

The Effects of Introducing Currency Futures on Spot Exchange Rates – A Review of Related Literature

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ABSTRACT

The paper reports a comprehensive review on the effects of introducing futures on the spot prices of underlying assets with specific reference to the effects of currency futures on spot exchange rates. The articles which have been published in peer reviewed international journals were collected by using databases of Wiley Online, Scopus, ProQuest, and Emerald Insight. The articles were scrutinized based on the authors' perspective analysis (effects of introducing currency futures on spot exchange rates). The articles contributing significantly on the effects of introducing currency futures on spot exchange rates were selected for final review and various issues were identified. Despite the popular opinion that introduction of futures trading fuels added volatility in financial markets the empirical evidence regarding this topic is far from conclusive. So there is a need to review the effects of introducing currency futures on the spot market volatility in India. The insights deduced in the paper are primarily based on 42 articles selected for critical review and analysis in the domain of currency futures and hence should be interpreted only as key concerns in the area.

Keywords: Currency derivatives, Currency futures, Market bubbles, Speculative trading, Spot exchange rate.

INTRODUCTION:

To harmonize with the international practice of using currency derivatives, market regulators in India introduced currency derivatives trading. The National Stock Exchange was the first privileged bourse to flag off the launch of currency derivatives segment on August 29, 2008. The introduction of currency futures trading in the bourses enabled the traders to transact in large volumes at reasonable transaction costs in contrast to the spot market. This resulted in an increase in order flow to futures markets, available reasons of which are unresolved on both theoretical and empirical front. A future market has two divergent effects:

- If the speculators perceive a noisy but informative signal, the hedgers react to the noise in the speculative trades, producing an increase in volatility.
- The futures market improves risk sharing and therefore reduces price volatility.

There is a connection between a well-functioning currency derivatives market and the capability of the economy to absorb exchange rate fluctuations. The spot and futures markets offer investors a chance to trade in the identical underlying security. It is fairly reasonable, therefore, to anticipate a trading induced dynamic relationship between the two markets. Though trading in futures contracts started in February 1982 in the USA and were soon followed by other developed countries, it is relatively a new phenomenon in emerging markets like India. International empiricism of the emerging markets with the introduction of currency futures is a pole apart.

After the introduction of futures trading there has been apprehension about the effects of futures on underlying spot market and the impact of derivatives trading on spot market has been a polemic issue. The financial literature is evidencing varied and contradictory opinions on the negative or positive implications of futures

trading on the underlying spot market volatility. In general, it is argued that the inflow and existence of speculators in derivatives market may harvest disrupting forces and generate detrimental 'market bubbles'. Further increased speculative activities in the spot market may give impetus to unwarranted volatility.

On the contrary, the opposite argument is that the introduction of futures reduce spot market volatility, for futures play an important role in price discovery. Moreover it is debated that the introduction of futures makes the market more efficient; enhances information flow and improves the investment choices amongst the market participants. Moreover, futures market provides the hedging opportunities to the market participants and so it reduces the risk and stabilises the market.

The organisation of this paper is as follows: Section 2 provides an overview of India's currency futures market, Section 3 describes the review methodology, Section 4 covers the diagnostic analysis of past literature, and Section 5 contains findings and conclusions.

An Overview of India's Currency Futures Market:

Currency futures market in India is a recent phenomenon. Two historical developments are generally considered responsible for the development of currency derivatives market in India. Firstly the reform measures undertaken during 1990s initiated the process of structural change in the Indian currency Market (Sharma, 2011). Secondly there was late realisation to enhance the outreach of Indian rupee internationally. Based on the evolving needs of the market place, NSE introduced trading in exchange traded Currency Futures contracts on August 29, 2008. At present currency futures are available on four currency pairs viz. US Dollars (USD), Euro (EUR), Great Britain Pound (GBP) and Japanese Yen (JPY). The USD-INR pair is now traded worldwide on Chicago Mercantile Exchange, Singapore Exchange, Dubai Gold and Commodities Exchange, Intercontinental Exchange and the Bahrain Stock Exchange. The currency futures trading volume on the Indian bourses has raised significantly in the last one decade (2008-2018). From a daily average turnover of Rs 1167.43 crores in 2008-2009 on the currency futures at NSE, it increased to Rs 19282.93 crores in 2017-2018 (Data Source: NSE websites). The USD/INR currency pair trading accounts for almost 88 per cent of currency futures trading.

