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The Lead Lag Relationship between Spot and Futures Markets in the Energy Sector: Empirical Evidence from Indian Markets

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ABSTRACT

The study aims at finding the intraday Lead-Lag relationship between Spot and Futures Market for Energy Sectors Stocks on which Single Stock Futures (SSFs) is available, by applying 1-min Price Returns for the period ranging from April 1, 2017 to March 31, 2019. The study explores price-discovery between stock futures and their underlying stocks by applying vector error correction model, Hasbrouck (1995) Information Shares, and Common Factor Component Weights of Gonzalo and Granger (1995). The findings indicate that trades in the Futures Market contribute more to Price-Discovery than Spot Market.

Keywords: Energy Sector, Single Stock Futures, Price-Discovery, Information Share, Vector Error Correction Model, Cointegration
JEL Classifications: G11, G14

1. INTRODUCTION

Ever since the origin of Futures Market, Price-Discovery, Market stability, and Market efficiency associated with Spot Market and Futures Market have been crucial issues. Price-Discovery is a process through which the Market attempts to attain the equilibrium prices. Futures Market, in particular, is considered a primary means for discovering the Spot price of an asset as it contains information regarding the future expectation of investors related to the Spot prices. Under perfectly efficient Markets, new information is impounded simultaneously into Cash and Futures Markets. However, in reality, institutional factors such as liquidity, transaction costs, and Market restrictions may produce a Lead-Lag relation between the two Markets. Due to leverage benefits, low transaction costs, and lack of short sell restrictions, Futures Market incorporates information faster than the Cash Markets (Tse, 1999).

It is believed that the Futures Market potentially performs a vital function of Price-Discovery. If so, then the Futures prices or movement thereof should contain useful information about subsequent Spot prices, beyond that already embedded in the current Spot price. A Futures Market is an essential source of information about prices. The Futures Market is expected to reflect the new information first, and later it flows to the underlying Cash Market. Lower transaction costs, provision of leverage trading, higher liquidity, and availability of short selling opportunities are the main reasons attributed to the leading role of Futures Market in the Price-Discovery process (Wahab and Lashgari, 1993). The rest of this paper is structured as follows. The second section contains a literature review. The third section offers a description of the data while the Fourth section deals with the methodology. Results are discussed in the Fifth section, whereas the Sixth section concludes.

2. LITERATURE REVIEW

An overwhelming number of studies have analyzed the Price-Discovery process between Index Futures contracts and its underlying Indices and have found Futures Market to lead the Spot Market in the Price-Discovery process. Some of such examples includes Kawaller et al. (1987), Stoll and Whaley (1990), Chan

(1992), Frino et al. (2000), Brooks et al. (2001), Zhong et al. (2004), and Kang and Lee (2006). There are studies on the potential informational role of Index Options such as Fleming et al. (1996), Booth and So (1999), and Chakravarty et al. (2004).

Studies such as Wahab and Lashgari (1993), Chan and Lien (2001), Kumar and Chaturvedula (2007), Kumar and Tse (2009), Sriram and Senthil (2013), Zakaria (2012), Sehgal et al. (2015), Boney et al. (2018) have found the Spot Market playing a dominant role in the Price-Discovery process. In India, (Thenmozhi, 2002) and (Raju and Karande, 2003) analyzed the Lead-Lag and Price-Discovery of Equity Futures Market in India. (Raju and Karande, 2003) adopted Cointegration and GARCH model with dummy variables to study the Price-Discovery between Nifty and its Futures and found that Price-Discovery occurs in both Futures and Spot Markets.

In the Energy sector, empirical studies have stated that price-discovery among futures and spot markets could be either unidirectional or a bidirectional. A study conducted by (Kim, 2015) suggests that the lead-lag relationship among crude oil spot and futures Prices is changing over time depending on macroeconomic events. Studies which have highlighted the existence of unidirectional influence include a study by (Schwarz and Szakmary, 2010) who analysed the long-run relationship between Spot and Futures prices of Crude Oil, Heating Oil and Gasoline sector from 1985 to 1991. Their results pointed out that the Futures Market plays a dominant role in Price-Discovery. Similar results were presented by (Ng and Pirrong, 1996)**,** who also investigated the Price dynamics of two major refined Energy commodities, heating Oil and gasoline, from 1984 to 1990. They concluded that the Futures Market adjust faster to correct the disequilibrium in prices.

