
Impact of restrictions on currency derivatives on
market quality

Finance Research Group
Indira Gandhi Institute of Development Research, Mumbai
2013-10-28

Indira Gandhi Institute of Development Research
<http://www.ifrogs.org>
Mumbai

Contents

1	Introduction	2
2	The policy interventions under analysis	2
3	Strategy in measurement	4
4	Measuring the impact of the interventions	5
4.1	Impact on open interest	5
4.2	Impact on realised volatility	7
4.3	Impact on turnover	7
4.4	Impact on impact cost	11
4.5	Impact on the exchange rate	13
5	Conclusion	15

1 Introduction

Policy makers in India frequently attempt to control rising market prices and volatility by intervening in the related derivatives markets. For instance, wheat futures trading was completely banned between 2007 and 2009 when both global and domestic wheat prices were going through historic highs. More recently, similar interventions have taken place in the currency derivatives markets in response to the depreciation of the currency.

In this document, we focus on the latter and ask whether (a) the currency interventions achieve their objective of controlling depreciation and (b) what the impact of these interventions are on the quality of the currency derivatives markets.

In order to do this, we first identify a list of recent interventions on currency futures and options markets. Then we measure their impact by calculating what was the average market quality in a period of 20 trading days *before* the intervention was announced. We compare this with the average market quality in a similar 20 trading days period *after* the intervention was announced. The impact is the difference between the measure in these two periods around the event of the interventions.

In the next section, we list the identified set of intervention events.

2 The policy interventions under analysis

E1 – December 15th 2011: The Reserve Bank of India (RBI) disallowed re-booking of forward contracts on the INR.

Certain forward contracts entered into by residents and exporters were allowed to be re-booked after cancellation. In case of probable exposures based on past performance, the facility stood reduced by 25% of the average of the previous three financial year's actual import or export turnover or the previous years actual import or export, whichever was higher and all the forward contracts booked under this facility were to be on fully deliverable basis and could not be canceled. Cash or spot transactions by the Authorised Dealers (AD) on behalf of their clients could not be canceled or cash-settled. FIIs were disallowed from re-booking forward contracts,

once cancelled. It was announced that Net Over-night Open Positions (NOOPL) were going to be reduced substantially.¹

E2 – May 21st 2012: NOOPL could not be set off by taking positions in other markets.

In July 2012, AD Category I banks were permitted to exclude their NOOPL and the positions taken by the overseas branches from their NOOPL for positions involving the INR. Setting-off or netting-off of positions in futures and options on exchanges in the OTC market, and vice versa, was prohibited. The position limit for the trading member AD Category-I bank in the exchanges for trading currency futures and options was reduced to the lower of USD 100 million or 15% of the outstanding open interest.²

E3 – July 8th 2013: RBI prohibited proprietary trading by Category-I banks. SEBI reduced position limits and increased margins on currency derivatives traded on exchanges.

The authorized deposit-taking (AD) Category I banks could only take positions on behalf of their clients.³

Initial and extreme loss margins were increased by 100% of the present rates. The gross open positions of a client across all contracts were restricted to 6% of the total open interest or 10 million USD, whichever is lower. The gross open position of a Trading Member, who is not a bank, across all contracts was restricted to 15% of the total open interest or 50 million USD whichever is lower.⁴

Next, we list what measures of market quality we use to study the impact of the interventions.

¹<http://rbidocs.rbi.org.in/rdocs/notification/PDFs/EAP58151211FL.pdf>

²<http://rbidocs.rbi.org.in/rdocs/notification/PDFs/CE9RM210512.pdf>

³<http://rbidocs.rbi.org.in/rdocs/notification/PDFs/07APDCF080713.pdf>

⁴http://www.sebi.gov.in/cms/sebi_data/attachdocs/1373297646169.pdf

3 Strategy in measurement

There are four measures of market quality that are calculated for the USD-INR futures market at the National Stock Exchange (NSE). These are measures of the size of the market, market liquidity and market volatility. We do not yet include measures of market efficiency in this set.

