

Efficiency of Currency Derivatives in Price Discovery Process: Evidences from India

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How to cite this paper: Sharma, P. and Chotia, V. (2019) Efficiency of Currency Derivatives in Price Discovery Process: Evidences from India. *Theoretical Economics Letters*, 9, 1669-1681.
<https://doi.org/10.4236/tel.2019.95106>

Received: May 10, 2019

Accepted: June 24, 2019

Published: June 27, 2019

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Abstract

The present study investigates the efficiency of currency derivatives market by assessing its contribution towards price discovery process using spot and future prices of four currencies (*USD/INR*, *EURO/INR*, *GBP/INR* and *JPY/INR*) traded on the National Stock Exchange (NSE), India. As per the investigation, it can be concluded that there is a long run equilibrium relationship between spot rates and future rates, with unidirectional causality running from future rates to spot rates for all currencies under consideration. As the futures markets contribute more to the price discovery, this implies that more investors are attracted to it. This in turn leads to more rational price discovery.

Keywords

Price Discovery, Short Run Causality, Long Run Causality, Vector Error Correction Model (VECM)

1. Introduction

Price discovery refers to the process of determining the price of a traded asset or an instrument in a market. As for other commodities, the price is determined by the interaction of the demand and supply forces. Due to the increase in the popularity of the futures market, there is much more activity than before. Thus, there is an increase in the information floating around. In an efficient market, as the information is freely available to all the participants, there is push and pull resulting from the demand and supply forces. But, as it is widely agreed that the markets are far from efficient, studying the lead and lag relationship between major market components is of vital importance. Foreign exchange (FX) or the currency markets play a major role in integrating economies all over the world.

The market participants include retail investors, brokers, multi-national corporations, public and private banks, central banks, hedge funds, etc.

The forex market in India has come a long way in terms of the number of participants, overall market turnover and variety of instruments. Today, Indian forex market is an attractive destination for investors and has seen an increase in the turnover for different foreign currencies. Over the years, the increase in the number of participants and the thriving derivative products for trading and hedging risk have added to the depth and complexity of the market. Due to this increase in the number of the participants and the changing structure of the market, there is a need of increased transparency, stability, and efficiency. This is one of the reasons currency futures were introduced.

In line with the above thought, RBI has been trying to adjust many policies and formulate new ones to make the forex markets more efficient. For that purpose, one needs to better comprehend how the market and the various components in it behave. One of the ways of that is to understand the price discovery process in the spot and futures market.

Furthermore, currently with the development of the forex markets, especially the futures market, most of the research has been done on the lead-lag relationship and the efficiency of currency derivatives in determining the price discovery process in the developed countries. There is dearth of such studies on the developing economies. Also, the major focus of previous studies have been on assessing the efficiency of futures in determining the price discovery process and lead-lag relationship in the stock markets, commodities market and not many efforts have been made in the context of currency derivatives.

The current study talks about the lead-lag relationship between spot and futures prices in the context of Indian forex markets. This information can be used to device a trading strategy so as to earn more returns as compared to the passive buy and hold strategy. This way the results of the price discovery examination can be used not only by the regulators but will also be beneficial to the market participants.

In terms of the limitations of the paper, the study can be expanded to other currencies and nations in order to expand the horizon of price discovery process. Other empirical techniques can be applied in order to carry out the analysis so as to if the final results come out in the same way or not.

Section 2 summarizes the important literature on this topic. Data and methodology relevant to this study are discussed in Section 3. The results of the empirical analysis are illustrated and reported in Section 4. The conclusions of the study are given in Section 5. Finally, the future scope of this study is discussed in Section 6.

2. Literature Review

Price discovery is a key function of the financial markets [1]. In an efficient market, the effect of all the information available to the market participants is

incorporated into the price of the financial assets. In accordance with the efficient market hypothesis proposed by [2] and further discussed by various academic studies [3] [4] [5], all the available information should be fully reflected in the asset prices. The purpose of price discovery analysis is to investigate as to which market is providing most useful information for determining the fundamental value of the asset. Unfortunately, so far, the concept of price discovery in the financial markets has not been completely grasped.