In the Natural Gas sector, (Tse and Xiang, 2005) stated that the introduction of e-mini Futures in 2002 in the sector enhanced the role of Futures Markets on Price-Discovery, leading Spot Markets to equilibrium. Contradictory findings were presented by (Chiou-Wei et al., 2008), who stated that Spot Markets plays, a dominant role in Price-Discovery. According to these scholars, shortage or surplus on the supply side would lead market participants to forecast Future Prices of the Commodity.

In accordance with the background and motivation presented, the current study aims at examining the lead-lag relationship between Spot and Futures Market for Energy Sectors Stocks on which SSF is available and to define which market is the primary source of Price-Discovery. The Energy sector or industry comprises of those companies which are involved in the exploration and expansion of Oil or gas reserves, Oil and gas drilling, and refining. It also includes integrated power utility companies such as renewable Energy and coal. Examining the lead-lag relationship between Energy Stock Futures and their Stocks can assist shareholders to decide which price should be followed during decision-making processes. It can also help in detecting potential arbitrage opportunities between Spot and Futures prices. The rules regarding margin requirements, market halts, and taxes on transactions can be better analyzed if the role and significance of the Futures market are well understood.

The present study contributes to the existing literature of Price-Discovery in many ways. First, studying the impact of Single Stock Futures will allow us to assess an individual Energy Sector company's response to Futures trading directly; in contrast to the Market-wide result obtained from Index Futures studies. Second, it is commonly known fact that Lead-Lag relationship between Spot and Futures Markets does not last for more than half an hour[1]. So, even if there is an existence of the Lead-Lag relationship between Spot and Futures Market, it is not possible to find the evidence for such a relation using daily data. Therefore using high-frequency data is of utmost importance for fetching reliable results. This study will use high-frequency 1-min Price data to explore the Price-Discovery process using the most liquid markets for the Single Stock Futures in the World, i.e., National Stock Exchange (NSE).

NSE offers a common platform for Spot and the SSF segment, thereby offering data with marginal microstructure noise. Both Equity Spot and SSFs have a dominant market share in trading at NSE, thereby minimizing the measurement complexities that arise with fragmented trading. From the methodological aspect, we use techniques suggested by Hasbrouck (1995) Gonzalo and Granger (1995) to determine Information Shares and Common Factor Component Weights for the SSFs market relative to that of the underlying stock market.

3. DATA

The study aims at finding the intraday Lead-Lag relationship between Spot and Futures Market for Energy Sectors Stocks on which SSF is available. The resulting sample for our research comprises of sixteen single stock futures and underlying stocks belonging to the Energy Sector. For the present study, we use 1-min price returns of 30 single stock futures and their underlying stocks for the period ranging from April 1, 2017 to March 31, 2019. High-frequency data is not readily available, and the charges for procuring such data are very high. Fewer studies have investigated the Lead-Lag relationship at the level of individual stocks using intraday data in the Indian context. The present study is an attempt to fill this gap to some extent. Data has been sourced from NSE's data vending partner Dotex International Ltd.

4. TECHNIQUES AND METHODS

4.1. Vector Error Correction Model (VECM)

We first ascertain the Stationarity of the price series using augmented Dickey-Fuller (ADF) unit root tests. For the price series found to be non-stationary at levels but stationary at First difference, we use Johansen Cointegration tests to check for the long-run equilibrium relationship between Spot and Futures prices. There may be an existence of a long-run equilibrium relationship between two or more variables, but in the short-run, there could be disequilibrium. The nature of the relationship among Cointegrated pairs of Stock Futures and their Underlying Stocks in the short-run

1 (Kawaller et al., 1987), (Herbst, McCormack, and West, 1987), (Stoll and Whaley, 1990), (Pizzi and Economopoulos, 1987), (Kang and Lee, 2006), and (Bhatia, 2007).

can be investigated by implementing the Vector Error Correction Mechanism. A VECM is a restricted VAR that has Cointegration restrictions built into the specification. Since all the variables are integrated of the order I (1), we have used Johansen Cointegration for a long term relationship. VECM includes both the error correction terms and the lagged differences of the series as stated in equation (1) and (2):

$$\Delta s_t = \gamma_s + \alpha_s \left(s_{t-1} - a - \beta f_{t-1}\right) + \sum_{i=1}^{n} \propto_{s1}(i)\Delta s_{t-1} + \sum_{i=1}^{n} \propto_{s2}(i)\Delta f_{t-1} + \in_{s,t} \quad (1)$$

$$\Delta f_t = \gamma_f + \alpha_f \left(s_{t-1} - a - \beta f_{t-1}\right) + \sum_{i=1}^{n} \propto_{f1}(i)\Delta s_{t-1} + \sum_{i=1}^{n} \propto_{f2}(i)\Delta f_{t-1} + \in_{f,t} \quad (2)$$

