

# **Report of the Task Force on Offshore Rupee Markets**

**July 2019**



**Reserve Bank of India**

**Mumbai**

## Letter of Transmittal

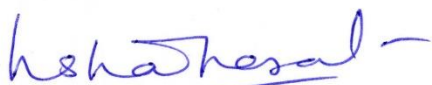
Shri Shaktikanta Das  
Governor  
Reserve Bank of India  
Mumbai 400001

July 30, 2019

Dear Sir,

We are pleased to submit the report of the Task Force on Offshore Rupee Markets. During its term the Task Force interacted with a wide range of market participants, both in India and abroad, to frame its views on a topic of growing importance to the macroprudential stability of the country. We thank you for entrusting this responsibility to the Task Force and hope that the recommendations of the Task Force will help in framing policies about the orderly growth of the domestic foreign exchange market.

Yours sincerely



(Usha Thorat)

Chairperson



(Gurumoorthy Mahalingam)

Member



(Anand Mohan Bajaj)

Member



(Ajit Ranade)

Member



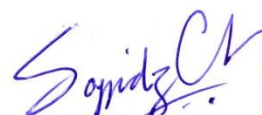
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# Contents

Letter of Transmittal

Abbreviations

Acknowledgements

Preface

Executive Summary

Chapters

1. Introduction	12
2. Evolution of the offshore rupee markets and cross-country experience	20
3. Linkages between offshore and onshore rupee markets: New evidence	46
4. IFSC – Use of Rupee derivatives	65
5. Issues and Recommendation	70

Annexures

## **Abbreviations**

ABS – Association of Banks in Singapore

AD – Authorised Dealer

AED – Arab Emirates Dirham

BI – Bank Indonesia

BIS – Bank for International Settlements

BoE – Bank of England

BKPM – Investment Coordinating Board in Indonesia

BRL – Brazilian Real

CAC – Capital Account Convertibility

CCIL – Clearing Corporation of India Ltd.

CME – Chicago Mercantile Exchange

CNH – Chinese Yuan (Offshore)

CNY – Chinese Yuan (Onshore)

CPI – Consumer Price Index

CSA – Credit Support Annex

DF – Deliverable Forward

DGCX – Dubai Gold and Commodities Exchange

DNDF – Domestic Non-Deliverable Forward

EM – Emerging Market

EME – Emerging Market Economy

ETCD – Exchange Traded Currency Derivatives

EUR – Euro

FBIL – Financial Benchmarks India Ltd.

FCY – Foreign Currency

FDI – Foreign Direct Investment

FEC – Foreign Exchange Committees  
FED – Federal Reserve Board  
FEMA – Foreign Exchange Management Act, 1999  
FPI – Foreign Portfolio Investor  
FSP – Final Settlement Price  
FSS – Financial Supervisory Services (FSS) in Korea  
FX – Foreign exchange  
GDP – Gross Domestic Product  
GIFT City – Gujarat International Financial Tec-City  
HKMA – Hong Kong Monetary Authority  
HKTR – Hong Kong trade repository  
IFC – International Finance Corporation  
IFSC – International Financial Service Centre  
IDR – Indonesian Rupiah  
INR – Indian Rupee  
IMF – International Monetary Fund  
IRC – Investment Registration Certificate  
ISDA – International Swaps and Derivatives Association  
JISDOR – Jakarta Inter-bank Spot Dollar Rate  
JIBOR – Jakarta Interbank Offered Rate  
JPY – Japanese Yen  
KRA – KYC Registration Agency  
KRW – Korean Won  
KYC – Know Your Customer  
LEI – Legal Entity Identifier  
MIFOR – Mumbai Interbank Forward Offer Rate  
MSEI – Metropolitan Stock Exchange of India Ltd.  
MYR – Malaysian Ringgit

NDF – Non Deliverable Forward

NOOPL – Net Overnight Open Position Limit

NRI – Non Resident Indian

NSE – National Stock Exchange

OIS – Overnight Indexed Swaps

OTC – Over the Counter

PBoC – People’s Bank of China

RBI – Reserve Bank of India

RMB – Renminbi

SEBI – Securities and Exchange Board of India

SFEMC – The Singapore Foreign Exchange Markets Committee

SGX – Singapore Exchange

SNRR – Special Non-Resident Rupee Account

TF – Task Force on Offshore Rupee Market

TWD – Taiwanese Dollar

USD – United States Dollar

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The Task Force benefitted from the interactions with Dr. T. V. Somanathan, IAS, Additional Chief Secretary, Government of Tamil Nadu; Shri R. Sridharan, Managing Director, CCIL; Dr. V. Anantha Nageswaran, Dean, IFMR Chennai; Shri Ananth Narayan, Associate Professor, SPJIMR Dr. A. K. Nag; Shri Himadri Bhattacharya and Shri Jamal Mecklai, CEO, Mecklai Financial Services.

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The Task Force also places on record the assistance provided by Shri Subrat Kumar Seet, Director and Smt. Priyanka Sachdeva, Manager from Department of Economic and Policy Research, Reserve Bank of India and Shri Hiren Sanghvi, Director and Shri Saket Banka, Associate Director from HSBC India. The Task Force specifically acknowledges the contribution of Shri Harendra Behera, Assistant Adviser, Department of Economic and Policy Research, Reserve Bank of India in research on ‘Linkages between Offshore and Onshore Rupee Markets’, undertaken in collaboration with Shri Sajjid Chinoy, Chief Economist, J. P. Morgan India.

Finally, the Task Force would like to commend the efforts put in by the Secretariat team from the Financial Markets Regulation Department, Reserve Bank of India led by Shri Supriyo Bhattacharjee, Deputy General Manager and supported by Shri Nitin Daukia, Manager. Meticulous organisation of meetings by Smt. Supriya Devalekar, Assistant Manager and Shri Kaivalya Sakalgaonkar, Assistant from the Secretariat team is also appreciated.

## Preface

Offshore markets in a non-convertible currency, usually referred to as non-deliverable forward (NDF) markets, enable trading of the non-convertible currency outside the influence of the domestic authorities. These contracts are settled in a convertible currency, usually US Dollars, as the non-convertible currency cannot be delivered offshore. Historically, NDF markets evolved for currencies with foreign exchange convertibility restrictions and controlled access for non-residents, beginning with countries in South America like Mexico and Brazil and thereafter moving on to emerging Asian economies, viz., Taiwan, South Korea, Indonesia, India, China, Philippines, etc. Apart from enabling trading in non-convertible currencies, NDF markets have also gained in prominence because of onshore regulatory controls and their ease of access.

Reserve Bank has been guided by the objective of developing a deep and liquid on-shore foreign exchange market that acts as a price setter globally. With regard to non-resident entities having legitimate exposure to the Rupee, the focus of policy efforts has been to align incentives for non-residents to gradually move to the domestic market, with adequate safeguards to ensure the external stability of the value of the Rupee.

The sharp growth in the offshore trading volumes in the Rupee NDF market in recent years likely even beyond the volumes in the onshore markets have raised concerns around the forces that are determining the value of the rupee and the ability of authorities to ensure currency stability. This necessitates a deeper understanding of the causes underlying the growth in those markets and identification of measures to reverse the trend.

The Task Force on Offshore Rupee Markets was set up to address that concern. It was mandated to study the factors attributable to the growth of the offshore Rupee market, its effects on the Rupee exchange rate and onshore market liquidity, and formulate measures to redress the concerns. The Task Force was also charged to examine the role, if any, that International Financial Services Centres (IFSCs) can play in addressing these concerns.

During its term, the Task Force interacted with a wide variety of stakeholders including banks, financial institutions, industry bodies, foreign portfolio investors, asset managers and academicians.



I trust that the Reserve Bank of India will find the recommendations made in the report useful.

Usha Thorat

Chairperson

## Executive Summary

The origin of the NDF markets may be traced back to the 1990s when a wave of capital account liberalisation in emerging market economies (EMEs) triggered a surge in capital inflows to these economies and consequently heightened the currency risk faced by foreign investors. Underdeveloped domestic markets, especially the market for financial derivatives, as well as controlled access to onshore markets raised the demand for a currency market outside the reach of local regulations. Another trend that supported the growth of the NDF market was the sharp rise globally in the size of derivatives markets in the 1980s and 1990s. As derivatives markets evolved, the speculative search for underlying moved out of the developed world into more esoteric assets. Following the successful speculative attack on the Sterling in 1992, EME currencies became viable subjects for such speculative positioning. Such activity becomes particularly noticeable during times of stress as offshore risk spills over to the domestic exchange rate through entities that have a presence in both onshore and offshore markets, usually global banks but also corporates.

A study of the degree and direction of such spillovers is important to understand the role of NDF markets and assess policy alternatives. The econometric study conducted by the Task Force observed that the influence between offshore and onshore exchange rate goes both ways in normal times, that is, it is bidirectional. The study also observed that during the last two stress episodes (the taper tantrum and the 2018 emerging markets crisis), the relationship turned unidirectional, with the NDF market driving onshore exchange rate. The study concludes that as NDF volumes have increased, they have begun to play an important role in both price discovery and driving volatility, particularly during heightened uncertainty period. The study also shows that periods of divergence are limited and the markets converge and that too fairly rapidly.

