133**	-0.065	-0.025	-0.110***	-0.015
	LB	52.953*	54.578*	55.431*	55.942*	56.011*	58.227*	58.979*	59.180*	61.521*	63.262*

Continued...

Symbol	Lag→ Statistics↓	1	2	3	4	5	6	7	8	9	10
CESC	AC	-0.390*	-0.074*	0.006*	0.008*	0.014*	0.006*	-0.084*	-0.016*	0.084*	-0.004*
	PAC	-0.390*	-0.267*	-0.171**	-0.106***	-0.050	-0.015	-0.110***	-0.139**	-0.031	-0.005
	LB	62.103*	64.365*	64.381*	64.406*	64.483*	64.496*	67.401*	67.509*	70.466*	70.472*
CHAMBLFERT	AC	-0.267*	0.076*	-0.119*	0.040*	-0.040*	0.010*	-0.011*	0.004*	0.046*	-.045*
	PAC	-0.267*	0.005	-0.105***	-0.019	-0.032	-0.021	-0.012	-0.009	0.048	-0.026
	LB	29.052*	31.422*	37.248*	37.912*	38.589*	38.633*	38.686*	38.692*	39.565*	40.422*
COLGATE	AC	-0.282*	-0.163*	0.087*	-0.137*	0.064*	-0.028*	-0.103*	0.049*	0.111*	-0.098*
	PAC	-0.282*	-0.264*	-0.054	-0.194*	-0.042	-0.103***	-0.163**	-0.113***	0.043	-0.084
	LB	33.751*	45.103*	48.302*	56.317*	58.063*	58.407*	62.938*	63.966*	69.287*	73.430*
CORPBANK	AC	-0.244*	-0.007*	-0.069*	-0.071*	-0.048*	0.031*	0.004*	-0.028*	-0.046*	-0.066*
	PAC	-0.244*	-0.071***	-0.094***	-0.122***	-0.115***	-0.034	-0.025	-0.062	-0.096***	-0.132**
	LB	24.363*	24.385*	26.323*	28.384*	29.322*	29.719*	29.726*	30.044*	30.937*	32.747*
CUMMINSIND	AC	-0.410*	0.045*	-0.114*	0.080*	-0.056*	-0.017*	-0.061*	0.072*	-0.017*	0.033*
	PAC	-0.410*	-0.148**	-0.189**	-0.055	-0.072***	-0.098***	-0.146**	-0.052	-0.041	-0.005
	LB	64.253*	65.018*	70.015*	72.494*	73.707*	73.816*	75.261*	77.285*	77.398*	77.820*
DIVISLAB	AC	-0.481*	0.098*	-0.084*	0.000*	-0.046*	0.046*	-0.059*	0.046*	-0.029*	0.039*
	PAC	-0.481*	-0.173**	-0.151**	-0.133**	-0.156**	-0.085***	-0.126***	-0.082***	-0.086***	-0.041
	LB	94.456*	98.356*	101.285*	101.285*	102.153*	103.011*	104.464*	105.363*	105.718*	106.359*
ESCORTS	AC	-0.411*	0.047*	-0.036*	-0.069*	-0.056*	0.017*	0.052*	-0.070*	0.079*	-0.109*
	PAC	-0.411*	-0.147**	-0.091***	-0.142**	-0.188**	-0.134**	-0.029	-0.110***	-0.033	-0.146**
	LB	67.075*	67.939*	68.446*	70.330*	71.595*	71.716*	72.821*	74.812*	77.320*	82.136*
ESSAROIL	AC	-0.366*	-0.057*	-0.058*	0.001*	0.026*	-0.017*	-0.009*	-0.046*	0.091*	-0.056*
	PAC	-0.366*	-0.221*	-0.200*	-0.149**	-0.083***	-0.080***	-0.075***	-0.121***	0.001	-0.055