Where i is the lag length as suggested by the Akaike information criterion and $\in_{s,t}$ and $\in_{f,t}$ are the disturbance terms. The error correction term of VECM specification signifies the rate at which it corrects its previous period disequilibrium or speed of adjustment to restore the long-run equilibrium relationship. The terms $\propto_{s1}(i)$, $\propto_{s2}(i)$, $\propto_{f1}(i)$, and $\propto_{f2}(i)$ are the short-run coefficients in the above equation $\alpha_s\,(s_{t-1} - a - \beta f_{t-1})$, and $\alpha_f\,(s_{t-1} - a - \beta f_{t-1})$ are the error correction terms representing the short-run adjustment arising due to the divergence from long-run equilibrium.

4.2. Hasbrouck Information Share Methodology and Common Factor Component Weights of Gonzalo and Granger (1995)

By following the methodology used by (Tse, 1999), (Chakravarty et al., 2004), (Kumar and Chaturvedula, 2007), (Shastri et al., 2008), (Kumar and Tse, 2009), and (Aggarwal and Thomas, 2011) Hasbrouck Information Share Methodology and Common Factor Component Weights of Gonzalo and Granger (1995) has been used. The two approaches are based on a common implicit efficient price that is contained in the observed price of a security and can be estimated using a VECM framework. (Hasbrouck, 1995) introduces the information share measure which captures the variation in the underlying random walk introduced by each Market. Hasbrouck's Information Share focuses on the variance of the efficient price innovation. It measures the extent to which the efficient price variance can be attributed to the innovations from different associated markets. Hasbrouck (1995) Information Share Measure and Common Factor Component Weights of Gonzalo and Granger (1995) models VECM in the following form:

$$\Delta \boldsymbol{X_t} = \Pi \boldsymbol{X}_{t-1} + \sum_{i=1}^{k} \Gamma_i \Delta \boldsymbol{X}_{t-1} + \acute{\varepsilon}_t \quad (3)$$

Where $X_t = \{X_{it}\}$ is an n × 1 vector of cointegrated prices. Π and Γ_i are n × n matrices of parameters, and $\acute{\varepsilon}_t$ is an n × 1 vector of serially-uncorrelated residuals with a covariance matrix $\Omega = \{\sigma_{ij}\}$. The long-run relation matrix Π has a reduced rank of r < n and can be decomposed as Π = αβ, where α and β are n × r matrices. The β matrix consists of the cointegrating vectors, and α is the error correction (or equilibrium adjustment) matrix. Hasbrouck (1995) Information Share Measures could be expressed as follows:

$$IS_j = \frac{\psi_j^2 \Omega_{jj}}{\psi \Omega \psi'}$$

If Ω is diagonal, then $\psi\Omega\psi'$ will consist of "*n*" terms, each of these terms would represent the contribution to the efficient price innovation from each market. However, if Ω is not diagonal, then the proposed measure has the problem of attributing the covariance terms to each market. To overcome this, Hasbrouck (1995) suggested using the Cholesky decomposition and measure IS using orthogonalized innovations. This is done as follows by assuming "F" to be a lower triangular matrix such that $FF' = \Omega$.

Table 1: Unit root test (Augmented Dickey-Fuller Test)