To know if the spot or the futures market is dominant in the respect of price discovery and which one of them takes the lead is of vital importance to the market participants as well as the regulators. Due to this, the quantification of the process of price discovery has gained importance in the area of empirical finance. Most widely held view is that the process of price discovery is dominated by the futures markets, across different assets [6] [7]. This is majorly because of the lower transaction costs. The process of price discovery has been widely studied under a number of settings, particularly the price discovery of stocks listed on different exchanges. The role of price discovery and volatility spill-over in informationally linked futures market has been studied extensively. Most of the researches on price discovery and the possible volatility consequences for the spot market are focused on a few developed countries, especially the USA. [8] and [9] have studied the price discovery of the stocks in the USA which are traded on different exchanges, with reference to the relative contributions of the NYSE and the regional exchanges. After analysing the commodity spot markets and futures markets, [10] has stated that about 75 percent of the new information first gets incorporated in the future prices. Articles describing the links between stock markets and stock index futures markets include [11]-[16]. Researchers have also studied other equity derivative products. The links between stock markets and option markets have been studied by [17]-[23].

Some other important studies which focus on the price discovery and volatility spill-overs in commodity and stock market's index futures are [24] [25] and [26]. The price discovery mechanism in India's National Stock Exchange (NSE) spot market and future market was studied by [27]. The study uses Johansen's cointegration test and Vector Error Correction Mechanism (VECM) to empirically conclude that there is a bilateral causality between S&P CNX Nifty index and the index futures, for the period from June 2002 to February 2005. Only few researches have tried to examine the price discovery process in the forex market, especially the forex futures market. [28] [29] [30] [31] [32] are some of the major studies that have analysed the foreign exchange markets in mature and emerging economies. [33] has studied the price discovery process in the currency markets by incorporating new information into the exchange rate dynamics. For the European markets, [34] has studied the impact of macroeconomic news and central bank announcements on the exchange rates. [35] has tried to study as to which market (spot market or future market) has greater contribution to price discovery. These studies conclude that in comparison to the spot market, the futures market have greater contribution to price discovery in the currency markets.

One major shortcoming of the existing studies on price discovery is that most of the studies focus on measuring price discovery over a relatively short period of time, typically less than a year. As such, variations in price discovery over time have not really been examined in the literature. Additionally, the process of price discovery and volatility spill-over has been studied majorly for the equity and commodity markets in the USA and other developed countries [36] [37] [38] [39]. Not much attention has been given to foreign exchange markets in the emerging countries. However, because of the increasing activity in the currency markets of emerging countries, it is of strong interest to see whether the new information is fully and immediately incorporated in prices of traded currencies or not. As far as the examination of price discovery is concerned, the published evidence on Indian economy is very scarce. There is hardly any study on India's foreign exchange market that has investigated the price discovery, majorly because of the recent origin and smaller size of the market. The present study is an attempt to fill this research gap.

3. Data and Methodology

Daily time series data for *EURO/INR*, *GBP/INR* and *JPY/INR* spot and future exchange rates from 1st January 2015 to 12th March 2019 (except for *USD/INR* where data was considered for period of 1st January 2015 to 28th November 2018) was used for this study. The data has been sourced from the databases of National Stock Exchange of India Ltd. (NSE) and Reserve Bank of India (RBI).

Before proceeding for the analysis, the descriptive statistics for all the variables are mentioned below (Table 1).

a) Testing for stationarity and co-integration of variables

Prior to the analysis, the Augmented Dickey-Fuller test (ADF) was employed to check for the stationarity of the spot and future exchange rates for all currencies [40]. The ADF tests were performed on both the level and first differenced observations and to determine the degree of integration of the data series. This was done to check for the possibility of spurious relationships between spot and future prices.

Consequently, in the case of non-stationarity, the maximum likelihood approach of [41] is used to investigate the presence of long-term equilibrium relationship between the spot and future prices. This test reports the maximal eigen-value and the trace statistic tests for each of the variable. The null hypothesis states that there is no co-integrated relationship between the variables. Presence of a co-integrated relationship between two variables is an evidence of the long-run equilibrium relationship between them. This also implies that there is a linear combination of the two variables that is stationary. As the test results are sensitive to the number of lags chosen, information criteria have been chosen to select the best lag length.

b) Causality analysis

Granger causality test has been undertaken to test for the possibility of causality relationships between the spot exchange rates and the future exchange rates

Table 1. Descriptive statistics.