Open interest (Unit: billion dollars per day)

Open interest the number of USDINR futures contracts that have not yet been settled. This is a measure of the size of the market because market participants have to set aside capital as margin requirements for all their open positions.

Realised volatility (Unit: percentage)

Realised volatility is the annualised standard deviation of intra-day returns of the USDINR futures contracts for a day. We calculate RV using prices at five minute intervals.

Turnover (Unit: billion dollars per day)

Turnover refers to the value of the total number of near month USD-INR futures contracts traded on a single day, and is a measure of the liquidity of the market.

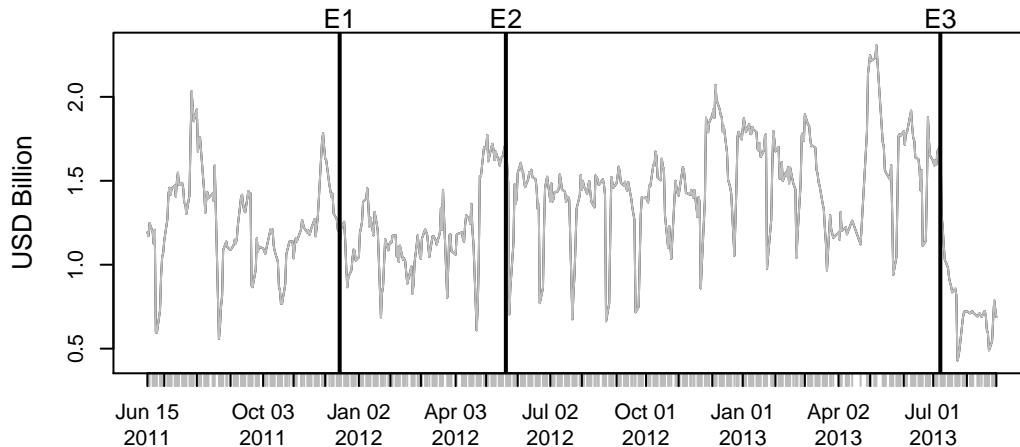
Impact cost (Unit: percentage)

If we establish $(bid+offer)/2$ as a benchmark price, impact cost is the extent to which a transaction of Rs.1 million is inferior to the benchmark price. It is measured in percentage units. It is the average of four values measured at different times during the trading day.

We add to these four, the level of the spot rate for USDINR. We examine the behaviour of the interventions in two ways: first, we plot the time series of the measure and then, we carry out an analysis of the average values for 20 trading days before and 20 trading days after each event. This analysis is presented for the market size measure (open interest), market volatility (realised volatility) and the measures of market liquidity (turnover and impact cost).

Figure 1 Daily time series of open interest

Each point in the figure below is the daily open interest of the near month INR-USD future contracts from June 2011 to August 2013. The vertical lines mark the dates of policy interventions as described in Section 2.



4 Measuring the impact of the interventions

4.1 Impact on open interest

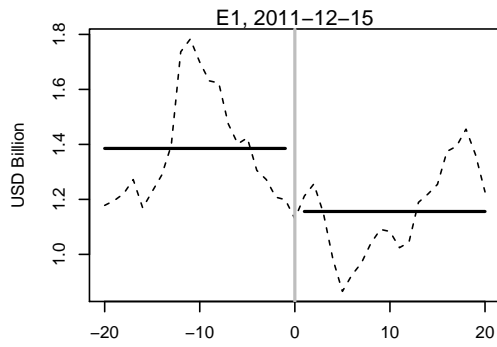
Figure 1 shows the full time series of the open interest on the near month INR-USD futures contracts. In contrast with most economic time-series in India, through this period, there was no trend growth in open interest of the INR-USD contract. A sharp drop in the open interest is immediately visible after E3.

Figure 2 goes closer into the 20 trading days before and after the event date. The vertical line at the centre is the event date ($t = 0$). The horizontal lines represent the mean values within the event window, before and after the event date.