	LB	54.725*	56.078*	57.479*	57.480*	57.759*	57.876*	57.911*	58.794*	62.279*	63.574*
FEDERALBNK	AC	-0.368*	-0.007*	-0.019*	-0.053*	-0.095*	0.074*	0.098*	-0.152*	0.043*	0.049*
	PAC	-0.368*	-0.165**	-0.098***	-0.119***	-0.205*	-0.085***	0.076***	-0.117***	-0.089***	0.009
	LB	55.491*	55.513*	55.656*	56.804*	60.501*	62.745*	66.734*	76.363*	77.136*	78.130*
GAIL	AC	-0.279*	0.013*	-0.108*	0.017*	0.043*	-0.059*	0.041*	-0.057*	0.001*	0.004*
	PAC	-0.279*	-0.071***	-0.135*	-0.058	0.024	-0.059	0.009	-0.044	-0.042	-0.011
	LB	63.422*	63.552*	73.126*	73.368*	74.876*	77.752*	79.151*	81.850*	81.851*	81.866*
GLAXO	AC	-0.425*	0.140*	-0.162*	-0.006*	0.061*	-0.001*	-0.074*	0.105*	-0.098*	0.044*
	PAC	-0.425*	-0.049	-0.147**	-0.157**	0.000	0.018	-0.112***	0.050	-0.025	-0.048
	LB	76.633*	84.970*	96.130*	96.147*	97.737*	97.737*	100.127*	104.850*	109.007*	109.836*

Continued...

Symbol	Lag→ Statistics↓	1	2	3	4	5	6	7	8	9	10
GNFC	AC	-0.261*	-0.034*	-0.011*	0.019*	-0.022*	-0.037*	0.071*	-0.107*	0.076*	-0.009*
	PAC	-0.261*	-0.110***	-0.053	-0.003	-0.022	-0.052	0.047	-0.088***	0.032	0.010
	LB	27.908*	28.379*	28.426*	28.570*	28.764*	29.328*	31.405*	36.131*	38.537*	38.568*
GRASIM	AC	-0.305*	-0.039*	-0.068*	-0.007*	-0.015*	-0.003*	0.004*	0.004*	-0.026*	-0.008*
	PAC	-0.305*	-0.146**	-0.142**	-0.095**	-0.079***	-0.061	-0.040	-0.026	-0.050	-0.048
	LB	93.309*	94.846*	99.455*	99.500*	99.713*	99.722*	99.736*	99.755*	100.435*	100.501*
HCLTECH	AC	-0.417*	0.007*	-0.045*	-0.034*	-0.073*	0.101*	-0.098*	0.182*	-0.122*	0.067*
	PAC	-0.417*	-0.202*	-0.159**	-0.159**	-0.228*	-0.089***	-0.180**	0.050	-0.054	0.017
	LB	170.615*	170.668*	172.698*	173.833*	179.125*	189.205*	198.729*	231.564*	246.210*	250.706*
HDFC	AC	-0.339*	-0.071*	-0.010*	-0.019*	-0.056*	0.020*	-0.022*	0.027*	-0.012*	0.013*
	PAC	-0.339*	-0.210*	-0.130**	-0.104***	-0.140**	-0.091***	-0.101***	-0.052	-0.058	-0.036
	LB	115.071*	120.096*	120.198*	120.565*	123.746*	124.167*	124.639*	125.379*	125.519*	125.687*
HDFCBANK	AC	-0.436*	0.034*	-0.022*	-0.057*	-0.008*	0.050*	-0.047*	0.039*	-0.049*	0.038*
	PAC	-0.436*	-0.192*	-0.112**	-0.142**	-0.134**	-0.037	-0.067	-0.025	-0.070***	-0.021
	LB	158.704*	159.695*	160.103*	162.821*	162.869*	165.009*	166.890*	168.140*	170.156*	171.345*