The Dubai Gold & Commodities Exchange (DGCX) announced that it managed to achieve record trading volumes for Indian rupee futures contract during 2018. Specifically, the exchange reported an uptick in trading volumes of 28 per cent year-over-year. During 2018, a total of 22.26 million contracts were traded. The value of these contracts was \$474.94 billion. The average daily volumes (ADV) also closed out the year at an all-time high of 86,615 contracts. Indeed, the Indian rupee futures contract traded on DGCX accounts for over 31% of all global exchange traded Indian Rupee market share. Although DGCX is a commodities exchange and Dubai has a very strong reputation for gold trading, the venue's most popular contract remained the Indian currency contract. This could be the actual dawn of the Indian rupee's rush to popularity as an exchange traded asset.

The National Stock Exchange of India Limited (NSE) launched Cross Currency Derivatives contracts on EUR-USD, GBP-USD and USD-JPY on February 27, 2018. The Indian Government with the help of central bank is also trying to stabilise the macroeconomic scenario especially the volatile foreign exchange market. Given the current state of India's currency market one should provide the recent evidence on the effects of currency futures trading on spot foreign exchange rate. Thus the present study sets to examine the following objectives:

- a) Does the introduction of currency futures alter the structure of volatility in spot market?
- b) Are there any linkages between currency futures trading and spot exchange rate volatility

REVIEW METHODOLOGY:

Keyword searches are employed to identify articles published in specific management databases of Wiley Online, Scopus, ProQuest and Emerald Insight. Initial key word searches are performed using terms such as "effects of introducing derivative contracts on the prices of spot underlying asset", "effects of introducing futures contracts on the prices of spot underlying asset", "implications of introducing futures contracts on the prices of spot underlying asset", and "effects of introducing currency futures contracts on the spot foreign exchange rate". These searches resulted in 24 articles in Wiley Online, 22 articles in Scopus 18 articles in ProQuest, and 36 articles in Emerald Insight. Summary of the search results is shown in Table I and the review methodology shown in Figure 1. In the identified articles a few papers were found repeated in these four databases and those papers were eliminated and finally 82 articles resulted. Distribution of these articles with respect to journals is given in Table II.

Table I: Summary of Database Review (1981-2018)

Database	No. of Articles/Thesis	Keywords
Wiley Online	24	“effects of introducing derivative contracts on the prices of spot underlying asset”, “effects of introducing futures contracts on the prices of spot underlying asset”, “implications of introducing futures contracts on the prices of spot underlying asset”, & “effects of introducing currency futures contracts on the spot foreign exchange rate”.
Scopus	22	
ProQuest	18	
Emerald Insight	36	
Sodhganga	2	
Total	102	

Figure 1: Review Methodology:

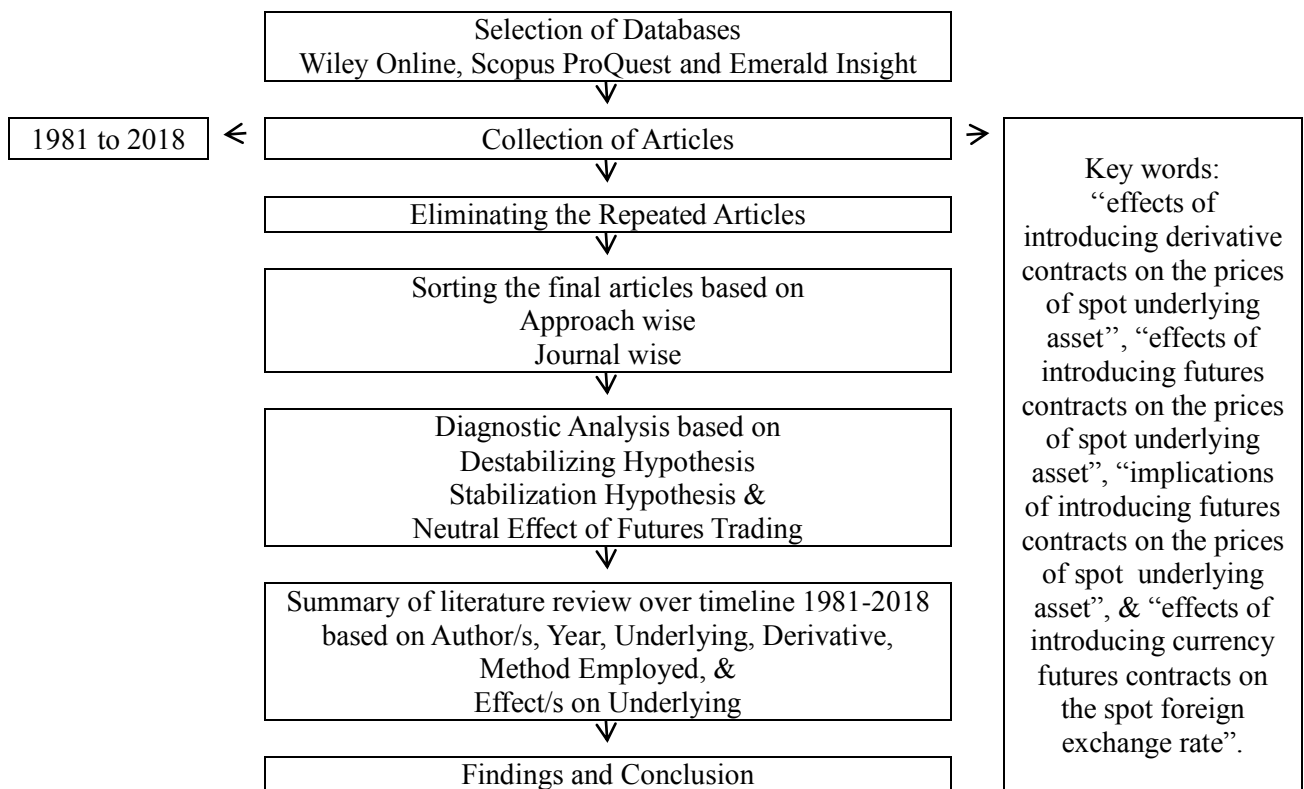


Figure 2: Approach-wise Representations of Articles

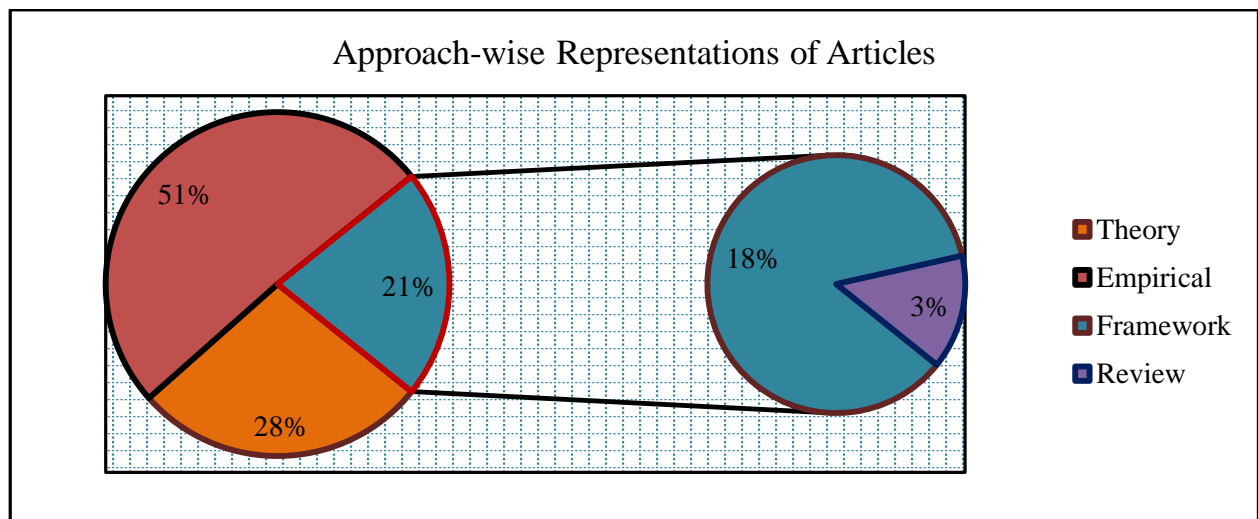


Table II: Journal-wise Distribution of Articles

Sl. No.	Journal Name	Count
1	The Journal of Finance	8
2	Journal of Economic Theory	3
3	Journal of Political Economy	2
4	Journal of Futures Markets	14
5	The Journal of Applied Business Research	2
6	Journal of Banking and Finance	3
7	Applied Financial Economics	4
8	Journal of International Economics	3
9	Global Finance Journal	3
10	FICCI Banking and Finance Digest	4
11	The ICAI Journal of Applied Finances	2
12	International Journal of Business and Economics	2
13	Review of Quantitative Finance and Accounting	3
14	The Journal of Risk Finance	4
15	International Finance Review	6
16	International Journal of Managerial Finance	4
17	Studies in Economics and Finance	4
18	Others	11
Total		82

In summary we have considered the most related and relevant 42 articles exclusively focussed on the effects of introducing currency futures contracts on the spot foreign exchange rate from the pool of 82 articles for the scope and objective of this paper.

DIAGNOSTIC ANALYSIS OF PAST LITERATURE:

The 42 scrutinized papers are reviewed in three phases as reported below:

1. Literature Supporting Destabilizing Hypothesis
2. Literature Supporting Stabilization Hypothesis
3. Literature on Neutral Effect of Futures Trading

Literature Supporting Destabilizing Hypothesis:

Figlewaski (1981) argued that speculation in the derivatives market is transmitted to the underlying spot markets. The inflow and existence of the speculators in the derivatives market produces destabilization forces, which creates undesirable bubbles. Ross (1989) held that the variance of the price change will be equal to the rate of information flow. The implication of this is that