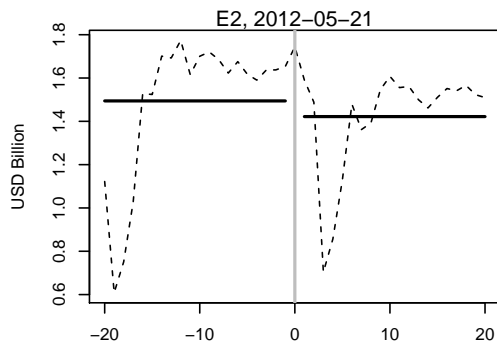
There was a statistically significant decline in the open interest associated with Event E1 (restrictions on re-booking of forward contracts) and Event E3 (restrictions on banks' trading on exchanges).

MEASURING THE IMPACT OF THE INTERVENTIONS

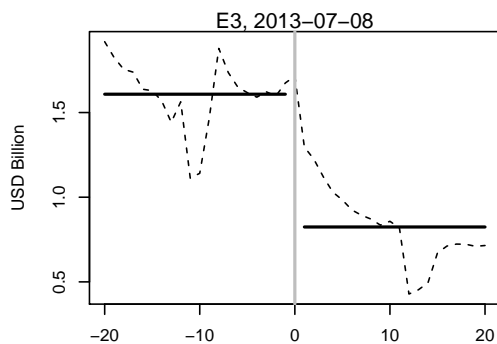
Figure 2 Event analysis for open interest



E1: Restrictions on forward contracts
Significant **Drop**: \$ 1.38 billion to \$ 1.15 billion



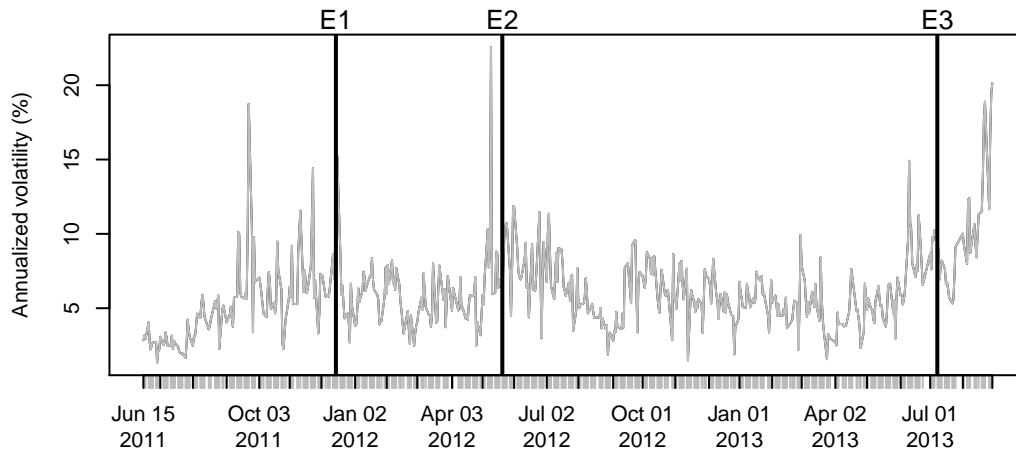
E2: Restrictions on banks' trading on exchanges
Insignificant **Drop**: \$ 1.49 billion to \$ 1.42 billion



E3: Restrictions on banks' trading on exchanges
Significant **Drop**: \$ 1.60 billion to \$ 0.82 billion

Figure 3 Daily realised volatility

Each point in the figure below is the daily realised volatility of the near month INR-USD future contracts from June 2011 to August 2013. The vertical lines mark the dates of policy interventions as described in Section 2



4.2 Impact on realised volatility

Figure 3 shows the time series of the realised volatility on the near month INR-USD futures contracts. A pronounced surge in the realised volatility is visible after Event E3.

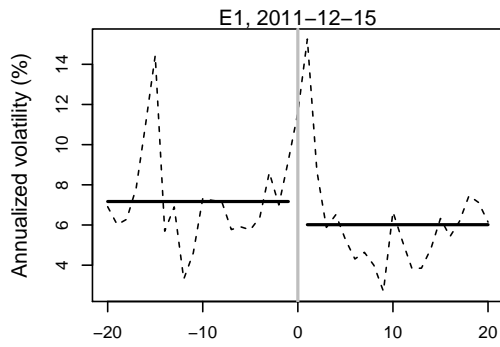
Figure 4 offers a closer examination of changes in realised volatility surrounding the three event dates. All the three changes are not significantly different from 0. If policy makers thought these restrictions would reduce volatility, this desired outcome was not obtained.