(a)				
	<i>USD_INR_FUT</i>	<i>USD_INR_SPOT</i>	<i>EURO_INR_FUT</i>	<i>EURO_INR_SPOT</i>
Mean	66.28658	66.14007	75.39605	75.21103
Median	66.5275	66.3495	75.05	74.8987
Maximum	74.5025	74.3875	86.0025	85.9012
Minimum	61.3975	61.4105	66.035	65.9451
Std. Dev.	2.503906	2.517663	4.172498	4.168791
Skewness	0.835786	0.841964	0.319533	0.313544
Kurtosis	3.995152	4.027828	2.441432	2.446805
Jarque-Bera	142.3911	146.4381	30.28693	29.39821
Probability	0.000	0.000	0.000	0.000
Sum	59856.78	59724.48	76074.61	75887.93
Sum Sq. Dev.	5655.132	5717.442	17549.02	17517.85
(b)				
	<i>GBP_INR_FUT</i>	<i>GBP_INR_SPOT</i>	<i>JYP_INR_FUT</i>	<i>JYP_INR_SPOT</i>
Mean	91.32356	91.11695	59.12248	58.98463
Median	90.9425	90.6625	58.94625	58.775
Maximum	104.8425	105.1	67.165	67.15
Minimum	80.0875	79.8563	51.185	51.06
Std. Dev.	6.078118	6.064364	4.272261	4.275719
Skewness	0.07663	0.077437	-0.140086	-0.143368
Kurtosis	1.870926	1.877638	2.042168	2.046494
Jarque-Bera	54.58254	53.96819	41.91238	41.72105
Probability	0.000	0.000	0.000	0.000
Sum	92145.47	91,937	59713.7	59574.48
Sum Sq. Dev.	37239.07	37070.72	18416.48	18446.31

for the different currencies under consideration. In this way, it is possible to examine both the long run causality captured by the significance of the error-correction term and the short run causality derived by testing the significance of sum of the lags of explanatory variables. For the currency pair *USD/INR*, the spot rate and exchange rate can be written in the following Vector Error Correction (*VEC*) form:

$$\Delta\left(\frac{USD}{INR} \text{Spot}\right)_t = \alpha_1 + \beta_1 \sum_{i=1}^{i=p} \Delta\left(\frac{USD}{INR} \text{Spot}\right)_{t-i} + \gamma_1 \sum_{i=1}^{i=q} \Delta\left(\frac{USD}{INR} \text{Future}\right)_{t-i} + \lambda_1 e_{t-1} + v_{1t} \quad (1)$$

$$\begin{aligned} & \Delta \left(\frac{USD}{INR} \text{Future} \right)_t \\ & = \alpha_2 + \beta_2 \sum_{i=1}^{i=p} \Delta \left(\frac{USD}{INR} \text{Spot} \right)_{t-i} + \gamma_2 \sum_{i=1}^{i=q} \Delta \left(\frac{USD}{INR} \text{Future} \right)_{t-i} + \delta_1 e_{t-1} + u_{1t} \end{aligned} \quad (2)$$

$$\begin{aligned} & \Delta \left(\frac{EURO}{INR} \text{Spot} \right)_t \\ & = \alpha_3 + \beta_3 \sum_{i=1}^{i=p} \Delta \left(\frac{EURO}{INR} \text{Spot} \right)_{t-i} + \gamma_3 \sum_{i=1}^{i=q} \Delta \left(\frac{EURO}{INR} \text{Future} \right)_{t-i} + \lambda_2 e_{t-1} + v_{2t} \end{aligned} \quad (3)$$

$$\begin{aligned} & \Delta \left(\frac{EURO}{INR} \text{Future} \right)_t \\ & = \alpha_4 + \beta_4 \sum_{i=1}^{i=p} \Delta \left(\frac{EURO}{INR} \text{Spot} \right)_{t-i} + \gamma_4 \sum_{i=1}^{i=q} \Delta \left(\frac{EURO}{INR} \text{Future} \right)_{t-i} + \delta_2 e_{t-1} + u_{2t} \end{aligned} \quad (4)$$

$$\begin{aligned} & \Delta \left(\frac{GBP}{INR} \text{Spot} \right)_t \\ & = \alpha_5 + \beta_5 \sum_{i=1}^{i=p} \Delta \left(\frac{GBP}{INR} \text{Spot} \right)_{t-i} + \gamma_5 \sum_{i=1}^{i=q} \Delta \left(\frac{GBP}{INR} \text{Future} \right)_{t-i} + \lambda_3 e_{t-1} + v_{3t} \end{aligned} \quad (5)$$

$$\begin{aligned} & \Delta \left(\frac{GBP}{INR} \text{Future} \right)_t \\ & = \alpha_6 + \beta_6 \sum_{i=1}^{i=p} \Delta \left(\frac{GBP}{INR} \text{Spot} \right)_{t-i} + \gamma_6 \sum_{i=1}^{i=q} \Delta \left(\frac{GBP}{INR} \text{Future} \right)_{t-i} + \delta_3 e_{t-1} + u_{3t} \end{aligned} \quad (6)$$