the volatility of the asset price will increase as the rate of information flow increases. Thus, if derivatives market increases the flow of information, the volatility of the spot price must change in the absence of arbitrage opportunity. Kmara at el (1992) suggested the futures market activity increases the spot price variability when futures price is changed by technical factors or manipulations. The hedging pressure in the futures market then spills over to the spot market when traders end up bearing risk transfer through both futures and spot market. Chatrath, Ramchander and Song (1996) examined the relationship between the volatility and trading volume and the results indicated that increase in trading volume leads the volatility in the exchange rate using GARCH (1, 1) model. Adrangi and Chatrath (1998) examined the relationship between the changes of exchange rate and the number of contracts held by traders. The results suggested that speculative traders cause the increased volatility in the market. Bhargava and Malhotra (2007) analyzed futures trading on four currencies over the time period of 1982-2000 and found the evidence that day traders and speculators destabilize the market for futures but it is not clear whether hedgers stabilize or destabilize the market. Sharma (2011) analysed the relation between volatility in the exchange rate in the spot market and trading activity in the currency futures. Findings indicated that volatility of spot exchange rate was greater after introduction of currency futures. Goyal and Mittal (2014) investigated the impact of currency futures on the volatility of USD/INR exchange rate. It was concluded that there was an increase in the volatility of USD/INR spot market after the introduction of currency futures in India.

Literature Supporting Stabilization Hypothesis:

Grossman and Miller (1988) suggested that spot market volatility decreases by higher liquidity provided by speculators. The availability of risk transference afforded by the futures market reduces the spot price volatility. Futures' trading attracts more traders to spot market making it more liquid and therefore less volatile. Jorion (1993) examined the usefulness of currency futures/forwards and concluded that currency risk can be minimized through futures/forward hedging. Shastri, Sultan and Tandon (1996) investigate the effect of the introduction of options on the volatility of currency markets and conclude that options contracts complete and stabilize the spot currency markets. Jochum and Kodres (1998) examine the impact of the introduction of the futures market to the spot currency markets, and report varying results depending on the market they studied. For Mexico, they find that the introduction of currency futures help reduce the volatility of the spot currency market, while for Brazil and Hungary, they find no discernable impacts. Butterworth (2000) claimed that introduction of the derivatives trading leads to more complete market enhancing the information flow. The transfer of the speculative activity from spot to futures market decreases the spot market volatility. Bologna and Cavallo (2002) argued that the speculation in the derivatives market also leads to stabilization of the spot prices. The profitable speculation stabilizes the spot price because informed speculators tend to buy when the price is low pushing it up and sell when the price is high causing it to fall. This profitable speculation in the derivatives market leads to a decrease in spot price volatility. Donald and Fathali (2008) identified that futures markets provide hedging opportunities to reduce currency risk, thus allowing each firm to bid more aggressively. This study provides a comparative analysis of the role that currency future markets play in optimal offshore biddings. In an interactive model where two bidders located in different countries bid on a project in a third country under exchange rate uncertainty, the optimal bids decrease with increasing risk aversion. Anuradha (2010) employed alternative time series estimation techniques like VAR and reports that currency futures trading has no influence on underlying spot exchange rate volatility in India. She obtained the daily closing exchange rates of US dollar/ INR from NSE for period of August 2008 to August 2009. The result shows that arrival news were first aggregated into currency futures market and then transmitted to spot foreign exchange market. Sarang (2012) showed that there was an increasing trend in the growth of currency futures market and currency futures introduction had reduced volatility asymmetric. It also led to the enhancement in the quality and speed of market transactions and information. Singh and Tripathi (2015) examined the impact of currency derivatives on the spot market of EURO/INR. GARCH (1, 1) model was applied and it was found that there is a decrease in the volatility of spot market for EURO/INR after the introduction of currency derivatives. Srivastava (2017) attempted to study theoretically the pricing of currency futures and the scope of the available models for pricing. Though this study has not tested the convergence empirically but seeing the pattern of trading he establishes that there is a long run stable relationship between foreign currency spot and futures market.

Literature on Neutral Effect of Futures Trading:

Klemkosky and Maness (1980) could not find significant changes in the price or the volatility of the underlying stocks after the introduction of options. Santoni (1987) analyses the S&P 500 index volatility after the introduction of index futures and reports no statistically significant changes in spot volatility. Bessembinder and Seguin (1992) investigate the impact of futures trading activity on spot market volatility. By using data from S&P 500 index (i.e., from January 1978 to September 1989), the study reports that trading in futures markets cannot be linked with volatility in the spot market. Darrat, Rahman, and Zhong (2002) investigate the impact of index futures trading on volatility of S&P 500 index spot market. For this, they collected data from November 1987 to November 1997. Mazouz (2007) re-examined the influence of introduction of options' contracts on the volatility of the stocks listed on New York Stock Exchange (NYSE). He also took account of investor's learning effects, while studying the potential impact. Gahlot, Datta, and Kapil (2010) examine the influence of futures trading on volatility of underlying market. They collected data on S&P CNX Nifty. The reported results does not show any change in the volatility dynamics post futures. Sahu (2012) examined the impact of currency futures on exchange rate volatility of EURO. Results explained that there was no significant change in the volatility of spot market after the introduction of currency futures and spot market become more efficient owing to the diminishing importance of old news and faster incorporation of recent news in exchange rates. Awan and Rafique (2013) examine the influence of parallel futures trading on volatility on underlying. By collecting data on twenty four companies and using F-test and GARCH models, they found that futures' trading does not change the volatility dynamics of the underlying. Kumar, Poornima, Sudarsan (2017) examined whether the spot volatility before and after the introduction of currency futures were significantly different. The study concludes that the introduction of futures is not effective in reducing spot volatility for INR–USD but there is a marginal effect for INR–GBP and INR–Euro.