Stock	SPOT		Futures		Stock	SPOT		Futures	
	ADF at level	ADF at first difference	ADF at level	ADF at first difference		ADF at level	ADF at first difference	ADF at level	ADF at first difference
ADANIPOWER	−2.669 (−0.079)	−77.9823 (−0.00)	−1.8401 (−0.361)	−25.085 (−0.00)	NTPC	−1.903 (−0.330)	−252.625 (−0.000)	−1.840 (−0.361)	−251.084 (−0.000)
BPCL	−3.075 (−0.112)	−14.3857 (−0.000)	−3.067 (−0.114)	−14.026 (−0.000)	OIL	−2.8434 (−0.052)	−264.133 (−0.000)	−2.696 (−0.074)	−264.045 (−0.000)
COALINDIA	−2.407 (−0.139)	−216.989 (−0.000)	−2.473 (−0.121)	−218.720 (−0.000)	ONGC	−1.793 (−0.389)	−435.009 (−0.000)	−1.887 (−0.333)	−297.513 (−0.000)
GAIL	−2.496 (0.116)	(−240.736) (−0.000)	−420.76 (−0.000)	−420.769 (0.000)	PETRONET	−1.436 (−0.565)	−169.532 (−0.000)	−1.450 (−0.558)	−218.429 (−0.000)
HINDPETRO	−1.471 (−0.548)	−305.751 (−0.000)	−1.505 (−0.531)	−189.269 (−0.000)	PFC	−2.743 (−0.072)	−254.133 (−0.000)	−2.596 (−0.064)	−254.045 (−0.000)
IGL	−1.476 (−0.546)	−296.195 (−0.000)	−1.189 (−0.681)	−186.673 (−0.000)	POWERGRID	−2.496 (0.116)	−240.736 (−0.000)	−420.769 (−0.000)	−420.769 (0.000)
IOC	−1.903 (−0.330)	−252.625 (−0.000)	−1.840 (−0.361)	−251.084 (−0.000)	TATAPOWER	−1.683 (−0.389)	−435.009 (−0.000)	−1.797 (−0.333)	−298.513 (−0.000)
MGL	−2.843 (−0.052)	−264.133 (−0.000)	−2.696 (−0.074)	−264.045 (−0.000)	TORNTPOWER	−1.803 (−0.320)	−242.625 (−0.000)	−1.740 (−0.351)	−241.084 (−0.000)

( ) denote p-value

Then the Information Share of the j^{th} market could be expressed as follow:

$$IS_j = \frac{([\psi' F]_i)^2}{\psi \Omega \psi'}$$

On the other hand, the Component Share approach emphasizes on the composition of the efficient price innovation and measures the contribution of the market to Price-Discovery as its contribution to the efficient price innovation. Under this approach, P_t takes the form:

$$P_t = A_1 f_t + A_2 z_t$$

Where f is the permanent component, and z_t is the transitory component while A_1 and A_2 are the loading matrices. Component Share of the j^{th} market is expressed as follow:

$$CS_j = \frac{\alpha_{\perp,j}}{\alpha_{\perp,j} + \beta_{\perp,j}}, j = 1, 2$$

5. EMPIRICAL RESULTS

We use the Augmented Dickey-Fuller Unit Root test to examine the stationary properties of the 1-min Price Returns of select highly traded Single Stock Futures and their underlying Stocks. The result of the Unit Root Test is given in the Table 1.

All the variables are non-stationary at the level as the p-value is more than 0.05%. Therefore, we conduct the Unit Root test in the first difference for all the variables. All the series are stationary at first difference at a 1% level of significance. The results of the ADF Test indicate that all variables are integrated of the same order. Therefore we could proceed with the Johansen Cointegration for exploring the long term relationship between Single Stock Futures and their underlying Stocks. This also indicates the existence of the Price-Discovery process between the Underlying Stocks and their respective Futures Contract.

Table 2 displays the result of the Johansen Cointegration test. The following test has been performed by taking appropriate lag interval, which has been selected as per the optimum lag length suggested by different tests like Akaie Information Criterion (AIC), Schwarz Criterion (SC), and the Likelihood Ratio (LR) test. The result of the Johansen Cointegration test indicates the presence of at least one Cointegrating vectors at the 5% level of significance. This result has been supported by Trace test as well as Max Eigen values. Therefore null hypothesis of no Cointegration can be rejected at a 5% level of significance for all the pairs of Single Stock Futures and their underlying Stocks. Thus based on the above observation, it can be concluded that there exists a long term Cointegrating relationship between all the Single Stock Futures and their Underlying Stocks.

Table 3 displays the estimates of the VECM for select highly traded Single Stock Futures and their Underlying Stocks. ECT Coefficient measures the speed of adjustment to restore the balance between

Table 2: Results of johansen cointegration test for stocks futures and their underlying stocks