HEROHONDA	AC	-0.210*	-0.045*	-0.020*	-0.046*	0.016*	-0.013*	0.006*	0.000*	-0.078*	0.046*
	PAC	-0.210*	-0.093***	-0.053	-0.070***	-0.016	-0.024	-0.006	-0.005	-0.085***	0.007
	LB	43.081*	45.061*	45.464*	47.503*	47.741*	47.898*	47.933*	47.933*	53.972*	56.101*
HINDUNILVR	AC	-0.232*	-0.005*	-0.051*	0.009*	-0.050*	0.016*	-0.028*	0.011*	-0.025*	0.015*
	PAC	-0.232*	-0.062	-0.070***	-0.022	-0.061	-0.016	-0.036	-0.012	-0.032	-0.005
	LB	53.738*	53.767*	56.335*	56.409*	58.898*	59.141*	59.928*	60.040*	60.681*	60.911*
HINDPETRO	AC	-0.275*	0.020*	-0.084*	-0.082*	0.033*	-0.036*	-0.019*	0.059*	-0.026*	-0.031*
	PAC	-0.275*	-0.060	-0.103***	-0.146**	-0.043	-0.063	-0.079***	0.015	-0.019	-0.067
	LB	75.687*	76.080*	83.174*	89.893*	90.995*	92.324*	92.691*	96.174*	96.845*	97.833*
ICICIBANK	AC	-0.293*	-0.024*	-0.113*	-0.084*	0.012*	0.034*	-0.037*	0.110*	-0.054*	-0.026*
	PAC	-0.293*	-0.120***	-0.173**	-0.204*	-0.131**	-0.069	-0.120***	0.028	-0.031	-0.061
	LB	84.148*	84.697*	97.193*	104.122*	104.263*	105.386*	106.702*	118.700*	121.545*	122.235*
IDBI	AC	-0.346*	0.018*	-0.135*	0.054*	0.019*	-0.050*	0.005*	0.047*	-0.086*	-0.016*
	PAC	-0.346*	-0.115***	-0.193*	-0.076***	-0.010	-0.076***	-0.045	0.034	-0.088***	-0.094***
	LB	50.839*	50.983*	58.727*	59.985*	60.133*	61.213*	61.225*	62.173*	65.359*	65.475*
IDFC	AC	-0.246*	-0.004*	-0.011*	-0.032*	-0.016*	0.028*	-0.149*	0.003*	-0.057*	0.021*
	PAC	-0.246*	-0.069	-0.031	-0.046	-0.039	0.012	-0.153**	-0.083***	-0.102***	-0.036
	LB	20.827*	20.833*	20.874*	21.231*	21.318*	21.595*	29.389*	29.392*	30.518*	30.677*

Continued...

Symbol	Lag→ Statistics↓	1	2	3	4	5	6	7	8	9	10
IFCI	AC	-0.401*	-0.006*	-0.056*	-0.056*	0.056.*	-0.013*	-0.034*	0.023*	0.000*	0.034*
	PAC	-0.401*	-0.199*	-0.172**	-0.198*	-0.099***	-0.081***	-0.118***	-0.081***	-0.058	-0.010
	LB	63.883*	63.899*	65.144*	66.383*	67.629*	67.699*	68.160*	68.366*	68.366*	68.837*
INDUSINDBK	AC	-0.341*	-0.037*	-0.048*	0.017*	-0.016*	-0.029*	0.022*	0.028*	-0.051*	0.050*
	PAC	-0.341*	-0.173**	-0.142**	-0.071***	-0.061	-0.079***	-0.033	0.011	-0.049	0.020
	LB	47.656*	48.210*	49.142*	49.265*	49.374*	49.733*	49.939*	50.268*	51.355*	52.386*
IOB	AC	-0.230*	-0.002*	-0.158*	-0.001*	-0.091*	0.046*	-0.015*	-0.015*	-0.032*	0.130*
	PAC	-0.230*	-0.058	-0.182**	-0.091**	-0.144**	-0.055	-0.057	-0.084***	-0.086***	0.079***
