Impact of Volatility in Rupee-Dollar Exchange Rates on Currency Futures Trading Volumes

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The need for derivative trading in any financial asset arises out of price volatility in the asset. This is because the fluctuations in the asset prices result in price risks for those who deal in such assets, either for forward buying or selling in domestic or overseas market, or for carrying those assets over distant periods. These risks necessitate instruments for risk management through hedging, which offsets such risks. Derivative contracts meet such necessity.

Incidentally, price volatility also offers opportunities to profit from price variations over time, encouraging speculation. Speculation facilitates risk management as and when needed at the least cost, for speculation brings in large trading volumes to enable hedgers to hedge their physical assets, with little variation in the price of the derivative contract in which they seek to hedge.

In short, price variability encourages both hedging and speculation. It follows that trading volumes in a derivative contract are positively correlated with the degree of price volatility. Higher is the price volatility, higher are the volumes; and conversely, reduction in price volatility results in reduction of derivative trades. The reason is obvious. Higher volatility in prices, ipso facto enhances price risks and inevitably increases the need for risk management for the physical-market players, and consequently causes larger hedge trade volumes. On the other hand, day-to-day increase in price volatility, and even within a day, stimulates speculators, including intra-day traders like jobbers, scalpers, trend traders, and others to enter into speculative derivative trades to profit from frequent price changes.

In other words, while physical trade functionaries hedge against price variations, speculators, including day traders, speculate to profit from price changes.

Need for currency derivatives

What is true of derivative contracts in other financial assets like those in commodities and securities is equally true with currency derivatives. Trade and industry engaged in import and export of diverse commodities and services primarily seek to hedge their exchange rate risks in currency derivatives. Such export–import contracts are entered into several months in advance at prices quoted in foreign currencies, mostly dollar. As exchange rates are far from stable, but change over time, these trade contracts in the export–import markets unavoidably involve considerable uncertainty and risks about the rupee costs of imports, and the rupee receipts from exports. If the rupee were to depreciate before the consummation of the import contract, import costs would increase. In contrast, if the rupee were to appreciate before the shipment or delivery against the export contract, the export realization would fall.

The best way to lock rupee liabilities and rupee receipts for importers and exporters of goods and services respectively is to hedge their currency risks by buying and selling currency futures as much as their corresponding liabilities and receipts, as the case may be. If, before the payment for imports becomes due, the rupee were to fall, as importers have acquired in advance the requisite foreign currency in the futures market, they have already absolved themselves from the risks of shouldering higher rupee costs. On the other hand, if the rupee were to rise before the exporters were to collect their export receipts, as they have sold beforehand their contracted foreign exchange receipts, they have already ensured that their rupee receipts would not be reduced. Hedge trades in currency futures, concurrently with their import and export deals, release importers and exporters from uncertainties and risks arising from currency volatility. Such hedges become possible because of the presence of a large number of individual and institutional speculators, especially intra-day traders, who are willing to absorb hedges at the prevailing currency futures quotes.

As with exporters and importers, inward and outward remitters of currencies, and short-term and long-term investors—both domestic investors investing abroad, and foreign investors investing in India—are also likewise not infrequently required to hedge their anticipated remittances and investments, including investment returns, in currency futures to lock in the values of their future liabilities and assets, arising from such remittances and investments. Worldwide currency derivatives have emerged out of such requirements of importers, exporters, remitters, and investors. And as derivative trade volumes are positively, though not necessarily proportionately related to price volatility, efficient risk management in currency futures at the least possible hedging costs has become possible.
Purpose of the paper

It is against this backdrop that the present paper attempts to examine the relation between volatility in currency futures and trade volumes in them. Ideally, volatility in the spot market for exchange rates should have been taken to ascertain such a relation. Because such data for intra-day variations could not be traced readily, reliance was placed on the easily accessible intra-day fluctuations in currency futures at the MCX-Stock Exchange (MCX-SX), one of the leading currency futures trading platforms in the country. The use of volatility data drawn from currency futures does not in any way affect adversely the validity of the prima facie inferences derived from the results of the present paper, because such volatility will necessarily mirror the volatility in the exchange rate spot market. The paper does not labour under the impression that its results are conclusive. It only attempts to provide a logical hypothesis, which, of course, needs to be tested more rigorously through elaborate desk research and intensive empirical analysis. That calls for considerable time and effort, and deserves a separate dissertation. Time and resource constraints prevent from undertaking such a study at present. This paper is primarily of a preliminary nature, and simply seeks to develop a justifiable hypothesis.