Null hypothesis	Stock	Trace statistics	Critical value at 5% (p-value)	Maximum Eigen statistics	Critical value at 5% (p-value)	Stock	Trace statistics	Critical value at 5% (p-value)	Maximum Eigen statistics	Critical value at 5% (p-value)
H0: r = 0	ADANIPOWER	164.262	15.494 (−0.000)	156.792	14.264 (−0.000)	NTPC	3958.365	15.4947 (0.000)	3948.358	14.264 (0.000)
H0: r ≤ 1		7.470	3.841 (−0.006)	7.470	3.841 (−0.006)		10.0073	3.8414 (−0.0016)	10.007	3.841 (−0.0016)
H0: r = 0	BPCL	169.376	15.494 (−0.000)	168.341	14.264 (−0.000)	OIL	3958.365	15.4947 (0.000)	3948.358	14.2646 0.000
H0: r ≤ 1		1.034	3.841 (−0.309)	1.034	3.841 (−0.309)		10.007	3.841 (−0.001)	10.007	3.841 (−0.001)
H0: r = 0	COALINDIA	450.391	15.494 (−0.000)	441.876	14.264 (−0.000)	ONGC	258.282	15.494 (0.000)	251.717	14.264 (0.000)
H0: r ≤ 1		8.514	3.841 (−0.000)	8.514	3.841 (−0.000)		6.5644	3.841 (−0.010)	6.5644	3.841 (−0.010)
H0: r = 0	GAIL	209.995	15.494 0.000	208.215	14.264 0.000	PETRONET	8538.870	15.494 (0.000)	8535.15	14.264 (0.000)
H0: r ≤ 1		1.7800	3.841 (−0.182)	1.7800	3.841 (−0.182)		3.7201	3.8414 (−0.0538)	3.720	3.841 (−0.053)
H0: r = 0	HINDPETRO	187.029	15.494 (0.000)	182.793	14.264 0.000	PFC	700.465	15.494 (0.000)	698.259	14.264 (0.000)
H0: r ≤ 1		4.2357	3.841 (−0.039)	4.235	3.841 (−0.039)		2.205	3.841 (0.137)	2.205	3.841 (0.137)
H0: r = 0	IGL	119.690	15.494 (0.000)	117.096	14.264 0.000	POWERGRID	490.744	15.494 (0.000)	485.545	14.264 (0.000)
H0: r ≤ 1		2.594	3.841 (−0.1072)	2.594	3.841 (−0.107)		5.198	3.841 (−0.022)	5.198	3.841 (−0.022)
H0: r = 0	IOC	399.253	15.494 (0.000)	396.775	14.264 (0.000)	TATAPOWER	148.8672	15.4947 (0.000)	145.821	14.2646 (0.000)
H0: r ≤ 1		2.478	3.841 (0.115)	2.478	3.841 (0.115)		3.0461	3.8414 (−0.0809)	3.0461	3.8414 (−0.0809)
H0: r = 0	MGL	318.041	15.494 (0.000)	317.679	14.264 (0.000)	TORNTPOWER	2429.376	15.4947 (0.000)	2425.34	14.2646 (0.000)
H0: r ≤ 1		0.361	3.841 (−0.547)	0.361	3.841 (−0.547)		4.0348	3.8414 (−0.044)	4.0348	3.841 (−0.044)

( ) denote p-value

Table 3: Estimates of vector error correction model

Stock	Dependent variable				Stock	Dependent variable			
	Spot		Futures			Spot		Futures	
	ECT coefficient	p-value	ECT coefficient	p-value		ECT coefficient	p-value	ECT Coefficient	p-value
ADANIPOWER	−0.0297	0.000	0.0000	0.5823	NTPC	−0.0011	0.000	0.0000	0.8530
BPCL	−0.0016	0.000	0.0000	0.6290	OIL	−0.0003	0.043	−0.0003	0.0000
COALINDIA	−0.0023	0.000	−0.0001	0.3007	ONGC	−0.6264	0.000	0.0000	0.8090
GAIL	−0.0546	0.000	−0.0004	0.0000	PETRONET	−0.0011	0.000	0.0001	0.4369
HINDPETRO	−0.0529	0.000	−0.0001	0.2360	PFC	−0.0020	0.000	0.0000	0.5723
IGL	−0.0038	0.000	0.0001	0.5647	POWERGRID	−0.0279	0.000	0.0000	0.8351
IOC	−0.0039	0.000	0.0001	0.2794	TATAPOWER	−0.1528	0.000	−0.0002	0.1086
MGL	−0.1810	0.000	−0.0006	0.0000	TORNTPOWER	−0.0135	0.000	−0.0001	0.2439

Table 4: Hasbrouck (1995) information share measures and common factor component weights of Gonzalo and Granger (1995)