	LB	22.480*	22.481*	33.164*	33.164*	36.729*	37.632*	37.729*	37.821*	38.272*	45.648*
IOC	AC	-0.396*	-0.031*	0.043*	-0.042*	-0.019*	0.019*	-0.002*	-0.023*	-0.007*	0.011*
	PAC	-0.396*	-0.222*	-0.074***	-0.072***	-0.076***	-0.039	-0.022	-0.042	-0.049	-0.027
	LB	127.920*	128.686*	130.230*	131.650*	131.953*	132.235*	132.239*	132.690*	132.725*	132.830*
IPCL	AC	-0.147*	0.025*	0.002*	-0.074*	0.013*	-0.058*	-0.102*	-0.005*	-0.073*	0.009*
	PAC	-0.147**	0.004	0.006	-0.074***	-0.009	-0.057	-0.122***	-0.045	-0.082***	-0.026
	LB	21.064*	21.681*	21.685*	27.057*	27.213*	30.514*	40.757*	40.786*	45.988*	46.075*
JETAIRWAYS	AC	-0.427*	-0.019*	-0.010*	-0.045*	0.105*	-0.090*	-0.013*	0.022*	-0.093*	0.169*
	PAC	-0.427*	-0.246*	-0.164**	-0.171**	-0.006	-0.073***	-0.100***	-0.067	-0.176**	0.026
	LB	82.221*	82.378*	82.426*	83.360*	88.323*	91.980*	92.061*	92.290*	96.284*	109.426*
JINDALSTEL	AC	-0.427*	0.002*	0.015*	-0.053*	-0.028*	0.018*	-0.047*	0.078*	-0.120*	0.089*
	PAC	-0.427*	-0.221*	-0.100***	-0.113***	-0.132**	-0.092***	-0.126***	-0.018	-0.151**	-0.056
	LB	77.504*	77.505*	77.604*	78.794*	79.133*	79.269*	80.231*	82.883*	89.072*	92.528*
JPHYDRO	AC	-0.398*	0.049*	-0.066*	0.063*	-0.052*	-0.073*	0.003*	-0.014*	0.013*	-0.025*
	PAC	-0.398*	-0.130**	-0.115***	-0.005	-0.039	-0.133**	-0.104***	-0.090***	-0.053	-0.059
	LB	67.593*	68.628*	70.479*	72.182*	73.367*	75.672*	75.676*	75.765*	75.838*	76.104*
JSTAINLESS	AC	-0.340*	-0.046*	-0.046*	0.007*	-0.106*	0.063*	-0.021*	-0.056*	0.126*	-0.068*
	PAC	-0.340*	-0.183**	-0.148**	-0.089***	-0.185**	-0.082***	-0.088***	-0.152**	0.025	-0.065
	LB	47.415*	48.266*	49.146*	49.167*	53.786*	55.405*	55.593*	56.881*	63.556*	65.484*
KTKBANK	AC	-0.287*	-0.043*	-0.091*	-0.008*	0.083*	-0.010*	-0.033*	0.029*	-0.031*	0.020*
	PAC	-0.287*	-0.137**	-0.160**	-0.107***	0.025*	0.005	-0.031	0.027	-0.016	0.000
	LB	32.732*	33.487*	36.772*	36.800*	39.588*	39.625*	40.058*	40.394*	40.776*	40.944*
LICHSGFIN	AC	-0.261*	-0.010*	-0.056*	0.032*	-0.042*	-0.003*	0.037*	-0.023*	-0.037*	0.087*
	PAC	-0.261*	-0.083***	-0.087***	-0.008	-0.045	-0.031	0.027	-0.013	-0.047	0.071***
	LB	28.873*	28.914*	30.234*	30.682*	31.423*	31.427*	32.015*	32.245*	32.828*	36.113*

Continued...