Table III: Summary of literature reviewed over timeline 1981-2018

Author/s	Year	Underlying	Derivative	Method Employed	Effect on Underlying
Figlewaski	1981	Treasury Bills	Futures	Event Study	The speculation produces a net loss with some speculators gaining (and others loosing), thereby destabilize the market.
Clifton & Eric	1985	Currency	Futures	Correlation	Found a strong positive correlation between futures trading volume and the daily exchange rate volatility for the major currencies.
Theodor	1987	Currency	Futures	Event Study	The results indicated that the currency futures market appears to be a reasonably good forecaster of future currency spot rates.
Concord	1989	Equity	Options	Event Study	The introduction of individual options causes a permanent price increase in the underlying security
Stephan & Whaley	1990	Equity	Options	Multiple Time-Series Analysis	The results indicated that price changes in the stock market lead the option market by as much as fifteen minutes.
Detemple & Jorion	1990	Equity	Options	Event Study	The faster adjustment of prices in the futures market cannot, by itself, be seen as proof that futures markets destabilize the underlying.
Schwarz & Laatsch	1991	Stock Index	Futures	Bivariate Random Walk	Mispricing is the immaturity of the arbitrage sector connecting the cash and futures markets and such evolving efficiency is not the case for stock index futures.
Bessembinder & Seguin	1992	Stock Index	Futures	2-Equation System	Their evidence indicates that equity volatility is positively related to spot-trading activity and to contemporaneous futures-trading shocks.
Kawaller, Koch & Koch	1993	Stock Index	Futures	Granger Causality Test	The relation between cash and futures prices becomes stronger as futures price volatility increases.

Table III: Summary of literature reviewed over timeline 1981-2018 (Contd...)

Author/s	Year	Underlying	Derivative	Method Employed	Effect on Underlying
Jabbour	1994	Currency	Futures	Regression and Specification Tests	The implied spot rates derived from currency futures are good predictors of short term future spot rates. The implied spot rates, derived from futures prices model, slightly under-priced the German Mark, and slightly overpriced the Japanese Yen.
Crain & Lee	1995	Currency	Futures	Granger Causality Test	The futures market shows a sharper jump in the volatility but also a faster decline during the trading hours immediately following the announcement than occurs in the cash market.
Andrea	1995	Currency	Futures & Options	Ederington's Portfolio Theory	Since management is concerned with currency exposure, it could hedge the anticipated exchange rate risk either with

Author/s	Year	Underlying	Derivative	Method Employed	Effect on Underlying
					futures or options
Quentin, David & Pyun	1996	Currency	Futures	Markov Chain Transition Matrix	The average implied bid-ask spread was about \$ 10, which was less than one tick's value of \$12.50.
Chatrath, Ramchander & Song	1996	Currency	Futures	Granger Causality Test	Provided strong evidence on the causality between futures trading volume and exchange rate volatility
Shastri, Sultan, and Tandon	1996	Currency	options	Bivariate GARCH	Suggested that the introduction of option contracts lowers volatility of the underlying instrument, enhancing its stability, regardless of its type.
Biswas & Shawky	1997	Currency	Forwards	Time Series Analysis & ADF	Found that forward market efficiency was violated during the gulf war for both exchange rate series .USD to GBP and USD to JPY.
Adrangi & Chatrath	1998	Currency	Futures	Event Study	Margin requirements that penalize speculators and small savers may serve to promote stability in the market.
Fung & Patterson	1999	Currency	Futures	VAR	The results indicated that the volatility appears to have predictive power on volume but not on market depth.

Table III: Summary of literature reviewed over timeline 1981-2018 (Contd...)

Author/s	Year	Underlying	Derivative	Method Employed	Effect on Underlying
Gulen & Mayhew	2000	Index	Futures	Event Study	Volatility is higher in periods when futures volume is high, but this is driven by the unexpected component of volume, not the expected component.
Pilar & Rafael	2002	Index	Futures & Options	GJR Model	Found that trading volume increased significantly but conditional volatility decreased after introduction of derivatives.
Ahmed, Beck & Goldreyer	2005	Currency	Futures	VMA	The predictability of future currency prices allowed investors to create effective hedges in the often volatile markets.
Samanta & Samanta	2007	Currency	Futures	GARCH	Found that there is no significant change in the volatility of spot market, but the structural changes in the volatility to some extent.
Pukthuanthong & Thomas	2008	Currency	Futures	EMH	The evidence is consistent with early weak-form inefficiency followed by vanishing trends as traders learn and adapt their strategies.
Lingareddy	2009	Currency	Futures	Correlation, T – Test, Standard Deviation and Coefficient of Variation	Currency futures market could not bring any notable changes in forward markets and the volatility of spot market is not affected by the introduction of currency futures.
Malliaris,	2010	Currency	Futures	Non-Linearity	Their evidence pointed to a relatively

Author/s	Year	Underlying	Derivative	Method Employed	Effect on Underlying
Serletis, Hinich & Gogas				Tests	rare episodic nonlinearity within and across foreign exchange rates.
Sharma	2011	Currency	Futures	GARCH & ARCH LM	There is a two-way causality between the volatility in the spot exchange rate and the trading activity in the currency futures market.
Kawamoto & Hamori	2011	Oil	Futures	GARCH-M-ECM	Futures are consistently efficient within 8-month maturity and consistently efficient and unbiased within 2-month maturity.