Against this backdrop and in the light of available information, results of the statistical analysis, and most importantly, based on the feedback received during the various consultations, the Task Force is making following recommendations in accordance with the terms of reference:

- i. Onshore market hours may be suitably extended to match the flexibility provided by the offshore market and thereby incentivize non-residents to hedge in the onshore market.
- ii. Banks may be allowed to freely offer prices to non-residents at all times, out of their Indian books, either by a domestic sales team or by using staff located at overseas branches

- iii. Non-deliverable Rupee derivatives (with settlement in foreign currency) may be allowed to be traded in the IFSC and IBUs may be allowed to deal in such derivatives with a distinct FCY-INR position limit. To start with, exchange traded currency derivatives involving Rupee may be introduced and, with experience, non-deliverable OTC currency derivatives involving Rupee may be allowed subsequently.
- iv. While requirement of underlying exposure will continue for trading in the onshore market, users may be allowed to undertake positions up to USD 100 million in OTC as well as exchange traded currency derivative market without having to establish the underlying exposure.
- v. The TF endorses the principle-based regulatory approach adopted in the draft regulation on hedging by non-residents released by the RBI on February 15, 2019. Also, back-to-back hedging by non-residents proposed under these draft regulations is endorsed. Further, in case of hedging of anticipated exposures, gains from cancellation of contract may be allowed to be passed on even in cases where there are no cash flows, at the discretion of the bank, where the bank considers the cancellation of underlying cash flow is due to external factors which are beyond the control of the user.
- vi. For ease of entering into hedge transactions for non-residents, the TF recommends:
  - a. Establishment of a central clearing and settlement mechanism for non-residents' deals in the onshore market.
  - b. Implementation of margin requirement for non-centrally cleared OTC derivatives in the onshore market at the earliest.
  - c. Allow Indian banks to post margin outside India.
  - d. Wider access to FX-Retail trading platform to non-residents.
- vii. A technology-based solution may be explored to centrally aggregate the investments of non-residents and derivative contracts entered into by them in the onshore market (both OTC and exchange traded) using LEI or any other unique identifier to start with.
- viii. The issue of taxation in respect of foreign exchange derivative contracts may be examined with the objective of overcoming gaps between tax regime in India and other major international financial centres to the extent possible.
- ix. KYC registration may be centralized across the financial market with uniform documentation requirement.

## **Chapter 1**

### **Introduction**

Currency is a component of sovereign money, which is legal tender, issued by the state. The external value of the currency, the exchange rate, is one of the most important economic and policy variables, which affects economic incentives and activity. The exchange rate is determined mostly by market forces of supply and demand, which influence its flows across international borders. The exchange rate has critical information value in guiding financial and economic decisions, which affect real economic variables. The stability and predictability of the exchange rate also has a critical influence on growth and financial stability.

Cross-border trade in goods, services and assets (or, capital) necessitates exchange of one currency into another; and can be thought of as the primary reason why currency markets exist. However, as in any other financial market, speculative elements – who take positions not for settling any underlying transactions but for benefitting from market movements – are important participants, who perform the function of imparting depth to the market. The aggregate actions of all participants – hedgers, arbitrageurs as well as speculators - determine the value and fluctuation of the exchange rate.

The currency markets for rupee, especially for exchange against the USD, are fairly well-developed today. One can classify these markets in three categories: (a) spot versus derivatives, (b) over-the-counter (OTC) versus exchange-traded and (c) onshore versus offshore. Further, derivatives can be cash-settled or delivery-based. The most commonly referred benchmark exchange rate of the rupee is from the onshore, spot OTC market. Similarly, the commonly referred forward exchange rate of the rupee is from the onshore forward OTC market. Rupee futures and options are traded in some onshore as well as offshore exchanges.

The classification of currency markets can also be in terms of the nature of contracts between buyers and sellers - spot, forwards (futures on exchanges) and options contracts. A spot contract is for standard settlement, i.e., the second working day after the date of transaction, whereas in case of forwards and futures (as well as options), the actual exchange or delivery of currency takes place in the future, at a date later than the spot settlement date. There are also non-deliverable forward contracts, which are discussed below. Forward and futures contracts are used as a risk management tool, or to hedge against possible adverse fluctuation in exchange rates. It is important

to note that hedging implies risk transfer between the contracting parties; it is not elimination of risk.

The category of the currency market that forms the focus of this report is the Offshore Rupee markets. The dominant segment of this market is the Non-Deliverable Forward (NDF) market – wherein foreign exchange forward contracts are traded in the OTC market at offshore locations, generally the International Finance Centres (IFCs) like Singapore, Hong Kong, London, Dubai and New York. These contracts do not involve a physical exchange of Rupees as Rupee is not deliverable offshore, and allow counter-parties to settle profit or loss in a convertible currency, usually the US Dollar, which is why it is called a non-deliverable market. NDF contracts are usually traded on currencies which are not readily available to trade globally or outside of sovereign boundaries. These are thus mainly currencies from countries which have partial or no capital account convertibility.

There are also a few exchange-traded offshore rupee markets dealing in rupee futures and options in Chicago, Singapore and Dubai. Volumes in these markets have typically been far smaller in comparison to the offshore NDF OTC market. Data on transactions in exchange-traded currency markets can be ascertained with greater certainty whereas data on transactions in offshore OTC NDF market have to be gauged through surveys and the estimates on the same are less firm.

### **Why do NDF Markets Exist?**

NDF markets are not a phenomenon peculiar to the Indian Rupee; they are common for currencies of many emerging market economies (EMEs). As per BIS data, NDFs in six currencies – Korean Won, Indian Rupee, Chinese Renminbi, Brazilian Real, Taiwanese Dollar and Russian Ruble – account for about two-thirds of the trade in NDFs globally. The total daily average volume in NDF markets is about USD 200 billion as per Bank of International Settlements (BIS) survey<sup>1</sup>. As per this survey the share of India was about 18.22 per cent of the trade in NDF's globally (see Table 2, Chapter 2). The 2016 BIS survey (the next one will be released in the later part of 2019) showed that offshore trades in Indian rupee were more or less equal to deliverable onshore forwards;

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<sup>1</sup> 2016 Triennial Central Bank Survey of Foreign Exchange and OTC Derivatives Markets.

around \$16 billion daily. The 2018 Bank of England reported \$23 billion in offshore rupee trades, while RBI sources estimate deliverable daily onshore forwards at \$21 billion for 2019<sup>2</sup>.

The size of an open economy is one of the primary determinants of international participation in its currency. If international participants do not have direct access to the on-shore currency market to meet their transaction needs, or to hedge their currency exposure, they are likely to use the offshore NDF market. The size, depth and liquidity of the offshore NDF is thus indicative of the non-resident interest in an emerging market economy.

To some extent the offshore NDF market complements the need for a deep and liquid onshore currency market. What is the appropriate size of the forex market for an emerging market economy, with partially open capital account, is determined by its size, the share of foreign trade, and appetite for capital flows. One proxy for estimating how large the forex market ought to be, is the GDP of the economy. A better estimate could be the size of the open economy, the trade and investment sector.

As India's economy has grown over the past two and a half decades, it has seen a significant rise in openness (i.e. trade to GDP ratio has grown from 15% in 1990 to 43% in 2018) and in cross border capital flows. This has commensurately raised non-resident interest in the Rupee, whether for risk management purposes or for speculative ends. The growing size of the Rupee NDF market points to a need to widen participation in on-shore markets.

The existence and size of offshore NDF markets is also a function of the degree of difficulty that participants in foreign exchange market (especially, non-residents) – both speculators and other participants with requirements arising from cross-border trade transactions – face in accessing the onshore markets. The difficulties in accessing onshore currency markets could span a variety of issues including the following:

- Restrictions on foreign exchange transactions,
- Cumbersome documentation and Know-Your-Customer (KYC) requirements for participants in the domestic market,
- Restrictions on market participants (especially, non-residents) in hedging activities such as transaction limits, tenor limits, other documentation etc.,
- Restrictions on cancellation and re-booking of contracts,

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<sup>2</sup> For comparison with offshore market, the onshore data includes forwards and swaps.

- Restrictions on the kind of derivative products that are allowed by market regulators, and
- Inconvenient market hours for those in other time zones.

These constraints exist either to curb excessive speculation or to maintain financial stability.

### **Are Offshore Rupee Markets a Problem?**

When the offshore market volume is significant or larger than the onshore currency market volume, as is the case with many EME currencies, it leads to two fragmented markets, wherein the price discovery on the onshore market becomes vulnerable to influences from the price discovery in the offshore market. Empirical evidence (see Chapter 3) shows that while at most times, the direction of the influence runs both ways, i.e. from onshore market to offshore market and vice-versa, the direction of the influence is more dominant from offshore market to the onshore market in times of high volatility. This could happen, especially when tidal forces from global financial markets influence the currency markets in a synchronised manner, such as during times of Emerging Markets (EM) currency crises.