$$\begin{aligned} & \Delta \left(\frac{JPY}{INR} \text{Spot} \right)_t \\ & = \alpha_7 + \beta_7 \sum_{i=1}^{i=p} \Delta \left(\frac{JPY}{INR} \text{Spot} \right)_{t-i} + \gamma_7 \sum_{i=1}^{i=q} \Delta \left(\frac{JPY}{INR} \text{Future} \right)_{t-i} + \lambda_4 e_{t-1} + v_{4t} \end{aligned} \quad (7)$$

$$\begin{aligned} & \Delta \left(\frac{JPY}{INR} \text{Future} \right)_t \\ & = \alpha_8 + \beta_8 \sum_{i=1}^{i=p} \Delta \left(\frac{JPY}{INR} \text{Spot} \right)_{t-i} + \gamma_8 \sum_{i=1}^{i=q} \Delta \left(\frac{JPY}{INR} \text{Future} \right)_{t-i} + \delta_4 e_{t-1} + u_{4t} \end{aligned} \quad (8)$$

where Δ , as usual is the first difference operator and e_{t-1} is the lagged residual term from the co-integrating regression, which is nothing but the error correction term. The above equations are used to evaluate the causality between changes in spot rates and future rates. In Equations (1), (3), (5) and (7), existence of a causal relationship running from change in future prices to spot prices is evaluated. In Equations (2), (4), (6) and (8), existence of a causal relationship running from change in spot prices to future prices is evaluated.

If the dependent variables can be driven by the error term obtained in the co-integrating equation, this implies that there exists a long-run causal relationship between the dependent and independent variables. This can be done by testing $H_0: \lambda = 0$ (or $H_0: \delta = 0$). If the error correction terms are non-significant, this implies that the dependent variable responds only to the short-term shocks. Similarly, short-term causality is confirmed by the rejection of the non-significance of the difference explanatory variables by the Wald test.

4. Empirical Results and Discussion

Co-integration analysis necessitates that the variables under consideration be integrated of the same order. Hence, it is necessary to undertake unit-root tests before co-integration analysis. **Table 2** reports the results for ADF test (only constant).

It can be seen that for all currency pairs at level, the null hypothesis of non-stationarity cannot be rejected at 10% level of significance (for both spot rates and future rates). However, when first differences are taken, the null hypothesis of non-stationarity is rejected for spot rates and future rates of all the currency pairs. In other words, these variables are integrated of order 1. This satisfies the necessary condition for co-integration to exist.

The next step is to test for the presence of long-term (co-integrating) relationship between spot rates and future rates. The results of Johansen co-integration test are summarised in **Table 3** and **Table 4**, which report the maximal eigen-value and the trace statistic tests for spot rates and future rates for each of the currency pairs (For co-integration analysis, Hannan-Quinn information criteria suggests an optimal lag-length of 2 for all the currency pairs under consideration).

The null hypothesis states that there is no co-integrating relationship between the spot rate and the future rate. The above results reveal that both the trace statistics and max-eigen statistics reject the null hypothesis of zero co-integrating vectors in favour of one co-integrating vector for all the currency pairs at the 5% level of significance. The existence of co-integration relationships among the spot rates and future rates suggests that there must be causality in at least one direction.

To determine the direction of causality, along with being able to distinguish between short-run and long-run causality, Vector Error Correction Model (VECM) is deployed. **Table 5** provides the joint Wald F-statistics of the lagged explanatory variables. These tests provide an evidence for or against the significance

Table 2. Augmented dickey fuller test (ADF) unit root test.

Exchange Rate	Variables	t-Statistics at Level	p-Value	t-Statistics at First Difference	p-Value
<i>USD/INR</i>	<i>USD/INR</i> Spot	-0.967602	0.7663	-31.77097*	0.0000
	<i>USD/INR</i> Futures	-1.044505	0.7389	-23.16401*	0.0000
<i>EURO/INR</i>	<i>EURO/INR</i> Spot	-1.572539	0.4963	-30.75897*	0.0000
	<i>EURO/INR</i> Futures	-1.552560	0.5066	-31.08740*	0.0000
<i>GBP/INR</i>	<i>GBP/INR</i> Spot	-1.757290	0.4020	-29.99626*	0.0000
	<i>GBP/INR</i> Futures	-1.826735	0.3676	-29.78690*	0.0000
<i>JPY/INR</i>	<i>JPY/INR</i> Spot	-1.697988	0.4320	-32.43747*	0.0000
	<i>JPY/INR</i> Futures	-1.628750	0.4674	-32.72482*	0.0000

* indicates statistical significance at 5% significance level.