Table III: Summary of literature reviewed over timeline 1981-2018 (Contd...)

Author/s	Year	Underlying	Derivative	Method Employed	Effect on Underlying
Takvor	2011	Currency	Futures	SVAR	Found that it was the fluctuations in the Japanese yen against the U.S. dollar exchange rate, rather than the U.S. stock market performance, that determined the direction of the yen carry trade.
Allanyannis, Lel & Miller	2012	Currency	Futures Options	Event Study	Use of currency derivatives for firms that have strong internal firm-level or external country-level governance is associated with a significant value premium.
Pavaskar & Kala	2013	Currency	Futures	Regression Model	Exchange rate volatility leads to higher intra-day trades to the benefit of currency hedgers.
Singh & Tripathi	2014	Currency	Futures	GARCH & ARCH LM	Currency futures trading have helped in reducing the exchange rate volatility of the foreign exchange market in India.
Kumar	2015	Currency	Futures	ADF & ARCH LM	Volatility has reduced in the post-futures period.
Chang & Fang	2015	Currency	Futures	MSVAR	Speculators' demand for futures goes down in response to increased volatility.
Christos & Salvador	2016	Currency	Futures	GARCH	Market depth has an effect on the volatility of futures markets and positive contemporaneous relationship between trading volume and futures volatility.
Varuna & Archana	2017	Currency	Futures	Unit Root, Stationarity Tests & VECM	There is a long run relationship between the futures and spot market.
Kumar, Poornima & Sudarsan	2017	Currency	Futures	GARCH and Granger Causality Test	USD and Euro has unidirectional causality (spot causes future fluctuations) while in the case of GBP, there is bidirectional causality.
Nath & Pacheco	2018	Currency	Futures	GARCH and EGARCH	Presence of volatility clustering.

The inconclusiveness on the subject calls for an extended analysis to determine the impact of currency futures on the spot market volatility in India. So there is a need to study the impact of currency futures on the spot market volatility in India.

FINDINGS AND CONCLUSIONS:

Foreign exchange rates are one of the most important determinants of a country's relative level of economic health. Consequently, exchange rates are among the most watched, analysed, and active economic variables. India has a huge concern about the deteriorating value of rupee particularly with respect to US Dollar because majority of Indian trade is denominated in US Dollar. On Oct 5, 2018, the Indian rupee plunged to a new record low, breaching the 74-mark against the US dollar. The Indian currency fell to a new low of 74.23 (intra-day) after the RBI kept key policy rates on hold. Now there are apprehensions of the rupee sliding to even 80. Rupee depreciation and appreciation both are the stimulating concerns for the economy of the country.

A lot of studies were piloted to gauge the volatility of foreign exchange rates and a fusion of the reviewed literature on the effects of currency futures trading on underlying market instability maintained that bulk of studies are in the milieu of developed foreign exchange markets. The available literature in the context of emerging markets is scanty. Besides, the results of many studies affirmed that the effects of introduction of currency futures trading have been different in different markets over different study period and it is difficult to reach at unanimity with regard to the effects of currency futures introduction on the volatility of spot exchange rate.

Finally, it has been found that in the last one decade (2008-2018) the volatility of Indian rupee was studied predominantly in the context of USD/INR. Fascinated by the cognizance of this fact, the reviewer felt that there is a need to study the volatility of Indian rupee not only against US dollar but also against Pound Sterling, Euro and Japanese Yen. Therefore, this study endeavours to fill this gap.

The above-mentioned details have provided a fillip to explore the effects of introducing currency derivatives from perspective of emerging markets which warrants further empirical study on the effects of currency futures trading on spot exchange rate volatility

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