There are essentially four issues with regard to offshore market that are critical for regulators –

- i. **Effectiveness of exchange rate management:** Many central banks, including the Reserve Bank, have exchange rate stability as one of their objectives, and resort to market intervention or other regulatory measures to control volatility of the exchange rate from time to time. Such influence, however, extends only to the onshore currency market. Presence of a large offshore market dilutes the effectiveness of the exchange rate management by the central bank. It also hinders the pursuit of the objective of financial stability in the domestic market.
- ii. **Disjointed price discovery:** During periods of volatility in the currency market, when price discovery in the offshore market causes large movements in onshore currency markets, the onshore market could often open with a large gap over the previous close. For resident market participants who want to cover their positions, such gaps expose them to significant risk.
- iii. **Revenue loss:** Every unit of turnover in a market earns a certain revenue for the market-making financial firms. Thus, turnover in the offshore market can be viewed as a potential revenue loss for domestic financial firms and the domestic economy.

- iv. **Effectiveness of RBI regulations on capital account management:** RBI's policies on capital account have been geared towards managing the impossible trinity: a "managed" exchange rate, free capital movement and an independent monetary policy. RBI policies have been geared toward avoidance of undue volatility in foreign exchange markets by having restrictions on cancellation and rebooking, and excessive risk-taking by resident entities, including corporates. With this objective, RBI restricts participation of resident entities in currency derivatives to the extent of their underlying exposures. A large market, outside the influence of regulatory authorities, undermines their effectiveness.

### **Constitution of the Task Force**

Against this backdrop, it was announced in the Statement on Developmental and Regulatory Policy dated February 7, 2019, the setting up of a Task Force on Offshore Rupee Markets. Accordingly, a Task Force, headed by Smt. Usha Thorat, was constituted with following terms of reference:

- i. Assess the causes behind the development of the offshore Rupee market;
- ii. Study the effects of the offshore markets on the Rupee exchange rate and market liquidity in the domestic market;
- iii. Recommend measures to address concerns, if any, arising out of offshore Rupee trading;
- iv. Propose measures to generate incentives for non-residents to access the domestic market;
- v. Examine the role, if any, International Financial Services Centre (IFSC) can play in addressing these concerns;
- vi. Any other relevant issue(s) the Task Force considers relevant to the context.

The Task Force comprises of the following:

- i. Smt. Usha Thorat, former Deputy Governor, Reserve Bank of India – Chairperson
- ii. Shri Anand Bajaj, Joint Secretary, Department of Economic Affairs, Ministry of Finance, Government of India – Member
- iii. Shri G. Mahalingam, Whole Time Director, Securities & Exchange Board of India – Member
- iv. Shri Ajit Ranade, Chief Economist of the Aditya Birla Group – Member
- v. Shri Sajjid Chinoy, Chief Economist, India, J.P. Morgan India – Member



- vi. Shri Surendra Rosha, CEO, India, HSBC Bank – Member
- vii. Shri Rajiv Ranjan, Adviser-in-charge, Department of Economic Policy and Research, Reserve Bank of India – Member
- viii. Shri T. Rabi Sankar, Chief General Manager, Financial Markets Regulation Department, Reserve Bank of India – Member Secretary

### **Approach of the Task Force**

Among the different issues relating to offshore markets, the argument concerning revenue loss is perhaps the most simplistic, and an obvious response could be for India to develop non-deliverable Rupee derivative market in an International Finance Service Centre (such as the GIFT City) located within the geographical boundary of India. However, such a market will be virtually no different from the markets located in Singapore or London; and hence, the objective of bringing volumes to the onshore market will remain unaddressed.

From the standpoint of addressing the concerns arising out of the existence of large offshore markets, it would make sense to incentivise movement of as much currency market transactions from such markets to onshore currency markets as possible. However, theoretically, one needs to recognise that there is a trade-off between the size/prominence of the offshore market and the extent of regulations/restrictions that are placed on cross-border transactions and foreign exchange markets/participants. It is also important to note that even if all non-residents with underlying exposure move their hedging transactions to onshore markets, offshore markets would continue to exist to meet the demand of participants who take a view on the exchange rate without any underlying exposure, i.e. the speculative demand.

At one extreme of the above-mentioned trade-off, if India opts for a full rupee convertibility – by removing all restrictions on current and capital account transactions – along with removal of all restrictions on currency derivatives, then offshore markets would no longer be a relevant concept. Capital account convertibility has been a hotly debated issue in the discourse on public policy both in India and globally. The received consensus in the last couple of decades endorsed by the International Monetary Fund (IMF) in 2012, is that while capital flows are an important aspect of the international monetary system, providing significant benefits for countries, they also carry risks for macroeconomic and financial stability, especially if they are large and volatile, and thus pose a challenge for policy. Hence, capital flows management measures are justified to help harness the

benefits while managing the risks. More generally, some restrictions to the capital account are necessary for India to avoid the “impossible trinity”. With an economy as large and diverse as India’s, which is therefore expectedly not completely synchronous to the global cycle, retaining the independence of monetary policy is imperative. Similarly, having some control over the exchange rate is necessary given its occasional propensity to be excessively volatile and overshoot, with attendant feedback loops to the macro-economy. Therefore, capital flow management measures become necessary to avoid the trilemma and ensure simultaneous fulfilment of the other two objectives. Based on this received consensus as well as the experiences of some emerging market economies through the last two decades, the Task Force has proceeded on the basis that the existing framework of capital account management followed by the Government and the RBI will continue.

There is also the issue of de-jure capital account convertibility. Even when speculators, arbitrageurs and traders do not have direct access to forex markets to exploit persistent interest rate differentials, or perceived mispricing of the currency, there are alternative channels available in the system, which make the actual arbitrage opportunities much lower. Some examples of such instruments is the Overnight Indexed Swaps (OIS) market, or the use of Mumbai Interbank Forward Offer Rate (MIFOR). Hence the de-jure level of capital account convertibility (CAC) could be much higher than implied by the existence of capital controls.

A related issue is the internationalisation of rupee. According to McCauley (2011), a currency is internationalised when market participants – residents and non-residents alike – conveniently use it to trade, invest, borrow and invoice in it. Based on the experience of China to internationalise Renminbi and the evidence of the narrowing of the gap between onshore forward rate and NDF rates for Renminbi, internationalisation of currency has been sometimes advocated as a way to reduce the influence of offshore markets. While one has witnessed issuance of rupee-denominated bonds (“Masala Bonds”) in some offshore markets in the recent past, internationalisation of rupee is still a distant goalpost given the persistent current account deficit and the negative net international debt position. Thus, internationalisation of rupee is not an explicit goal guiding the recommendations of the Task Force.

Further, the Task Force believes that India’s approach to the trade-off between deregulation of currency markets and tolerance of offshore market must be shaped by the specific considerations of the Indian economy rather than following any global template blindly.

Compared to countries like Korea, Taiwan or China, India's macroeconomic structure is significantly different. India is a structurally an economy with twin deficits – both fiscal and current account. Nearly half of India's consumer price index (CPI) basket comprises of food items, making India's inflation more vulnerable to supply shocks. Although India's macroeconomic stability has improved considerably in the last few years, considering the above factors, the Task Force feels that India cannot risk macroeconomic instability through potential exchange rate shocks by drastically lifting the restrictions on foreign exchange markets and participants.

On the other hand, large volumes in the offshore market also reflect the fact that the interest in Rupee is far larger than what is evident in onshore currency markets. This reflects the growing size of the Indian economy, greater role of India in the global economy and growth in trade and capital flows. Over time, therefore, it would be imperative for the Indian regulators to take steps to expand the role of onshore currency markets gradually, lest the disjointed price discovery issue flares up more frequently and in larger degrees.

The balanced approach of the Task Force, therefore, is to look at each of the difficulties faced by market participants in accessing onshore currency markets and prioritise their resolution in such a way that prudent regulatory considerations are least compromised. For instance, certain market micro-structure issues (such as extending the market hours of onshore currency markets) can be addressed relatively quickly without any regulatory compromise. On issues related to documentation and KYC requirements, smart application of ease-of-doing-business principles needs to be followed. Economic entities which need to undertake hedging of their foreign exchange exposure on account of genuine underlying exposures need to be given greater flexibility in undertaking such transactions in domestic currency markets. While the need for underlying exposure in order to operate in the forward markets cannot be eliminated, the way in which it is evidenced and monitored can be simplified. The Task Force has proceeded on the basis of the existing principles of regulations of foreign exchange markets.

Of course, the Task Force recognises that the recommendations will not do away with the economic imperatives for which trading of rupee forward contracts exists in offshore markets. With our recommendations, the Task Force believes that regulatory concerns arising out of the offshore markets can be reduced though not eliminated.

The Task Force held nine meetings between March 2019 and July 2019. The details of the meetings are given in Annex V.

## **Chapter 2**

### **The Evolution of NDF Markets and Cross-country Experience**

The foreign exchange market in India during 1970s and 1980s was heavily controlled and closed in nature with various kinds of restrictions in place. The Indian foreign exchange market started deepening with the transition to a market-determined exchange rate system in March 1993 and the subsequent liberalisation of restrictions on various external transactions leading up to current account convertibility under Article VIII of the Articles of Agreement of the International Monetary Fund in 1994. Notwithstanding various measures taken to further deepen and broaden the foreign exchange market in India, various restrictions are still in place to limit market access to only those with underlying exposure and prevent undue speculation. As India gets increasingly integrated with the global markets, and the exchange rate is increasingly market determined, a combination of capital flows management measures and currency trading restrictions in the on shore markets are used to manage the 'impossible trinity' external value of the rupee. These measures and restriction are under constant review to ensure that the overall objective of growth through foreign trade and investment are served.