Table 3. Johansen cointegration test results (Trace statistics).

Variables	Number of Lags	Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
<i>USD/INR</i> Spot	2	None*	0.129246	125.2173	15.49471*	0.0001
<i>USD/INR</i> Futures		At most 1	0.000734	0.661070	3.841466	0.4162
<i>EURO/INR</i> Spot	2	None*	0.214378	245.1713	15.49471*	0.0001
<i>EURO/INR</i> Futures		At most 1	0.002426	2.443928	3.841466	0.1180
<i>GBP/INR</i> Spot	2	None*	0.226558	261.4933	15.49471*	0.0001
<i>GBP/INR</i> Futures		At most 1	0.003024	3.046968	3.841466	0.0809
<i>JPY/INR</i> Spot	2	None*	0.232314	268.8235	15.49471*	0.0001
<i>JPY/INR</i> Futures		At most 1	0.002577	2.598811	3.841466	0.1069

* indicates statistical significance at 5% significance level.

Table 4. Johansen cointegration test results (Max-Eigen statistics).

Variables	Number of Lags	Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistics	0.05 Critical Value	Prob.
<i>USD/INR</i> Spot	2	None*	0.129246	124.5562	14.26460*	0.0001
<i>USD/INR</i> Futures		At most 1	0.000734	0.661070	3.841466	0.4162
<i>EURO/INR</i> Spot	2	None*	0.214378	242.7274	14.26460*	0.0001
<i>EURO/INR</i> Futures		At most 1	0.002426	2.443928	3.841466	0.1180
<i>GBP/INR</i> Spot	2	None*	0.226558	258.4464	14.26460*	0.0001
<i>GBP/INR</i> Futures		At most 1	0.003024	3.046968	3.841466	0.0809
<i>JPY/INR</i> Spot	2	None*	0.232314	266.2247	14.26460*	0.0001
<i>JPY/INR</i> Futures		At most 1	0.002577	2.598811	3.841466	0.1069

* indicates statistical significance at 5% significance level.

of the short-run causal effects. Finally, **Table 6** provides the t-statistics for the coefficients of the error correction terms, which give an indication of long-run causal effects.

Results in **Table 5** imply that in the short run, there is causality running from the future rates to the spot rates for all currency pairs except *JPY/INR*. F-test statistic is not significant for *JPY/INR* at 5% level of significance.

Table 6 shows that all the error correction terms (those capturing causality relationship from the future rates to the spot rates) are negative and have t-statistics which are significant at 5% level of significance. This establishes the unidirectional causality, running from the future rates to the spot rates, in the long run for all the currency pairs. The error correction term depicts the speed of correction of the short-term rates towards the long-term steady. Adjustment in spot rates is maximum for *JPY/INR* at a speed of convergence to equilibrium of 82.5%. The negative values of the error correction terms confirm the stability of the system. Also, the speed of adjustment for all the currency pairs is fairly rapid.

Table 5. Wald test (Testing for short run causality from future rates to spot rates).

Variables	Chi-square Statistics	Df	Prob.
<i>USD/INR</i> Spot <i>USD/INR</i> Futures	76.36413*	2	0.0000
<i>EURO/INR</i> Spot <i>EURO/INR</i> Futures	10.17732*	2	0.0062
<i>GBP/INR</i> Spot <i>GBP/INR</i> Futures	16.22894*	2	0.0003
<i>JPY/INR</i> Spot <i>JPY/INR</i> Futures	4.404702	2	0.1105

* indicates statistical significance at 5% significance level.

Table 6. Vector error correction model.

