Volume : 2 | Issue : 12 | Dec 2013 • ISSN No 2277 - 8160

Research Paper | Management

Lead Lag Relationship between Futures and Spot Market: Empirical Evidence from Bank Nifty

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ABSTRACT

By using intraday data from 13th June to 30th September 2013, an attempt has been made to investigate the possible lead-lag relationship among the Bank Nifty spot index and Bank Nifty futures index traded in India. Our results suggests that there is a unidirectional relationship among the price series of bank nifty index in the spot and futures market, the spot market has been found to play comparatively stronger leading role in disseminating information available to the market, and therefore said to be more efficient.

KEYWORDS : Future market, Spot Market, Lead-Lag Relationship, Informational Efficiency.

Introduction

In the mid-1970, Bretton Woods's fixed-exchange-rate system demised and world became more familiar with erratic exchange rates, interest rates, and relatively higher levels of inflation. This post fixed-exchange-rate context was riskier for financial institutions. Thanks to the development of information technology and financial innovation that led to the creation of derivatives that serve as risk-reduction tool for financial institutions managers in many countries. After introduction, these Derivatives Markets became an integral part of capital markets in developed as well as in Emerging Economies. Derivative market instruments assist business growth by disseminating effective price signals concerning exchange rates, indices and on other assets and thereby render both cash and derivatives markets more efficient. In India derivative trading were Firstly started on 9 June 2000 by launching Stock Index Futures on Bombay Stock Exchange (BSE) and on National Stock Exchange (NSE) on 12 June 2000. On bank Nifty Index future trading was started in June 2005.This offer protection from possible adverse market movements in banking industry and used to manage or offset exposures by hedging or shifting risks particularly during periods of volatility. By allowing for the transfer of unwanted risk in banking industry, Bank Nifty futures contracts promote more efficient allocation of capital across the economy, increasing productivity in the economy. After futures contract introduction many research were done in the area of futures and spot markets (Chan, Chan and Karolyi, 1991), (Chan, 1992), (Madhusudan Karmakar, 2009), (Mallkarjunappa, T. and E. M., Afsal, 2010), (Moore, M.S. and Callen, U., 1995. Hedging and price discovery are considered as main function of futures market. Raju, M.T. and Karande, Kiran in his paper believed that in efficient markets "being smart is no advantage" because every bit of superior information is already captured in actual asset prices. In perfectly efficient futures and spot markets, new information is reflected in both markets, simultaneously. In perfectly efficient futures and spot markets, informed investors are indifferent between trading in futures and spot market. In the developed economies viz; U.S.A. and U.K., markets are found to be efficient but reverse holds in case of the emerging markets like India, Taiwan, Bangladesh etc. (Mobarek and Keasey (2000)). If one market reacts faster to information and the other market is slow to react, due to market frictions such as transactions costs or market microstructure effects, a lead-lag relation in returns is observed. The market that provides greater liquidity, lower transaction costs, and less restriction, is likely to play a more important role in price discovery (Karmakar, Madhusudan, 2009). A better understanding of the dynamic relation of spot and futures prices and its relation to the basis provides to these "agents" the ability to use hedging in a more efficient way. For these reasons, If on the date of the maturity of the contract, price series in two markets converges it implies that cost-of-carry model holds good and both the series have long run relationship. If reverse holds, then it implies that the futures are mispriced and may not be an efficient price discovery vehicle (Garbade and Sibler (1983)). For an efficient convergence on the maturity date the basis is required to be predictable, but predictable basis does not necessarily imply that speedier price discovery takes place in the futures market (Fortenbery and Zapata (1997)). Chan (1992), using intra-day data, reports a strong evidence to show that the futures lead the cash index and weak evidence that the cash index leads the futures. (Karmakar (2009) studied the Indian market, using daily data of S&P CNX Nifty and Nifty futures and found that Nifty futures dominate the cash market in price discovery process. Therefore, he concludes that Nifty futures are more efficient than the underlying cash market. Abhyankar (1998) has tried to capture the linear and non-linear causal relationship between the index futures and spot market. Their most important finding was that if non-linear effects were taking into consideration, neither market would found to lead or lag the other. Qing-fu, LIU, Jin-qing, ZHANG (2006) finds the long run equilibrium relationships and significant bidirectional information flows between spot and futures market in china, with futures being dominant. Mallikarjunappa, T. and E. M., Afsal (2010) analyses information-based superiority of markets mainly with an objective of exploring arbitrage opportunities by using high frequency price data of twelve individual stocks, observed at one-minute interval. Their finding suggests that neither spot nor futures assume a considerable leading role and neither of the markets is supreme in price discovery. The efficient market theory has been strongly challenged by the literature on excess volatility. Futures prices are quick to adjust to new information and if this process is transferred to the spot market through arbitrage mechanisms, spot market volatility and market efficiency would increase simultaneously. This paper focuses on lead lag relationship between bank nifty index future and spot market.

Methodology and Data Description

Main objective of this paper is to examine the lead lag relationship between bank nifty index future and spot market. This study is diagnostic cum causal in nature. To examine the lead lag relationship in future and spot bank nifty index, the daily data is taken from National Stock Exchange (NSE) website. The data span over a period of almost 9 years and 3 months i.e. 13th June 2005 to 30th September 2013. Cointegration and granger causality test has been used to check the lead lag relationship in future and spot bank nifty index.