Stock	Hasbrouck information share		Gonzalo Granger factor weights		Stock	Hasbrouck information share		Gonzalo Granger factor weights	
	Stock	SSF	Stock	SSF		Stock	SSF	Stock	SSF
ADANIPOWER	0.46	0.54	0.53	0.47	NTPC	0.41	0.59	0.39	0.61
BPCL	0.14	0.86	0.22	0.78	OIL	0.36	0.64	0.45	0.55
COALINDIA	0.02	0.98	0.06	0.94	ONGC	0.06	0.94	0.1	0.9
GAIL	0.03	0.97	0.14	0.86	PETRONET	0.04	0.96	0.11	0.89
HINDPETRO	0.18	0.86	0.33	0.67	PFC	0.43	0.57	0.42	0.58
IGL	0.08	0.92	0.07	0.93	POWERGRID	0.16	0.84	0.28	0.72
IOC	0.22	0.78	0.34	0.66	TATAPOWER	0.02	0.98	0.03	0.97
MGL	0.16	0.84	0.28	0.72	TORNTPOWER	0.16	0.84	0.31	0.69

Stock Futures and Underlying Stocks. If the ECT is negative and significant, it indicates a stable long term relationship between Dependent variables and Independent variables.

In the equation with Spot return as a dependent variable, all the sixteen Stocks are having negative Error Correction Term and significant p-value. However, in the equation with Futures return as the dependent variable, the Error Correction Term is negative and significant for only three out of sixteen Stocks. The speed of adjustment in the Futures Market for all the Stocks is higher than the Spot Market. It indicates that when there is a disequilibrium in the cointegrated series in the short-run, Futures Market makes more significant adjustments than the Spot Market to restore the equilibrium. Futures Market appears to play a more efficient role in Price-Discovery than the Spot Market for Stocks in the Energy Sector.

Table 4 reports Hasbrouck (1995) information shares and Common Factor Component Weights of Gonzalo and Granger (1995) computed using 1-min price data for Select highly traded Stocks and their respective Future Contracts. It could be inferred from Table 4 that the Information Share is generally higher in Stock Futures Segment consistently for the majority of the stocks. The average Information Share of the Futures Market is 81% and 18% for the Spot Market. The estimates of the Hasbrouck Information Share indicate that the Futures Market leads the Spot Market in the Price-Discovery process. Similar findings are also presented by Component Share Weights, where the Component Share of Futures Market is 75% and 25% for the Spot Market. The results of Hasbrouck (1995) information shares and Common Factor Component Weights of Gonzalo and Granger (1995) indicate that Futures Markets leads the Price-Discovery Process while the Spot Market follows.

6. CONCLUSION

Through this study, we attempted to understand the Price-Discovery process between SSFs and their underlying stocks using high-frequency data of Energy Sector. The findings of the study suggest that Single Stock Futures play a crucial role in the Price-Discovery and leads the Spot Market in the process of Price-Discovery. VECM test indicated that when there is disequilibrium in the Cointegrated series, Futures Market makes more significant adjustments than the Spot Market to restore the equilibrium. For India's economy, Futures Market appears to play a more efficient role in Price-Discovery than the Spot Market.

Hasbrouck Information Share indicates that Price-Discovery concentrates on the Futures market with the Information Share of 81%. The estimates of the Hasbrouck Information Share indicate that the Futures Market leads the Spot Market in the Price-Discovery process. Similar findings are also presented by Component Share Weights, where the Component Share of Futures Market is 75% and 25% for the Spot Market. The findings of the Hasbrouck Information Share is contradicting the findings offered by (Kumar and Tse, 2009), who found the stock market contributing more to Price-Discovery than the Futures markets. The results of Hasbrouck (1995) information share and Common Factor Component Weights of Gonzalo and Granger (1995) provide evidence to support the dominant role played by the Stock Futures Market. The findings of the study are in line with

Kawaller et al. (1987), Stoll and Whaley (1990), Chan (1992), Frino et al. (2000), Brooks et al. (2001), Zhong et al. (2004), and Kang and Lee (2006).

The Futures Market is expected to reflect the new information first, and later it flows to the underlying Cash Market. Lower transaction costs, provision of leverage trading, higher liquidity, and availability of short selling opportunities are the main reasons attributed to the leading role of Futures Market in the Price-Discovery process. The study points towards the fact that Price-Discovery happens in Spot Market as well as the Futures Market. However, Stock Futures are more efficient relative to its corresponding underlying Stocks, as it processes information faster. Overall findings of the study point towards the fact that Single Stock Price quotes are more informative and overpower the Spot Market in the Price-Discovery process.

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