4.3 Impact on turnover

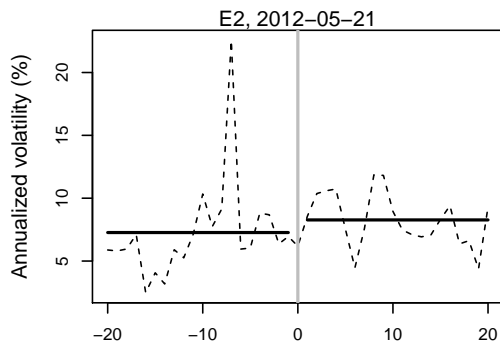
Figure 5 shows the time series of the turnover on the near month INR-USD futures contracts. Here also, there is a surprising lack of a time trend in the turnover, in contrast with most economic and financial time-series in India which grow strongly through time. A sharp decline in turnover is visible after Event E3.

MEASURING THE IMPACT OF THE INTERVENTIONS

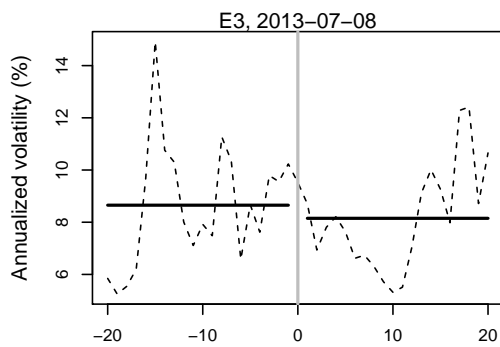
Figure 4 Event analysis for realised volatility



E1: Restrictions on forward contracts
Insignificant Drop: 7.16% to 6.01%



E2: Restrictions on banks' trading on exchanges
Insignificant Rise: 7.26% to 8.27%

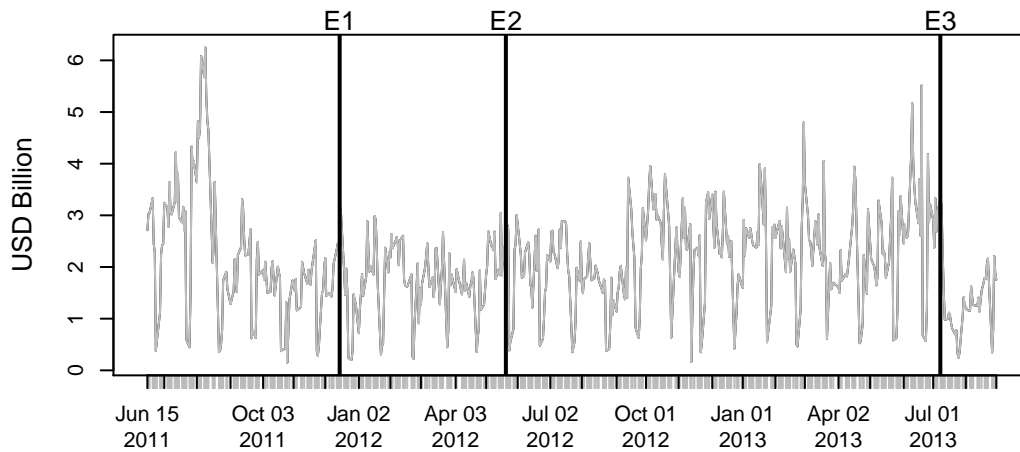


E3: Restrictions on banks' trading on exchanges
Insignificant Drop: 8.65% to 8.15%

MEASURING THE IMPACT OF THE INTERVENTIONS

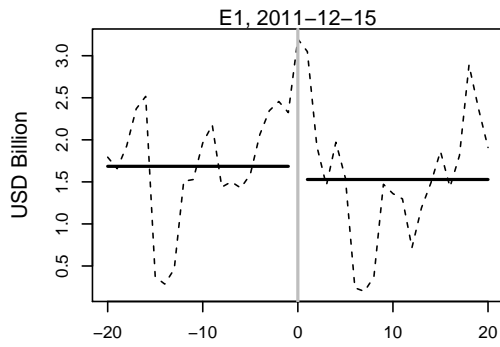
Figure 5 Daily turnover

Each point in the figure below is the daily turnover of the near month INR-USD future contracts from June 2011 to August 2013. The vertical lines mark the dates of policy interventions as described in Section 2.