Against this backdrop, this chapter attempts to highlights evolution in section II; a brief review of literature on the reasons behind increase in turnover in NDF market in Asian countries has been given in Section III. Section IV highlights the developments in NDF market. The country experiences such as nature of restrictions on non-residents operating in domestic currency forwards market, liberalisation measures taken by countries and its impact in curbing offshore market discussed in Section V.

#### **I. Introduction**

NDFs are foreign exchange derivative instruments on non-convertible or restricted currencies traded over the counter (OTC) mainly at offshore centres i.e., outside the direct jurisdiction of the respective national authorities. It is essentially a forward contract with different settlement process. Unlike the standard forward contract which involves exchange of underlying currencies on maturity, the NDF contract is typically settled as the difference between an exchange rate agreed months before and the actual spot rate at maturity in an international currency (deliverable) mainly the US dollars. And the other currency which is usually emerging market currency is non-

deliverable. The settlement of the transaction is not by delivering the underlying pair of currencies, but by making a net payment in a convertible currency equal to the difference between the agreed forward exchange rate and the subsequent spot rate (Ma et al, 2004). NDF contracts can either be traded over the counter market or at exchanges at offshore financial centres such as Hong Kong, Singapore and London. Lately they have become popular derivative instruments catering to the offshore investors' demand for hedging, arbitraging and speculating including by those who look upon currency as an asset class.

The major participants in NDF market could include foreign businesses and investors doing business in countries with complex requirements for hedging currency risk in the local markets, arbitragers who have access to both on shore and offshore markets, pure speculators like hedge funds and others who take positions in the NDF market. While these are the end users there are also market intermediaries like banks dealers and brokers who provide quotes for trading in these currencies and custodians who provide settlement arrangements. While the multinational companies deal in both the long and short end of the market, the short end of the market is particularly dominated by the hedge funds (Misra and Behera, 2006). The pricing is influenced by a combination of factors such as interest rate differential between the two currencies, supply and demand, future spot expectations, foreign exchange regime and central bank policies.

NDF market primarily evolved in response to under-developed onshore forward markets and limited access to non-residents to currencies with foreign exchange convertibility restrictions. An important advantage that enhances the demand for NDF is reduced credit risk compared to onshore counterparts, since there is no exchange of principal and only the difference amount is settled thus allowing investors to circumvent limits associated with onshore activity. Other reasons which also favoured the emergence of NDF market includes convenience of time zones, location of customer business operating from a global treasury for multinational companies, short-trading hours in onshore forex market, capital controls by individual central banks, position limits, frictions like registration norms and know your customer norms, frequent and significant changes in regulations and guidelines in the domestic exchanges and OTC markets. Moreover, credit risk is also less relevant since mostly large foreign banks are engaged as a counterparty in NDF trading. Further, offshore centres in some cases are better placed to offer competitive services compared to the

onshore market on account of various factors ranging from tax treatment, less onerous regulations and documentation to operational efficiency.

## **II. Evolution of NDF Markets**

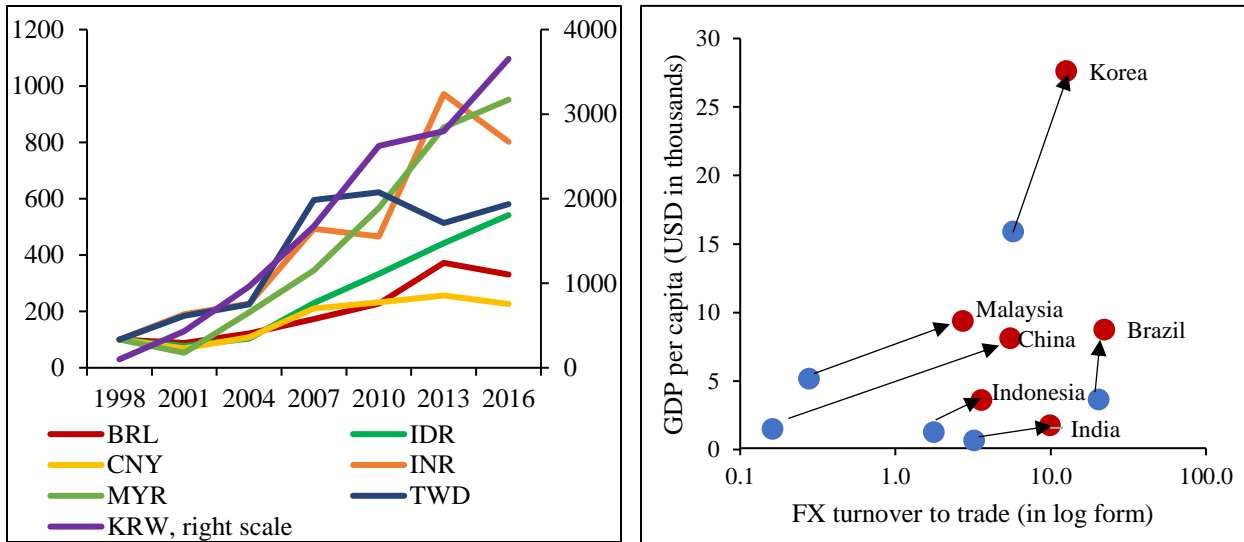
The origin of NDF market traces back to the 1990s when a wave of capital account liberalisation in emerging market economies (EMEs) triggered surge in capital inflows to these economies and consequently increased currency risk faced by the investors. However, under-developed domestic forward market or restricted access to onshore forward market paved the way for evolution of NDF market as an alternative hedging tool to these investors. The widely shared concern amongst local monetary authorities was that easy access to onshore market and availability of domestic currency to non-residents will encourage speculative activity leading to greater exchange rate volatility and eventually the loss of monetary control. Consequently, some international banks, began offering NDF contracts to meet the demand of investors willing to hedge their EM currencies exposure during early 1990s (Higgins and Humpage, 2005).

One of the earliest NDF market developed during early 1990s was in Mexican peso to speculate on the currency ahead of the devaluation from its then fixed exchange rate against the US Dollar. The increase in trading turnover during that time was facilitated by the entrance of voice brokers as intermediaries between inter-bank trading activities (Lipscomb, 2005). The NDF market for some Asian economies like Korean Won, Taiwanese Dollar, Indian rupee and Chinese Renminbi existed since mid-1990s due to either restricted or no access to onshore forward markets by non-residents (BIS, 2004). In case of New Taiwan Dollar, only onshore entities had access to onshore markets while it was subjected to underlying requirements in case of Korean Won, Indian rupee and Chinese Renminbi. For other currencies like Indonesian rupiah, NDF market evolved after the Asian financial crisis in response to re-imposition of capital restrictions which were liberalised in early 1990s. In Indonesia, rapid liberalisation beginning as early as 1970s and further internalisation of Indonesia rupiah enabled the development of deliverable offshore market for rupiah. Following the currency crisis, initial measures were directed at curbing non-trade and investment related forward transactions with non-residents and broader measures prohibiting banks from extending loans, conducting derivative transactions and transferring rupiah to non-residents were introduced in early 2001. While Malaysia also imposed cross border restrictions

after the crisis, evolution of NDF market in Ringgit was initially inhibited by comprehensiveness of regulations as well as its effective enforcement by the authorities (Ishii, 2001).

McCauley (2011) showed that as income per capita rises, a currency trades in ever greater multiples of the home economy's underlying international trade ("financialisation") and trades to an even greater extent outside its home market ("internationalisation"). The increasing economic interest in emerging market economies as a result of upbeat growth scenario from 2000s spurred greater participation in currencies of these economies (Chart 1). In this context, increasing turnover in the Indian rupee, Chinese Renminbi and other Asian currencies like Indonesian rupiah, Malaysian Ringgit, Korean Won and New Taiwanese Dollar is consistent with increased investment in these economies amidst restricted access to onshore markets. Both India and China recorded phenomenal growth rates translating into increased businesses (trade and investments) with rest of the world and resulting exposures facilitated offshore trading of their currencies (Chart 2 a & b). During 1990s, mostly non-residents with genuine exposure used NDF market to hedge their exposures in Indian rupee. However, with the development of onshore market providing reasonable hedging facilities to foreign investors amidst gradual relaxation of controls, most of the market activity seems to be driven by speculators and arbitrageurs and those who are looking at the rupee as a separate asset class to diversify their portfolios in view of its growing international importance. As a result the size of NDF market has grown over time. In the China's case, the emergence of offshore deliverables market for Renminbi (CNH) since 2010 was mainly due to internationalisation of Renminbi which gradually substituted the NDF market.