Symbol	Lag→ Statistics↓	1	2	3	4	5	6	7	8	9	10
MARUTI	AC	-0.369*	-0.029*	-0.030*	-0.020*	-0.026*	0.003*	-0.029*	0.012*	0.016*	-0.027*
	PAC	-0.369*	-0.191*	-0.136**	-0.112***	-0.113***	-0.087***	-0.105***	-0.078***	-0.045	-0.071***
	LB	118.611*	119.357*	120.146*	120.491*	121.103*	121.111*	121.842*	121.974*	122.195*	122.823*
MATRIXLABS	AC	0.047*	-0.195*	0.005*	0.014*	0.023*	0.134*	0.121*	-0.199*	-0.115*	0.023*
	PAC	0.047	-0.198*	0.026	-0.028	0.032	0.133**	0.124***	-0.172**	-0.058	-0.049
	LB	0.929*	17.170*	17.181*	17.261*	17.496*	25.173*	31.528*	48.655*	54.340*	54.561*
MRPL	AC	-0.282*	-0.080*	-0.008*	-0.031*	0.048*	-0.064*	-0.060*	0.023*	0.008*	0.018*
	PAC	-0.282*	-0.174**	-0.094***	-0.087***	0.001	-0.070***	-0.112***	-0.060	-0.037	-0.011
	LB	33.793*	36.551*	36.581*	36.983*	37.967*	39.716*	41.251*	41.470*	41.498*	41.636*
MTNL	AC	-0.260*	-0.041*	-0.010*	0.028*	-0.090*	-0.015*	-0.067*	0.047*	0.025*	-0.066*
	PAC	-0.260*	-0.116***	-0.057	0.005	-0.092***	-0.070***	-0.117***	-0.021	0.018	-0.070***
	LB	67.692*	69.374*	69.480*	70.258*	78.414*	78.653*	83.182*	85.363*	85.990*	90.354*
NAGARFERT	AC	-0.393*	-0.081*	0.032*	-0.021*	-0.023*	-0.019*	0.008*	-0.020*	0.100*	-0.059*
	PAC	-0.393*	-0.278*	-0.151**	-0.120***	-0.115***	-0.125***	-0.103***	-0.118***	0.028	-0.018
	LB	61.381*	63.990*	64.395*	64.568*	64.777*	64.922*	64.951*	65.119*	69.213*	70.638*
NATINALUM	AC	-0.374*	0.065*	-0.147*	0.108*	-0.054*	0.027*	-0.081*	0.082*	-0.030*	-0.036*
	PAC	-0.374*	-0.087***	-0.179**	-0.012	-0.030	-0.019	-0.081***	0.014	0.002	-0.070***
	LB	136.739*	140.874*	161.984*	173.474*	176.366*	177.059*	183.515*	190.118*	191.006*	192.279*
NDTV	AC	-0.394*	-0.053*	-0.014*	-0.044*	0.128*	-0.166*	0.105*	-0.019*	-0.074*	0.072*
	PAC	-0.394*	-0.246*	-0.172**	-0.178**	0.019	-0.156**	-0.022	-0.026	-0.109***	-0.039
	LB	63.586*	64.724*	64.802*	65.592*	72.377*	83.835*	88.438*	88.592*	90.872*	93.064*
NEYVELILIG	AC	-0.453*	0.073*	-0.052*	-0.038*	0.039*	-0.046*	-0.026*	0.032*	0.021*	-0.093*
	PAC	-0.453*	-0.167**	-0.115***	-0.133**	-0.057	-0.078***	-0.119***	-0.063	-0.003	-0.128***
	LB	87.289*	89.537*	90.677*	91.285*	91.935*	92.855*	93.156*	93.595*	93.788*	97.566*
NICOLASPIR	AC	-0.418*	0.008*	-0.030*	-0.026*	0.015*	-0.029*	0.003*	0.026*	0.023*	0.019*