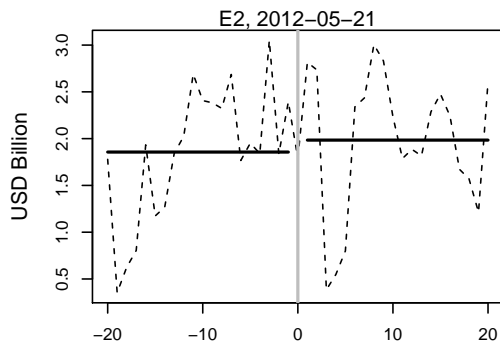


MEASURING THE IMPACT OF THE INTERVENTIONS

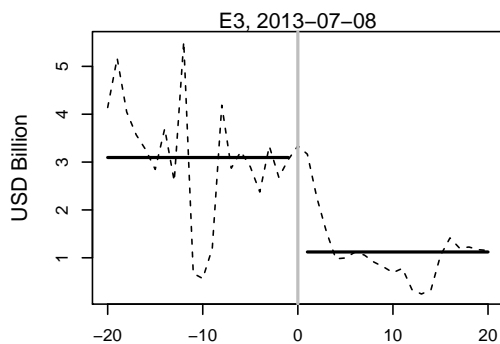
Figure 6 Event analysis for turnover



E1: Restrictions on INR forward contracts
Insignificant Drop: \$ 1.68 billion to \$ 1.52 billion



E2: Restrictions on banks' trading on exchanges
Insignificant Rise: \$ 1.85 billion to \$ 1.98 billion



E3: Restrictions on banks' trading on exchanges
Significant **Drop**: \$ 3.09 billion to \$ 1.12 billion

Figure 7 Daily impact cost

Each point in the figure below is the daily impact cost of trading Rs 1 million on the near month INR-USD future contracts from June 2011 to August 2013. The vertical lines mark the dates of policy interventions as described in Section 2.

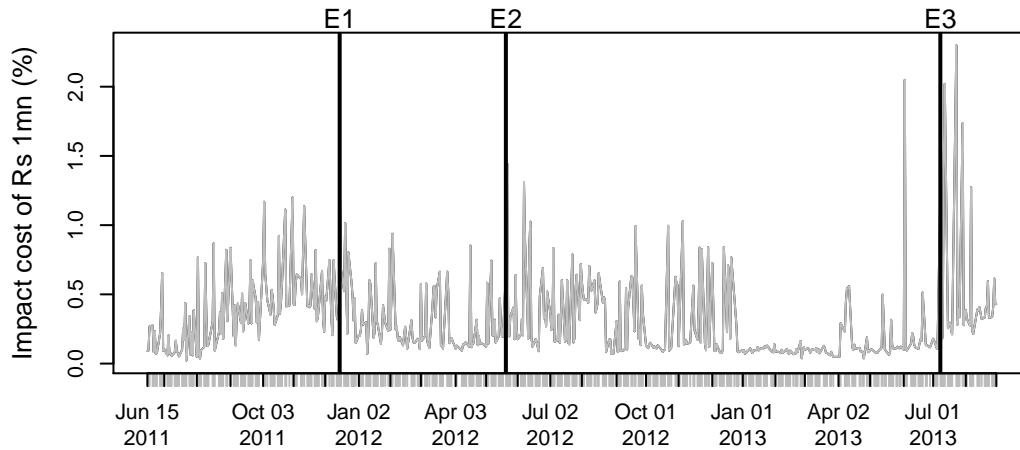


Figure 6 goes closer into the evolution of turnover surrounding the three events. There was a sharp decline in turnover after Event E3.