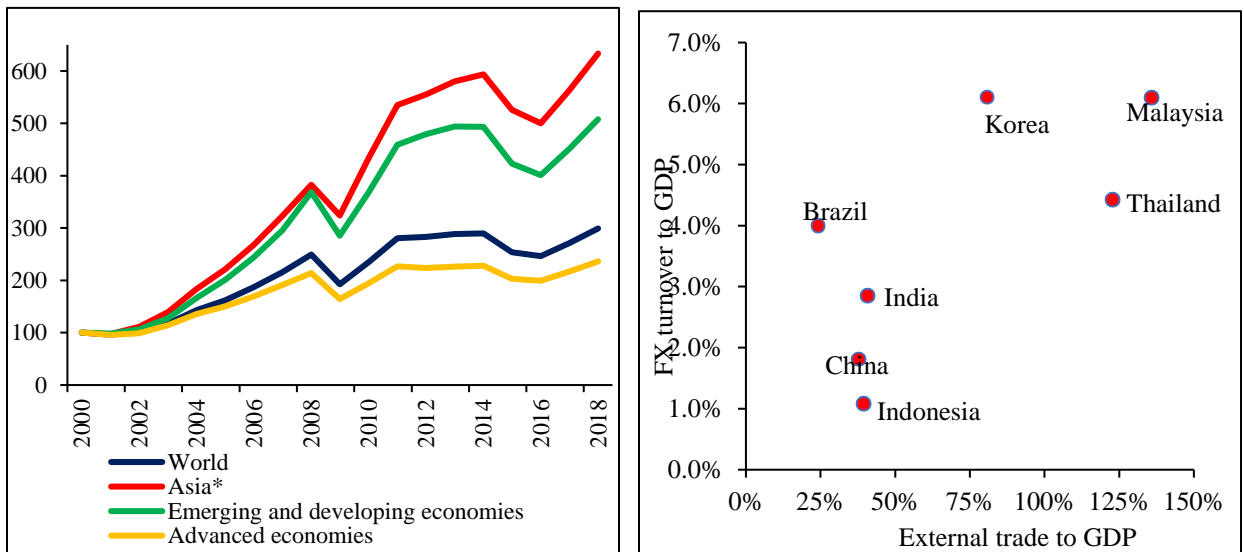
Chart 1 a & b: FX turnover, Indexed 1998=100 and FX Turnover/Trade vs. GDP



Source: BIS Triennial survey, IMF, CEIC

Note: Chart 1b: A higher ratio of FX turnover to trade indicates that a currency trade in higher multiple relative to its underlying trade as GDP increases.

Chart 2 a & b: Gross trade, Indexed 2000=100 and Gross trade vs. FX turnover



Source: IMF, BIS, World Bank

Both Indonesia and Malaysia have witnessed sharp increase in non-resident participation in local currency bond market particularly in the aftermath of global financial crisis 2008, while these countries local forward markets imposed restrictive conditions that restricted use of these markets for hedging; this led to the increased use of NDF market. Non-resident ownership of government debt in Indonesia and Malaysia as share of total outstanding government debt stood at 38.3 per



cent and 24.3 per cent as at the end of March 2019, respectively, highest amongst other Asian economies. However, foreign participation in equity market is higher for Korea and Taiwan. While Taiwan has limits on investments in domestic bonds by non-residents, foreign investors are not subject to any investment ceiling for both aggregate and individual holdings in a listed company, except for a few restricted industries.

Additionally, the reason for growing NDF market could be increased carry trade activities for high yielding currencies. After examining the returns of carry trades with deliverable and non-deliverable forwards, Doukas and Zhang (2013) found that carry trades for currencies with NDF contracts perform better compared to carry trades for currencies with deliverable forward contracts. This excess return is attributed to the compensation of risks emanating from currency convertibility and capital controls. For the Brazilian Real (BRL) derivatives, offshore NDFs in particular are the main vehicle for investors looking to implement carry trades (BIS Santaella, 2015).

NDF market evolved mainly for emerging market economies witnessing increased economic interest in the process of transition to high growth phase since 1990s, whilst restrictions persisted in accessing onshore markets for hedging currency risk arising out of these exposures. The NDF market also provided an opportunity to speculate on currencies which underwent notable shift in their exchange rate regime. During periods of global uncertainties like in 2013 during “taper tantrum”, the NDF market is used for speculative purposes arguably causing disruptions in domestic forex market.

### **III. Size of the NDF market**

Given that NDF is an over the counter (OTC) traded instrument, the turnover data relies on various surveys conducted by institutions at different time intervals. In view of this, issues like comparability and continuity in data often arises. However, these surveys still provide useful information to gauge the growth of NDF market over time. Results from the semi-annual turnover survey for the Foreign Exchange Joint Standing Committee chaired by Bank of England (BoE) suggests that growth of NDF market has outpaced the forward market as well as overall foreign exchange market. In London, the average daily NDF turnover surged to USD 139 billion as per

the latest survey in October 2018 from as low as USD 21 billion in 2008. During this period, NDF turnover quadrupled and its share increased to 5.3 per cent of overall forex turnover and comprised nearly 34 per cent of both onshore and offshore forwards compared to nearly 10 per cent in 2008.

<b>Table 1: NDF trading in London (Average daily turnover in billions of US dollars)</b>					
	<b>NDFs</b>	<b>All forwards</b>	<b>NDF, % of all forwards</b>	<b>All FX</b>	<b>NDF as % of all FX</b>
Apr-08	23	200	11.5	1832	1.3
Oct-08	19	230	8.3	1699	1.1
Apr-09	16	162	9.9	1356	1.2
Oct-09	26	191	13.6	1522	1.7
Apr-10	25	186	13.4	1687	1.5
Oct-10	37	188	19.7	1787	2.1
Apr-11	42	192	21.9	2042	2.1
Oct-11	37	192	19.3	2038	1.8
Apr-12	36	192	18.8	2014	1.8
Oct-12	45	211	21.3	2017	2.2
Apr-13	60	265	22.6	2547	2.4
Oct-13	43	205	21.0	2234	1.9
Oct-14	62	304	20.4	2711	2.3
Apr-15	64	295	21.7	2481	2.6
Oct-15	54	253	21.3	2111	2.6
Apr-16	60	275	21.8	2225	2.7
Oct-16	62	292	21.2	2179	2.8
Apr-17	78	332	23.5	2401	3.2
Oct-17	90	330	27.3	2380	3.8
Apr-18	111	407	27.3	2727	4.1
Oct-18	139	409	34.0	2611	5.3
<i>Source: BIS, London Foreign Exchange Joint Standing Committee.</i>					

A similar survey is conducted by Hong Kong trade repository (HKTR) under the mandatory reporting obligations imposed since July 2015. According to the HKTR survey, daily average

NDF turnover in Hong Kong has also exhibited significant growth and daily average turnover increased to USD 55-60 billion in 2018 from nearly USD 8 billion in 2015.

The BIS publishes data on foreign exchange and derivatives trading activity every three years and also prepare a separate report on NDF covering global market since 2013. The latest 2016 BIS triennial survey reported that average daily turnover in global NDF market has increased by 5.3 per cent to USD 134 billion as compared to April 2013. Further, NDF share in outright forward and overall foreign exchange trading remained stable at 19.0 per cent and 2.6 per cent, respectively (Table 1). This is in contrast to the decline in average daily turnover in global FX markets to USD 5.1 trillion in 2016 from USD 5.4 trillion in 2013 survey conducted by BIS.

The currency composition suggests that the Asian currencies dominate the NDF trading activity with the highest turnover recorded by Korean Won as Korea generally has open capital account and there are limits on non-residents borrowings in Korean Won from banks in Korea, therefore, it is not deliverable offshore (BIS Survey, 2016). Survey results from London, Hong Kong and Tokyo foreign exchange committees (FEC) as well as the BIS triennial survey points toward increased NDF trading activity in Korean Won. The Tokyo survey, which is available from the year 2006 suggest that the growth in NDF trading activity for Korean Won has shown significant growth outperforming other major currencies. The momentum in major currencies picked up ahead of the global financial crisis 2008 before faltering during the crisis period owing to deteriorating financial conditions. Subsequently, the NDF activity has deepened over time with the Indian rupee and Brazilian Real constituting higher proportion of total global turnover after the Korean Won, as corroborated by the London survey also. During the five-year period from 2008-13, the increase in NDF turnover is largely consistent with the FX turnover in emerging market economies (BIS, 2013).

Since 2013, greater demand for hedging in anticipation of monetary policy normalisation seems to be the driving factor for increase in NDF activity given that lot of capital flows to emerging markets was funded using low cost dollar liquidity (BIS, 2013). The BIS 2016 survey identified that developments associated with higher volatility in Renminbi during August 2015 and January 2016 has also boosted Asian NDFs, even as trading activity in Renminbi NDF has faded. According to the BIS 2016 survey, during 2013 and 2016, trading in Renminbi NDF contracted by 39.4 per cent, while that of Korean Won and Taiwanese Dollar expanded by 53.7 per cent and

29.9 per cent, respectively. The decline in the NDF activity for Indian rupee reflects the depreciation of rupee against the US dollar, however, daily average turnover was up by 16.7 per cent between 2013 and 2016 in unadjusted terms. Hong Kong (HKTR) survey indicates continued decline in NDF activity for Chinese Renminbi and Malaysian Ringgit (Table 2 and Chart 2 a & b). In case of China, this was due to the Renminbi internationalisation policy followed after 2011.