Error Correction	D (<i>USD/INR</i> Spot)	D (<i>USD/INR</i> Futures)	D (<i>EURO/INR</i> Spot)	D (<i>EURO/INR</i> Futures)	D (<i>GBP/INR</i> Spot)	D (<i>GBP/INR</i> Futures)	D (<i>JPY/INR</i> Spot)	D (<i>JPY/INR</i> Futures)
CointEq1	-0.290589* (0.05359) [-5.42263]	0.148606* (0.06371) [2.33250]	-0.642371* (0.07374) [-8.71111]	0.096129 (0.08277) [1.16135]	-0.579403* (0.08078) [-7.17249]	0.275555 (0.09384) [2.93642]	-0.825269* (0.08710) [-9.47521]	0.002819 (0.09581) [0.02942]
S (-1)	-0.361254 (0.05836) [-6.19018]	-0.127987 (0.06938) [-1.84464]	-0.072148 (0.06564) [-1.09912]	-0.017299 (0.07368) [-0.23478]	-0.099637 (0.06959) [-1.43171]	-0.016877 (0.08084) [-0.20877]	0.033724 (0.07359) [0.45827]	0.095605 (0.08095) [1.18101]
S (-2)	-0.010929 (0.04569) [-0.23923]	-0.048062 (0.05432) [-0.88488]	0.014924 (0.04777) [0.31241]	-0.024496 (0.05362) [-0.45681]	0.020063 (0.04810) [0.41707]	-0.031174 (0.05588) [-0.55786]	0.085104 (0.05218) [1.63098]	0.082734 (0.05740) [1.44139]
F (-1)	0.424256 (0.05622) [7.54674]	0.121190 (0.06684) [1.81323]	0.173161 (0.06849) [2.52828]	0.056501 (0.07688) [0.73494]	0.224721 (0.07087) [3.17077]	0.150833 (0.08233) [1.83205]	0.001107 (0.07734) [0.01431]	-0.102822 (0.08508) [-1.20853]
F (-2)	0.021333 (0.05014) [0.42544]	-0.012403 (0.05962) [-0.20805]	0.001572 (0.05427) [0.02896]	0.031705 (0.06092) [0.52044]	0.010383 (0.05397) [0.19239]	0.009428 (0.06269) [0.15037]	-0.092148 (0.05840) [-1.57786]	-0.126963 (0.06424) [-1.97630]
C	0.007713 (0.00656) [1.17564]	0.008361 (0.00780) [1.07195]	0.002404 (0.01198) [0.20069]	0.002785 (0.01345) [0.20706]	-0.005088 (0.01588) [-0.32051]	-0.005326 (0.01844) [-0.28880]	0.009547 (0.01119) [0.85335]	0.010323 (0.01231) [0.83879]

* indicates statistical significance at 5% significance level.

The analysis came out to be robust as the model had no Multicollinearity and was also checked for autocorrelation using the Durbin Watson statistic and heteroskedasticity using Breusch-Pagan/Cook-Weisberg test. The test statistic value of Durbin Watson is 1.25. The Breusch-Pagan test for heteroskedasticity with a null hypothesis of constant variance is 0.90. Through this test, we fail to reject the null hypothesis which ultimately confirms constant variance or homoscedasticity.

5. Conclusions

To understand the nuances of the market and its components, one needs to understand the price discovery process. The relationship of the currency futures and spot market for the four currencies—*USD*, *GBP*, *EURO* and *JPY* is analysed. As per the above results there is a long run equilibrium relationship between the futures and spot markets for all the four currencies considered. This study concludes that the spot market follows the futures market so as to attain the equilibrium in the long run. As the price is first reflected in the futures market, arbitrageurs and speculators take advantage of this mismatch. This moves the spot market price towards the equilibrium. Futures market being more efficient in incorporating new information, plays a major role in price discovery. This goes to show that the Indian forex market suffers from informational efficiency.

Even when the trading volume is higher in the foreign exchange spot market, the futures market has an important role to play in price discovery. This is supported by the fact that there is much higher level of transparency in the future market as compared to direct interdealer spot trading. The future prices lead the spot price due to the assimilation of the new information in the short-run. Also, the cash market for the currencies under consideration is very well developed. [42] states that in the case of lower transaction costs and faster trade execution, secondary markets can play an important part in the price discovery process.

This information can be used by regulators like RBI and SEBI to lay down better policies for the growth of the markets. As the futures markets lead price discovery, this goes to say that the participants are more attracted towards the futures market. Thus, it is crucial for the regulators to maintain better inspection and control over the spot markets as well. Because the investors are more attracted to a fair, transparent and efficient market, this leads to greater number of participants in the futures market. Greater number of market participant ensures a more reasonable and democratic price discovery.

6. Future Scope of Study

The present findings of this paper on the price discovery process can be complemented by examining the volatility spill-overs between spot and futures market. This may help one to understand completely the asymmetric reactions in the forex market. This will help policy makers, portfolio managers, traders and other market participants to identify the source of volatility and to take corrective measures.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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