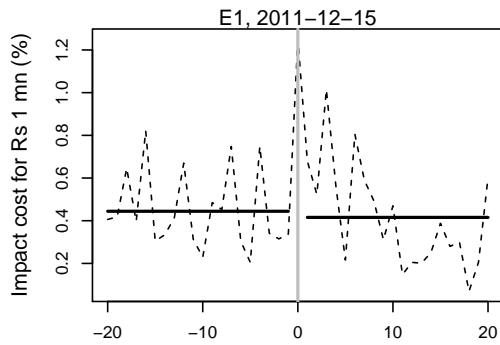
4.4 Impact on impact cost

If we establish $(bid+offer)/2$ as a benchmark price, impact cost is the extent to which a transaction of Rs.1 million is inferior to the benchmark price. It is measured in percentage units.

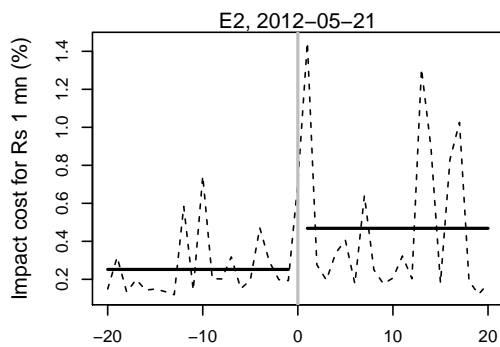
Figure 7 shows the long time series of the impact cost on the near month INR-USD futures contracts. While liquidity in India generally improves through time, in this graph, there is no discernable trend showing progress. Extremely high values of impact cost, i.e. market illiquidity, are visible after E3. By world standards, an impact cost of more than a basis point, for a transaction of Rs.1 million, would be considered a fairly illiquid market. In the graph, values of above a basis point are generally seen, and the worst values are even worse than 100 basis points.

MEASURING THE IMPACT OF THE INTERVENTIONS

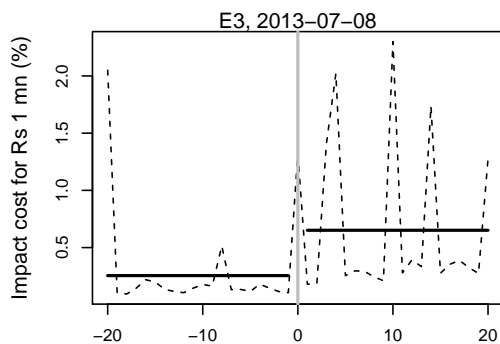
Figure 8 Event analysis for impact cost



E1: Restrictions on forward contracts
Insignificant Drop: 0.44% to 0.41%



E2: Restrictions on banks' trading on exchanges
Significant **Rise**: 0.25% to 0.47%



E3: Reduction on banks' trading on exchanges
Significant **Rise**: 0.25% to 0.65%

Figure 9 Daily spot rate

Each point in the figure below is the daily value of the reference rate for INR-USD from June 2011 to August 2013. The vertical lines mark the dates of policy interventions as described in Section 2.