	Table 2: Daily average turnover (USD billion)						Spread	
	Oct- 2018						Bid-Ask (Latest)	
	BIS 2013		BIS 2016		(London Survey)			
	NDF	DF	NDF	DF	NDF	DF (Latest*)	Onshore	Offshore
Chinese Renminbi	17.1	2.4	10.4	28.1	8.8	65.0	0.001-0.002	0.003-0.005
Indian Rupee	17.2	3.1	16.4	16.3	23.0 <sup>3</sup>	21.4	0.01	0.02
Korean Won	19.6	1.1	30.1	14.5	29.5	30.0	0.10	0.30
Taiwanese Dollar	8.9	0.2	11.5	7.8	-	19.3	0.005-0.010	0.010-0.020
Brazilian Real	15.9	2.7	18.7	3.0	15.4	-	-	-
Russian Ruble	4.1	0.5	2.9	18.6	4.0	-	-	-

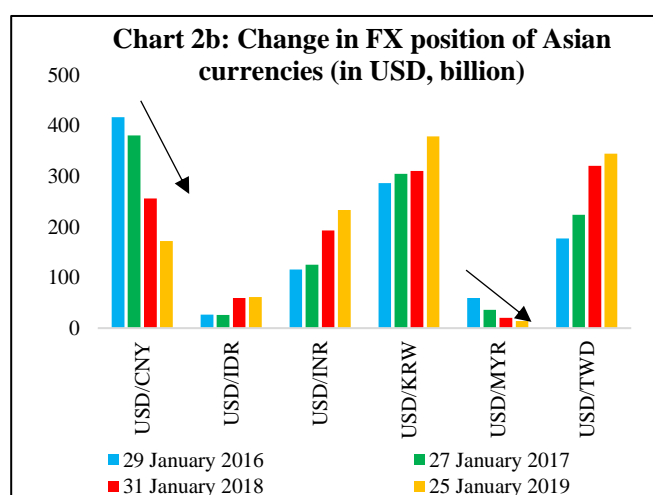
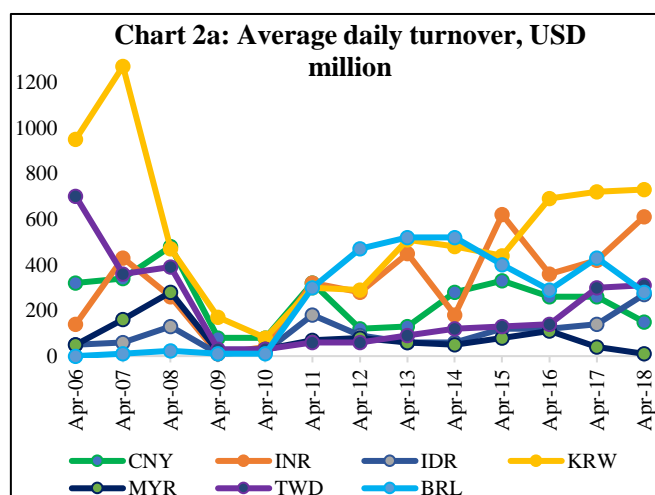
Source: BIS, London FEC, BoK, RBI, China Foreign Exchange Trading Center, Central bank of Taiwan, HSBC

Note

1. DF= Deliverable forwards and include forwards and FX swaps traded onshore.
2. Chinese Renminbi volumes on offshore segment are negligible after development of CNH market.
3. BIS DF and DF (latest) are not directly comparable since latest numbers are taken from country sources.

\* Chinese Yuan is for Jun-19, Indian rupee and Taiwanese Dollar is for Apr-19, Korean Won is for 2017.

Chart 2: Average Daily Turnover and Change in Forex position of Asian Currencies



<sup>3</sup> The corresponding figure for April, 2019 stood at USD 28 billion.

*Source: Tokyo FEC, Hong Kong FEC.*

Based on latest surveys conducted by London and Hong Kong FEC which are major offshore centres, clearly, it showed that the global NDF activity has surged led by Korean Won, Indian rupee, Brazilian Real and Taiwanese Dollar. The trend is likely to be validated by BIS 2019 survey which encompasses global turnover and is due to release later this year.

#### **IV. Review of Literature**

In view of the noticeable rise in NDF activity with potential to engender distortions in local market, there exist varied literature, on the emergence of NDF market and its spill-overs to onshore counterparts. One of the earliest attempts was made by Park (2001) which investigated the impact of financial deregulation on relationship between onshore and offshore prices. A key finding was that Korean Won NDF influenced onshore prices after a shift to floating exchange rate regime coupled with liberalisation of capital controls. As part of liberalisation measures following the Asian financial crisis in 1997, excessive regulations pertaining to foreign exchange market were removed and measures were undertaken to improve efficiency of market by increasing liquidity and broadening participation base (Chung et al., 2000). Amongst these measures, onshore entities were allowed to participate in offshore market. In this regard, Lipscomb (2005) suggested that transition to a more convertible exchange rate regime and permissible participation of onshore counterparties in NDF transactions contributed to the increase in offshore liquidity which begets liquidity in domestic market as well. A classic example is Korean Won where both onshore and offshore market co-exist with arbitrage opportunity exploiting any incipient price discrepancy. However, NDF markets tend to disappear as the currency becomes fully convertible as stated earlier.

Wang et al (2007) also corroborated the finding that NDF market seems to be the driver for the domestic spot market of Korean Won, while the information flow is reverse for Taiwanese Dollar where the spot market was found to have influence on NDF market. Adding to this literature, Colavecchio and Funke (2008) found Renminbi NDF to be the key driver of Asian currency markets with varied degree of heterogeneity contingent on real and financial inter-linkages. Amongst the country specific study, the one by Cadarajat and Lubis (2012) demonstrated that Indonesia rupiah NDF tends to have influence on domestic spot and forward return.

Studies by Hutchison (2009), Mihajek and Packer (2010) and McCauley and Scatigna (2011) asserted that offshore trading becomes increasingly important with growing economic interest in a particular currency amidst limited access to onshore markets and convertibility restrictions. A study by BIS (2013) analysed the directional impact for nine currencies including the Indian rupee for the period 2005-13 along with separate analysis for 2008-09 crisis and May-August 2013. It found the presence of two way causation for most currencies for the full sample period, however noted the increase in NDF influence during market stress. Both the stress period saw noticeable impact of NDF particularly during May-August 2013 with major exception of Malaysian Ringgit where NDF played dominant role and there was no case of deliverable forward influencing NDF.

In the Indian context, the earliest study with regard to spill-overs impact was undertaken by Misra and Behera (2006). They found onshore prices to have directional impact on NDF prices even as volatility spillovers could exist from NDF to onshore market. The subsequent research on this subject during the period 2000-09 by Behera (2011) demonstrated the change in dynamics with evidence of greater volatility spillover from NDF to spot market. A similar finding was outlined by Guru (2009) on the relationship between the NDF and onshore market for Indian rupee. It is argued that dynamics of relationship between onshore and offshore markets has undergone a change with the introduction of the currency future market in 2008 and returns in NDF market seem to be influencing the domestic spot as well as forward market.

A study by Darbha (2012) finds that offshore markets plays an important role in price discovery mechanism, particularly in India and China. Goyal *et al.* (2013), after examining the period 2006-13 found the existence of bi-directional relationship between onshore and NDF market for Indian rupee over the long term, however, the directional impact turns one way from NDF to onshore during periods of depreciating pressures *i.e.*, movements in NDF markets drives adjustment in onshore market when the currency is under depreciation pressures. This asymmetric behaviour is attributed to the fact that the Reserve bank intervenes in the foreign exchange market to stem excessive volatility during periods of rupee depreciation.

McCauley *et al.* (2014) described two paths for evolution of the NDF markets. The first one is being followed by Chinese Renminbi which has become deliverable after the emergence of offshore market. The Indian rupee falls under the second where the NDF market has grown amidst continued restrictions on foreign participation.

The report of the Standing Council (Standing Council on International Competitiveness of the Indian Financial System, 2015 by Ministry of Finance, Government of India enumerated factors including capital controls, position limits, frictions like registration norms and know your customer norms, frequent and significant changes in regulations and guidelines in the domestic exchanges and OTC markets as deterrent to foreign investors participation in the onshore market.

IGIDR Finance Research Group (2016) made an important recommendation that domestic entities should be permitted to participate in NDF market after outlining factors driving offshore activity compared to onshore segment. In respect of the internationalisation of rupee as one of the debated recommendation, Kumar and Patnaik (2018) argued the case for gradual internationalisation of rupee on analysing the role of the Indian rupee in terms of official sector currency, reserve currency and trade invoicing currency.

## **V. Country Experience**

### ***China***

The Chinese Renminbi (RMB) forward market can be segmented into offshore NDF market (since 1990s), an onshore Renminbi market (since 2007) and the CNH market (offshore deliverable). In the current scenario, RMB NDF has been gradually replaced by offshore deliverables after the creation of CNH market since mid- 2010 as a by-product of promotion of international role of RMB since 2009.