	PAC	-0.418*	-0.202*	-0.139**	-0.126***	-0.078***	-0.088***	-0.074***	-0.024	0.023	0.056
	LB	74.096*	74.123*	74.508*	74.799*	74.894*	75.245*	75.250*	75.550*	75.780*	75.934*
NTPC	AC	-0.219*	-0.181*	-0.095*	0.154*	-0.001*	-0.063*	-0.051*	-0.011*	0.018*	-0.058*
	PAC	-0.219*	-0.240*	-0.219*	0.025	-0.015	-0.044	-0.060	-0.088***	-0.058	-0.112***
	LB	25.738*	43.372*	48.224*	61.048*	61.049*	63.186*	64.609*	64.674*	64.848*	66.660*
ORIENTBANK	AC	-0.257*	-0.047*	0.016*	-0.062*	-0.052*	-0.070*	0.040*	-0.007*	-0.023*	-0.022*
	PAC	-0.257*	-0.120***	-0.031	-0.078***	-0.099***	-0.137**	-0.040	-0.037	-0.057	-0.080***
	LB	55.007*	56.836*	57.052*	60.309*	62.591*	66.735*	68.062*	68.098*	68.557*	68.947*

Continued...

Symbol	Lag→ Statistics↓	1	2	3	4	5	6	7	8	9	10
PATNI	AC	-0.411*	-0.010*	-0.029*	-0.021*	-0.064*	-0.017*	0.068*	0.018*	-0.036*	0.035*
	PAC	-0.411*	-0.216*	-0.156**	-0.134**	-0.189**	-0.207*	-0.108***	-0.053	-0.092***	-0.052
	LB	71.901*	71.947*	72.314*	72.504*	74.285*	74.410*	76.379*	76.512*	77.065*	77.586*
PNB	AC	-0.224*	-0.087*	-0.060*	-0.074*	0.084*	0.050*	-0.022*	-0.072*	-0.024*	0.026*
	PAC	-0.224*	-0.145**	-0.123***	-0.146**	0.004	0.043	0.000	-0.067	-0.050	-0.011
	LB	42.103*	48.474*	51.466*	56.035*	61.953*	64.056*	64.465*	68.776*	69.279*	69.835*
POLARIS	AC	-0.327*	-0.068*	0.009*	0.001*	0.003*	-0.026*	-0.045*	-0.003*	-0.005*	-0.022*
	PAC	-0.327*	-0.196*	-0.095***	-0.050	-0.022	-0.041	-0.083***	-0.071***	-0.060	-0.069
	LB	104.633*	109.142*	109.224*	109.224*	109.233*	109.902*	111.895*	111.904*	111.924*	112.384*
REL	AC	-0.238*	-0.080*	-0.078*	-0.096*	-0.025*	0.041*	-0.025*	0.050*	0.156*	-0.084*
	PAC	-0.238*	-0.145**	-0.146**	-0.186**	-0.153**	-0.076***	-0.110***	-0.039	0.146**	0.010
	LB	39.709*	44.183*	48.520*	55.039*	55.481*	56.673*	57.099*	58.897*	76.256*	81.290*
RELCAPITAL	AC	-0.391*	-0.021*	-0.041*	-0.001*	-0.022*	0.014*	0.020*	-0.033*	-0.009*	-0.010*
	PAC	-0.391*	-0.205*	-0.161**	-0.114***	-0.108***	-0.070***	-0.025	-0.054	-0.062	-0.067
	LB	64.894*	65.080*	65.805*	65.805*	66.015*	66.100*	66.266*	66.727*	66.764*	66.807*
RELIANCE	AC	-0.253*	-0.079*	0.005*	-0.058*	0.040*	-0.074*	0.008*	0.045*	-0.051*	-0.019*
	PAC	-0.253*	-0.153**	-0.063	-0.094***	-0.008	-0.091***	-0.043	0.013	-0.045	-0.055
	LB	64.085*	70.359*	70.381*	73.715*	75.363*	80.933*	80.992*	83.065*	85.691*	86.048*