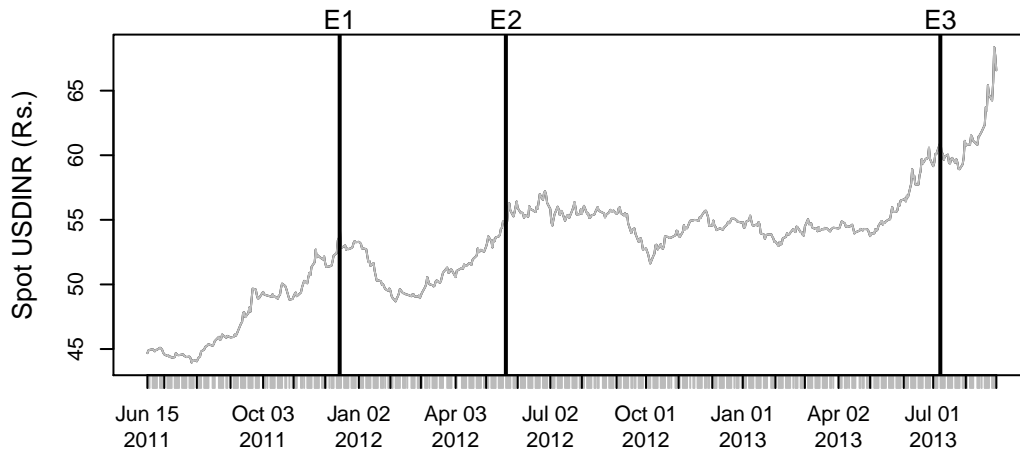


Figure 8 goes closer into the three events. While Event E1 did not have a statistically significant impact, events E2 and E3 led to a statistically significant worsening of liquidity. Each event generated (roughly speaking) a doubling of impact cost.

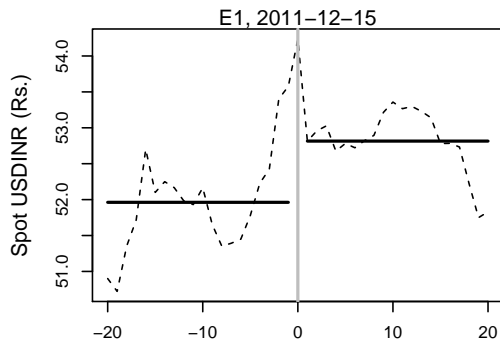
4.5 Impact on the exchange rate

Figure 9 shows the daily time series of the spot INR-USD rate. Exchange rate objectives have motivated the interventions into the currency market, hence it is interesting to assess the impact if any. In the long time-series, it does not appear that there was a significant impact. However, we do see that each of these events took place after a period of depreciation. This suggests that the fluctuations of financial regulation may be motivated by currency considerations.

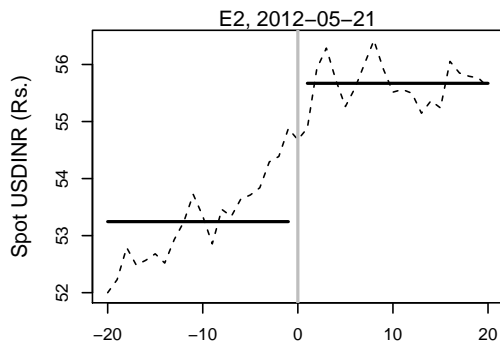
Figure 10 goes closer into each of the events. In all the three cases, there was a statistically significant depreciation of the rupee after the event. If the objective of RBI was to prevent currency depreciation, this was per-

MEASURING THE IMPACT OF THE INTERVENTIONS

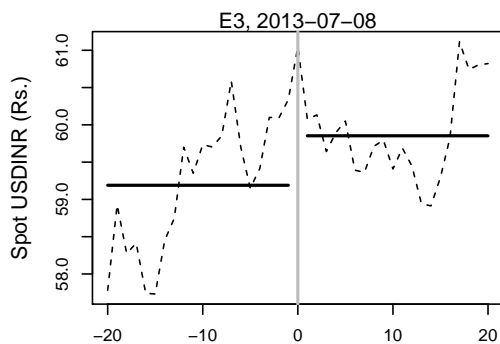
Figure 10 Event analysis for spot rate



E1: Restrictions on forward contracts
Significant **Depreciation**: Rs. 51.97 to Rs. 52.81



E2: Restrictions on banks' trading on exchanges
Significant **Depreciation**: Rs. 53.24 to Rs. 55.67



E3: Reduction on banks' trading on exchanges
Significant **Depreciation**: Rs. 59.19 to Rs. 59.85

haps not achieved.

5 Conclusion

In this analysis, we have shown simple reduced form facts about what happened in terms of market outcomes after the three events of restrictions upon currency derivatives trading. As many other events also took place, we cannot assert causality. The outcome may have been driven by other developments. We do not have a control sample, hence there is no identification. However, to the extent that within the short event window of 20 days, many other developments may not have taken place, and a sharp impact is visible immediately after the event date, this gives us sound grounds for attributing causality.