China's exchange rate regime has evolved from fixed to managed floating rates followed by internationalisation of Renminbi (RMB). In early 1990s, reforms started with the unification of multiple exchange rate in 1994 and in 1996, China allowed the full convertibility of Yuan under current account transactions. Eventually, the People's Bank of China (PBoC) announced the implementation of managed floating exchange rate against basket of currencies in July 2005 ending the dollar peg prevalent since 1994. Over the last decade, China's strong economic performance and growing linkages with rest of the world prompted authorities to promote the international role of RMB. The idea of internationalisation of RMB gained prominence following the financial crisis of 2008, which revealed the fragilities of dollar dominated global financial system. The thrust of early initiatives was RMB trade settlement premised on China's deeper trade

links and its central role within Asia's supply chain that supported the demand for its currency for trade invoicing. In this regard, a pilot scheme permitting cross border trade settlement in RMB was launched in 2009, which was widened to cover all current account transactions over the course of next three years. Capital account liberalisation was undertaken at a more gradual pace with the Chinese RMB becoming officially deliverable at offshore centres in 2010. While Hong Kong banks were permitted to accept RMB deposits as part of personal accounts in 2004, an important milestone was the sign of Memorandum of cooperation between HKMA and PBoC in July 2010, which eliminated restrictions on Hong Kong banks in establishing Renminbi accounts and providing related services *i.e.*, payments and transfers in RMB to individuals and corporations. Moreover, financial institutions were permitted to offer Yuan denominated products. As a result, CNH (offshore Renminbi) began to trade actively amongst other range of products and prompted investors to switch to deliverable market in place of NDF which was used previously. Whilst, CNH can be transferred freely between offshore accounts; transfer of RMB between onshore and offshore is still confined to regulated channels to fend off potential adverse impact on onshore markets. Moreover, these restrictions are skewed towards outflows from the mainland to offshore centres.

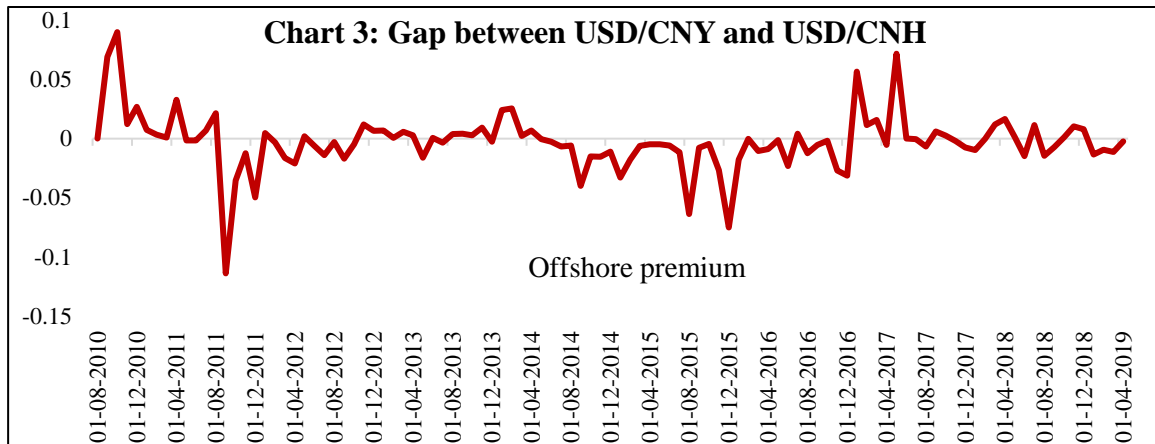
With Renminbi internationalisation, the offshore CNH market has shown exponential growth displacing the NDFs. The BIS Triennial Survey showed significant decline in RMB NDF which fell nearly 40 per cent between 2013 and 2016, driving its share in total RMB trading to 5 per cent from 14 per cent earlier (BIS, 2016). The rapid expansion of offshore market is clearly discernible in rising FX turnover for CNH which has nearly doubled between 2013 and 2016 and forms around 67 per cent of the total RMB turnover. Of the total CNH turnover, average daily turnover in the DFs in April 2016 was estimated to increase to USD 16.4 billion from USD 8.4 billion in 2013 (Table 3).



<b>Table 3: RMB market turnover, average daily turnover in USD billion</b>								
	<b>OTC</b>						<b>OTC</b>	
	<b>OTC</b>	<b>FX</b>	<b>OTC</b>	<b>OTC</b>			<b>OTC</b>	
	<b>spot</b>	<b>swaps</b>	<b>DFs</b>	<b>NDF</b>	<b>Options</b>	<b>Futures</b>	<b>currency</b>	<b>swaps</b>
								<b>Total</b>
<b>CNY</b>								
2013	20.1	10.5	2.6	0	0.3	0	0	33.5
2016	24.9	27	1.3	0	2	0	0.2	55.4
% change	23.9	156.5	-51.4		569.3			65.1
<b>CNH</b>								
2013	13.9	29.4	8.4		16.8	0	0.5	69
2016	42.7	59	16.4		15.8	0.3	2.5	136.7
% change	207.9	100.8	94.3		-5.6	578.4	383.6	98.1
<b>NDF</b>								
2013				17.1				17.1
2016				10.4				10.4
% change				-39.4				-39.4

Source: BIS

Since the inception of CNH, pricing gaps tend to persist between onshore and offshore exchange rates, however, it has narrowed over last couple of years. This pricing gap arises on account of different economic conditions in mainland China and Hong Kong amidst imperfect arbitrage (Funke, 2015). While central bank intervention can constrain the movement of CNY at onshore centres, CNH is more market determined and hence closely follows the global swings (Chart 3). Since September 2015, PBOC has reportedly taken action in the offshore market when the onshore-offshore gap was large (McCauley & Shu, 2018).



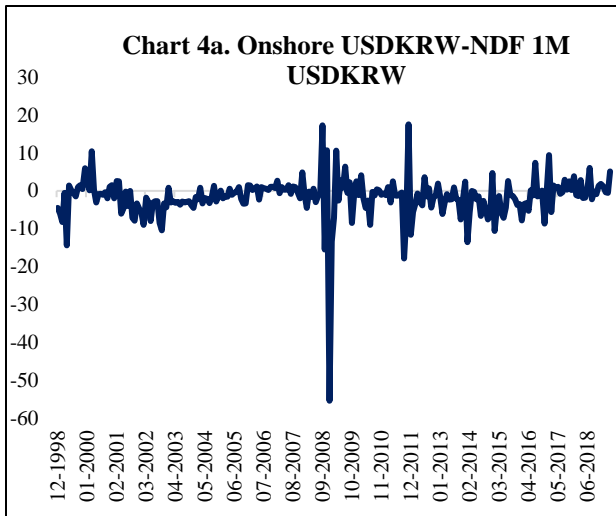
Source: Bloomberg

Further liberalisation of the onshore FX market along with allowance of offshore deliverable market has made the CNY NDF market almost non-existent, despite maintaining the ‘need basis’ principle. Notwithstanding, the existence of basis between CNY and CNH due to the band range trading in CNY and market determined pricing in CNH, the spread has been contracting over years with ample liquidity available in onshore and offshore markets. Further, the creation of offshore market has made various options available to offshore investors to both hedge their exposures on underlying investments and also generate RMB risk in their portfolios *via* various products and offshore deliverable market.

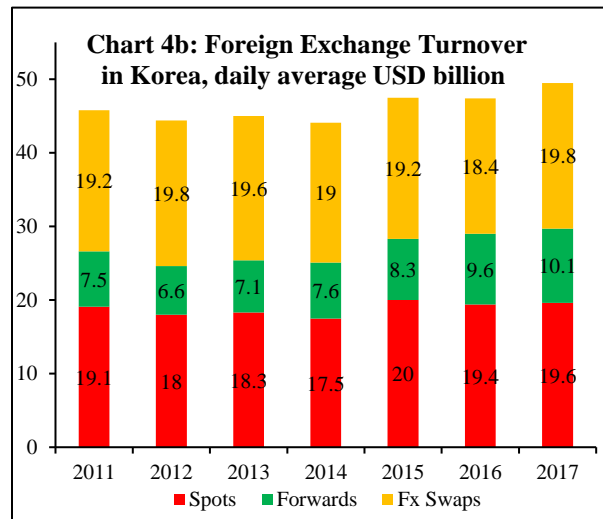
### ***Korea***

With an average daily turnover of USD 30 billion as per the BIS survey 2016 and USD 29.5 billion in the latest London survey of October 2018, Korean Won (KRW) NDF boasts of the most active and liquid NDF market amongst most emerging market currencies. Further, permissible participation of local banks in the NDF market ensures close integration of onshore and offshore forex markets, allowing for quick sentiment spillovers between the two markets. Turnover in NDF market is substantially higher than onshore forwards mainly on account of higher documentation requirements for accessing onshore market. In the onshore market, average daily turnover was reported at USD10.1 billion in 2017 for forwards, which increased from USD 9.6 billion during the previous year (Chart 4 a &b).

**Chart 4: Foreign Exchange Turnover and NDF market in Korea**



Source: Bloomberg, Bank of Korea



Korea embarked on liberalisation reforms in 1980s, however, took big strides post Asian financial crisis in 1997-98 in line with the IMF adjustment programme. As part of these measures, foreign exchange transactions were liberalised, which allowed the local banks to engage in NDF transactions with non-residents. Prior to this, the development of the onshore currency derivatives market was constrained by legal requirements such as any forward transaction had to be certified as a hedge against future current account flows, the so-called “real demand principle”, which also spurred the development of a liquid offshore “non-deliverable” forward (NDF) market in the Korean Won. In 1999, as part of liberalisation measures, this restriction was lifted and a lot of activity moved onshore, leading to the convergence of the offshore and onshore prices (IMF, 2004). This resulted in sharp increase in NDF transactions between onshore banks and non-residents for both hedging as well as speculative purposes. Amidst likely possibility of turmoil in foreign exchange market, the central bank implemented regulations in January 2004 governing Korean banks NDF positions with the non-residents directed at restraining any potential selloffs. However, these restrictions were abolished in April 2004 as speculative activity was assessed to have reduced significantly.