SBIN	AC	-0.331*	0.007*	-0.031*	0.002*	-0.032*	0.020*	-0.083*	0.077*	-0.050*	0.028*
	PAC	-0.331*	-0.114***	-0.075***	-0.038	-0.055	-0.015	-0.099***	0.012	-0.036	-0.004
	LB	109.419*	109.475*	110.427*	110.432*	111.485*	111.891*	118.801*	124.729*	127.247*	128.038*
SCI	AC	-0.324*	0.028*	-0.002*	-0.033*	-0.058*	0.002*	-0.038*	0.039*	-0.066*	0.020*
	PAC	-0.324*	-0.086***	-0.023	-0.044	-0.094***	-0.057	-0.069	-0.001	-0.072***	-0.041
	LB	102.798*	103.554*	103.559*	104.632*	107.970*	107.976*	109.382*	110.914*	115.195*	115.577*
SRF	AC	-0.342*	-0.012*	0.035*	-0.120*	0.044*	-0.059*	-0.015*	-0.063*	0.058*	-0.041*
	PAC	-0.342*	-0.147**	-0.023	-0.135**	-0.053	-0.094***	-0.082***	-0.149**	-0.040	-0.085***
	LB	46.579*	46.641*	47.135*	52.936*	53.721*	55.117*	55.208*	56.815*	58.198*	58.892*
STAR	AC	-0.464	0.057	-0.111	0.093	-0.109	0.042	-0.025	0.104	-0.107	0.043
	PAC	-0.464*	-0.201*	-0.229*	-0.086***	-0.162**	-0.134**	-0.123***	0.014	-0.067	-0.055
	LB	85.536*	86.830*	91.729*	95.164*	99.973*	100.688*	100.945*	105.313*	109.959*	110.712*
SUNPHARMA	AC	-0.293*	-0.142*	0.045*	-0.083*	-0.127*	0.122*	0.060*	-0.042*	0.009*	-0.018*
	PAC	-0.293*	-0.249*	-0.093***	-0.156**	-0.257*	-0.086***	-0.010	-0.033	-0.034	-0.052
	LB	36.548*	45.093*	45.975*	48.923*	55.848*	62.214*	63.784*	64.529*	64.562*	64.695*

Continued...

Symbol	Lag→ Statistics↓	1	2	3	4	5	6	7	8	9	10
SYNDIBANK	AC	-0.183*	-0.038*	-0.190*	0.004*	0.065*	0.028*	0.093*	-0.050*	-0.084*	-0.037*
	PAC	-0.183**	-0.074***	-0.220*	-0.089***	0.018	-0.002	0.102***	0.017	-0.069	-0.040
	LB	27.342*	28.508*	58.086*	58.098*	61.519*	62.156*	69.304*	71.371*	77.200*	78.332*
TATACHEM	AC	-0.201*	-0.005*	-0.284*	0.102*	0.016*	0.105*	-0.023*	0.004*	0.013*	-0.068*
	PAC	-0.201*	-0.047	-0.308*	-0.027	0.001	0.036	0.041	0.034	0.072***	-0.055
	LB	17.147*	17.157*	51.654*	56.147*	56.262*	60.996*	61.215*	61.223*	61.297*	63.322*
TATAMOTORS	AC	-0.474*	0.071*	-0.005*	-0.029*	0.012*	0.000*	-0.018*	0.040*	-0.051*	0.040*
	PAC	-0.474*	-0.199*	-0.080***	-0.070***	-0.043	-0.020	-0.033	0.019	-0.030	0.004
	LB	224.973*	229.960*	229.986*	230.814*	230.950*	230.950*	231.280*	232.854*	235.436*	237.033*
TATAPOWER	AC	-0.216*	-0.051*	-0.173*	0.045*	-0.079*	0.048*	-0.029*	0.066*	-0.080*	0.000*
	PAC	-0.216*	-0.103***	-0.219*	-0.062	-0.134**	-0.050	-0.063	0.007	-0.079***	-0.059