Period, data and approach

Trading in in currency futures was launched at MCX-SX in August 2008 in the currency pair USD/INR. The trading gathered momentum in 2009, however. Hence, this paper has preferred to select a period of four financial years from 2009–10 to 2012–13.

The paper relies on daily intra-day price volatility, and daily trading volumes that could be attributed to day traders, such as jobbers, scalpers, and arbitrageurs, seeking to gain from bid–ask spreads, and intra-day trend traders. Data on intra-day prices and daily trading volumes have been gathered for near month contracts, when such contracts are actively traded. In other words, among two or more successive contract months, data have been drawn for the most active contract month in which the trade volume is the highest.

Intra-day trading volumes are preferred to total trade volumes because intra-day dollar–rupee rates are primarily determined by the former rather than the latter. Day-traders largely facilitate hedging at the least transaction cost, as they help to reduce the bid–ask spreads, which constitute an important element of the total transaction cost. In the absence of day-traders, hedgers will be unable to hedge efficiently, as and when needed at a moment’s notice, either their forward purchases and sales of physical dollars, or their anticipated receipts and payments of foreign exchange against their exports or imports respectively, at the minimum transaction cost, without affecting adversely the price of placing their hedges.

Data on intra-day trading volumes are not readily available. As intra-day trades are invariably squared off through the course of each day’s trades, and do not result in any open interest position at the end of a trading day, such trade volume on any day may, by and large, equal the total volume of trading on that day less the outstanding open position at the end of that day. That way time-series data on the intra-day trading volumes for the period under study were collated for the paper.

Volatility of any time-series data is commonly measured by the co-efficient of variation of such time-series. As intra-day time-series currency rates are not readily accessible, the volatility (co-efficient of variation) was approximately calculated from the difference between daily highs and lows of such currency rates by applying the following formula.

\[ VT_{ij} = \left( \frac{Hp - Lp}{U_{ij}/V_{ij}} \right) \times 100 \]

Where,
- \( VT_{ij} \) is the intra-day volatility of the \( i \)th trading day for derivative contract \( j \)
- \( Hp \) and \( Lp \) represent the high and low price of the \( i \)th trading day for derivative contract \( j \)
- \( U_{ij} \) denotes the total value of trade of the \( i \)th trading day for derivative contract \( j \)
- \( V_{ij} \) denotes the total volume of trading on the \( i \)th trading day for derivative contract \( j \)

Regression results

In all, 972 observations, from April 2, 2008 to March 31, 2013, of intra-day volatility and intra-day trade volumes have been obtained to ascertain the relation between the intra-day volatility and intra-day trading volume through the regression model as under.

\[ \text{Log } Y = \alpha + \beta \text{Log } X \]

\( Y \) = Intra-day trade volumes
\( X \) = Intra-day volatility

Both the regression equation and the regression coefficients are statistically significant at 1% level. The equation yields a positive regression coefficient of 0.3875 for intra-day volatility, which is
statistically significant in terms of its 't' and 'f' ratios.

Conclusion

As the regression co-efficient is positive and statistically significant, it can be prima facie inferred that exchange rate volatility leads to higher intra-day trades to the benefit of currency hedgers. Of course, this inference needs to be treated more as a hypothesis than a firm conclusion. Testing such an hypothesis is beyond the scope of this paper, as that would call for determining not only many other independent macro- and micro-economic variables that influence the day-to-day exchange rate volatility and currency derivative trading volumes, but also quantifying them, and collecting their long time-series data.

The present paper does not labour under an illusion that it is not without any limitations. Still, one thing seems quite sure. MCX-SX appears to be offering adequate, effective, and efficient facility for hedging to currency-market players involved in either export-import trade, or inward-outward remittances, because currency volatility that necessitates risk management also promotes intra-day trading volumes, which can absorb hedges immediately, with not much bid-ask spreads.

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