Empirical Results and Discussion

The empirical analysis reported here is based on two-stage estimation. In the first stage, Cointegrating relationship among the variables is identified. If cointegrating relationship is identified, granger causality test is applied on future and spot price series to identify lead lag relationship. Before we test for cointegration relation in spot and futures market of bank nifty index, it is necessary to check the stationarity of data by using unit root test. This paper applies Augmented Dickey Fuller (ADF) and Phillips-Perron (P-P) unit root test for checking stationarity of data. A time series may be integrated [I(1)] or stationary [I(0)]. An I(1) time series is said to have a unit root and any shock in this series is permanent. Table No. 1 shows the results of Unit root test. Augmented Dickey Fuller test T statistics and P values indicate that both future and spot price series can't reject the null hypothesis at 1%, 5% level of significance so they have unit root at level. It means that both future and spot exchange rates series of bank nifty index are non stationary at level. Phillips Perron unit root test also support this result. After it we check the unit root at level, trend and intercept. Both augmented dickey fuller and Phillips Perron test result shows that series also have unit root at level, trend and intercept. Then we check the unit root at 1st difference. Both Augmented Dickey Fuller and Phillips Perron unit root test reject the null hypothesis at 1% level of significance. So it is confirmed that both future and spot price series of bank nifty index are integrated at order1.

Table No.1: Results of Unit Root Test

variable			LOG(BANK NIFTY FUTURE)	LOG(BANK NIFTY SPOT)
Augmented dickey fuller test	Level	T-Statistics	-2.1454	-2.0268
		Prob. value	0.227	0.2754
	Level+ trend and intercept	T-Statistics	-2.9237	-2.6171
		Prob. value	0.1551	0.2726
	1st difference	T-Statistics	-34.9716	-39.4949
		Prob. value	0	0
Phillips Perron test	Level	T-Statistics	-2.0108	-1.9872
		Prob. value	0.2823	0.2927
	Level + trend and intercept	T-Statistics	-2.6001	-2.4501
		Prob. value	0.2804	0.3533
	1st difference	T-Statistics	-46.1908	-39.2991
		Prob. value	0.0001	0

After it Cointegration test has been applied to see the cointegrating relationship between spot and future market of bank nifty index. Cointegration test trace statistics probability value (0.0464) suggests that there is cointegrating relationship between spot and future market of bank nifty index. After knowing about the existence of Cointegration in spot and future price series of bank nifty index, this paper applied Granger Causality Test for identifying lead lag relationship.

Table no. 2 discloses the granger causality result. Null hypothesis that future price doesn't cause spot price cannot be rejected as its probability value is more than 5%, but Null hypothesis that spot price doesn't cause future price is rejected. So spot market is the leader market and future market follow to spot market.

Table No. 2: Granger Causality Test Results

variable	Null Hypothesis	Observations	F-Statistics	Probability Value
Bank Nifty	Bank Nifty future does not granger cause Bank nifty spot	2039	1.0785	0.3403
	Bank Nifty spot does not granger cause Bank Nifty future		58.2794	2.E-25

Conclusion

By using daily data, this paper investigates the possible lead-lag relationship between bank nifty index future and spot market. Spot market has been found to play comparatively stronger leading role in disseminating information available to the market. Possible justification behind such lead lag relationship among bank nifty index spot and futures markets may be the joint efficiency of both the markets. As we know that one of the main objective of introducing derivatives product, such as index futures, in Indian market is to enhance the informational efficiency of the underlying cash market. Therefore by looking into this paper results, one can easily conclude that the informational efficiency of the Indian cash market has really been increased due to the onset of derivative trading, as claimed by the Indian regulators.

REFERENCES

• Abhyankrar, A. (1998), "Linear & non-linear granger causality: Evidence from the U.K Stock index Futures markets", The journal of Futures Markets, 18(5), 519-540. | • Chan, K. (1992), "A further analysis of the lead –lag relationship between the cash market and stock index futures market", The Review of Financial Studies, 5 (1): 123-152 | • Chan, K. etal (1991), "Intraday volatility in the stock index and stock index futures markets", The Review of Financial Studies, 4(4): 637-684 | • Garbade, D. K. and Sibler, L. W. (1983),"Price Movements and Price Discovery in Futures | and Cash Markets,"The Review of Economics and Statistics, Vol. 65, No. 2, 289 - 297 | • Karmakar, M. (2009), "Price discoveries and volatility spillovers in S&P CNX Nifty Futures and its underlying index CNX Nifty", VIKALPA. VOLUME. NO 2. APRIL-JUNE 2009 | • Mallikarjunappa, T. and E M, Afsal. (2010), "Price discovery process and volatility spillover in spot and futures markets: Evidences of Individual Stocks", VIKALPA • VOLUME 35 • NO 2 • APRIL - JUNE 2010 | • Mallikarjunappa, T. & E.M., Afsal. (2008), "Effect of Futures trading on Spot Market Volatility: A Study of CNX bank Nifty Index", Decision, 35(1), 31-45. | • Mobarek, A. and Keasey, K. (2000), "Weak-Form Market Efficiency of an Emerging Market: Evidence from Dhaka Stock Market of Bangladesh," Paper Presented at the ENBS Conference held on Oslo, May 2000, 1-30 | • Moore, M.S. and Callen, U. (1995), "Speculative Efficiency on the London Metal Exchange", The Manchester School, Vol. LXIII, 1995, pp. 235-56. | • Qing-fu, LIU and Jin-qing, ZHANG. (2006), "Price discovery and volatility spillovers: evidence from Chinese spot-futures markets", retrieved from: | http://ifsfd.fudan.edu.cn/lab/download/papers/Price%20Discovery%20and%20Volatility_Spillovers-_Evidence_from_Chinese_Spot-futures%20Markets.pdf | • www.nseindia.com