	LB	46.712*	49.333*	79.202*	81.239*	87.441*	89.752*	90.591*	94.977*	101.355*	101.355*
TATATEA	AC	-0.269*	-0.073*	0.020*	-0.087*	0.038*	-0.039*	-0.051*	0.096*	-0.033*	0.007*
	PAC	-0.269*	-0.157**	-0.050	-0.118***	-0.027	-0.065	-0.094***	0.036	-0.012	0.000
	LB	72.700*	77.997*	78.385*	85.942*	87.412*	88.930*	91.551*	100.870*	101.971*	102.020*
TITAN	AC	-0.287*	-0.125*	-0.016*	-0.016*	-0.034*	-0.033*	-0.005*	0.098*	-0.090*	-0.005*
	PAC	-0.287*	-0.225*	-0.142**	-0.114***	-0.120***	-0.133**	-0.121***	0.012	-0.103***	-0.082***
	LB	33.601*	39.972*	40.073*	40.182*	40.655*	41.108*	41.119*	45.138*	48.516*	48.527*
TVSMOTORS	AC	-0.299*	-0.179*	0.041*	0.116*	-0.128*	-0.023*	0.054*	-0.073*	0.013*	-0.002*
	PAC	-0.299*	-0.295*	-0.141**	0.035	-0.095***	-0.074***	-0.030	-0.118***	-0.045	-0.067
	LB	36.609*	49.794*	50.478*	55.980*	62.751*	62.966*	64.186*	66.431*	66.498*	66.500*
UNIONBANK	AC	-0.254*	-0.114*	0.003*	0.037*	-0.067*	-0.010*	-0.052*	-0.001*	0.020*	-0.006*
	PAC	-0.254*	-0.190*	-0.088***	-0.010	-0.075***	-0.051	-0.101***	-0.070***	-0.030	-0.032
	LB	53.736*	64.577*	64.586*	65.709*	69.443*	69.527*	71.840*	71.842*	72.163*	72.193*
UTIBANK	AC	-0.377*	-0.071*	0.010*	-0.080*	0.068*	-0.066*	0.021*	0.015*	-0.008*	0.023*
	PAC	-0.377*	-0.248*	-0.145**	-0.192*	-0.079***	-0.138**	-0.097***	-0.073***	-0.059	-0.030
	LB	60.310*	62.453*	62.495*	65.214*	67.213*	69.080*	69.284*	69.378*	69.407*	69.645*
VIJAYABANK	AC	-0.378*	-0.002*	-0.077*	0.014*	-0.042*	0.032*	-0.002*	-0.069*	0.083*	-0.037*
	PAC	-0.378*	-0.169**	-0.170**	-0.107***	-0.122***	-0.064	-0.043	-0.125***	-0.009	-0.037
	LB	60.594*	60.596*	63.118*	63.203*	63.971*	64.420*	64.422*	66.455*	69.473*	70.073*
WOCKPHARMA	AC	-0.491*	0.187*	-0.225*	0.086*	-0.017*	0.003*	-0.003*	-0.005*	0.024*	-0.033*
	PAC	-0.491*	-0.072***	-0.215*	-0.149**	-0.049	-0.068	-0.054	-0.036	-0.002	-0.036
	LB	102.472*	117.314*	139.018*	142.170*	142.301*	142.305*	142.309*	142.322*	142.568*	143.049*

AC=Coefficient of Autocorrelation, PAC=Coefficient of Partial Autocorrelation, LB= Box Ljung Q Statistics, * Significant at 1% Level of Significance, ** Significant at 5% Level of Significance and *** Significant at 10% Level of Significance.

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