KRW is almost a non-restricted currency, provided the investor holds an Investment Registration Certificate (IRC) issued by the Financial Supervisory Services (FSS) in Korea. The IRC allows an offshore investor to invest in onshore securities and provides near non-restricted currency rights, barring any holding of short selling position in onshore KRW account.

For non-residents investors who do not hold IRS, USD/KRW remains a highly regulated market. Any onshore/offshore transactions need to be approved by the appropriate authorities and must have proof of underlying. For multinational clients that repatriate dividends, documentation with proof of underlying must be in place. Further, ceilings are imposed on foreign exchange derivatives transactions of foreign as well as local banks, which came into existence as a prudential measure to mitigate the adverse impact of volatile capital flows.

Ahead of the 2008 financial crisis, Korean economy experienced huge build-up of short-term external debt led by foreign exchange derivatives positioning of banks on account of over-hedging undertaken by Korean corporations as well as likely carry trades in anticipation of appreciation of domestic currency. Both these activities were funded using offshore dollar borrowing and posed serious difficulties at the time of global dollar liquidity crunch during financial crisis. With a view to prevent recurrence of the any such episode triggered by volatile capital flows which resurged from 2009, over-hedging was specifically prohibited, and limits were imposed on Foreign exchange derivatives activity of banks in relation to their capital. Liberalization in KRW has been continuing for decades with the last one completed in December 2007 whereby prior approval requirements for some capital account transactions was abolished. Even onshore participants can freely participate in the NDF markets thereby providing onshore liquidity to Non-Residents as long as the hedges are booked as NDF. Essentially, KRW is a fully convertible currency but is only tradable on NDF basis offshore.

### ***Malaysia***

Malaysia had liberal foreign exchange policies until Asian financial crisis with regard to cross border transactions involving Malaysian Ringgit (MYR). Following the crisis, offshore trading of MYR was banned. However, grace period was notified for depositors to repatriate their offshore deposits back to Malaysia and the adoption of fixed exchange rate policy in 1998 - a significant move, whilst imposing selective capital controls. All these measures were intended at ceasing offshore activity which contributed to the excessive pressure on currency despite relatively stronger fundamentals. Although, Malaysia imposed cross border restrictions after the Asian crisis, evolution of NDF market in MYR was initially inhibited by comprehensiveness of regulations as well as its effective enforcement by the authorities (Ishii, 2001). Further, absence of reference rate



Assessing the overwhelming impact of NDF activities which has the potential to undermine financial stability, BNM took a number of measures in 2016 to eliminate speculative transactions in order to ensure appropriate price discovery and orderly functioning of onshore market. These measures includes reinforcement of non-internationalisation policy for Ringgit, steps to improve the onshore pricing mechanism and deepen the domestic forex market. After prohibiting banks from quoting fixing orders used to settle offshore trades, the central bank revised the methodology to compute onshore reference rate to account for transacted deals from mid-2016. Further, BNM imposed a ban on ringgit NDF trading in November 2016 and reminded local banks that ringgit remains a non-internationalised currency and therefore any offshore trading is not recognized. At the same time, BNM strengthened its monitoring to ensure compliance to Foreign exchange administration rules (FEA) rules by market participants on non-involvement in facilitating NDF transactions. Subsequently, financial markets committee (FMC) instituted in mid-2016 laid down a series of developmental measures for onshore market aimed at allowing better market access and greater hedging facilities to market participants (Table 5).

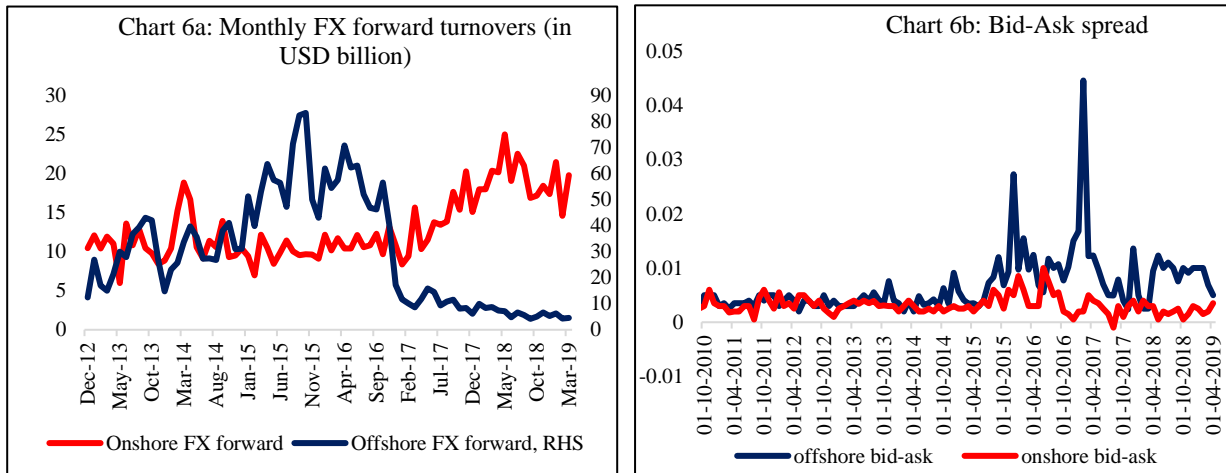
**Table 5: Developmental Measures Relating to Foreign Exchange Market**

<b>Jul-16</b>	<b>Dec-16</b>	<b>Apr-17</b>
<p><b>Adopting global best practices</b></p> <ul style="list-style-type: none"> <li>• Transaction based KL USD/MYR reference rate,</li> <li>• Extension of official closing hour for onshore Ringgit rate.</li> </ul>	<p><b>Rebalance onshore FX demand and supply</b></p> <ul style="list-style-type: none"> <li>• 25% retention of export proceeds in foreign currency,</li> <li>• Trade settlement among residents in Ringgit only,</li> <li>• Streamline onshore and offshore foreign currency investment limit.</li> </ul> <p><b>Promote FX risk management onshore</b></p> <ul style="list-style-type: none"> <li>• Active hedging below RM6t million of net open position,</li> <li>• Active hedging for institutional investors,</li> </ul>	<p><b>Additional FX risk management practices</b></p> <ul style="list-style-type: none"> <li>• Streamline passive and dynamic hedging flexibilities for investors,</li> <li>• Active hedging for corporations.</li> </ul>

- Expansion of appointed overseas office framework.

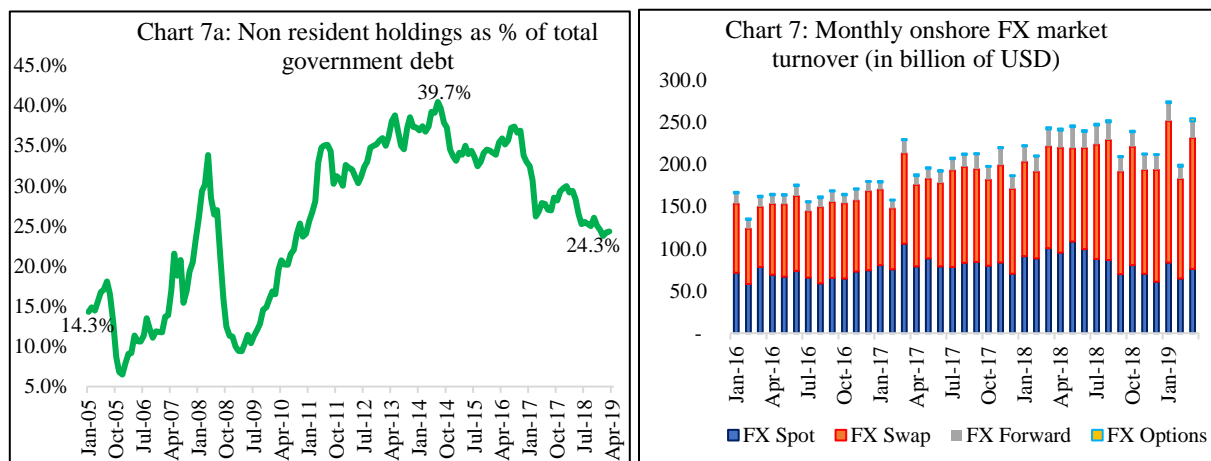
In an immediate impact, reinforcement of restrictions on USD-MYR NDF market resulted in significant outflows from local bonds in Malaysia. However, as a positive impact, with the bout of capital outflows following ban on NDF transactions, composition of non-resident holdings has shifted towards more stable and long-term investors, thereby, reducing the risk exposure to global impulses. Further, the disruptive influence from NDF market subsided and onshore foreign market continues to register higher average daily volume. These measures have helped in increasing the depth and liquidity of the foreign exchange market as evidenced by declining volatility and narrowed bid-ask spreads in onshore market. The decline in offshore volumes has resulted in widened bid-ask spread (Chart 6 a & b).

**Chart 6: Malaysia: Monthly FX forward volumes and Bid-Ask Spread**



Source: BNM, Reuters and Bloomberg.

**Chart 7: Non-resident holdings of total government debt and Monthly FX turnover**



Source: BNM and HSBC.

## Indonesia

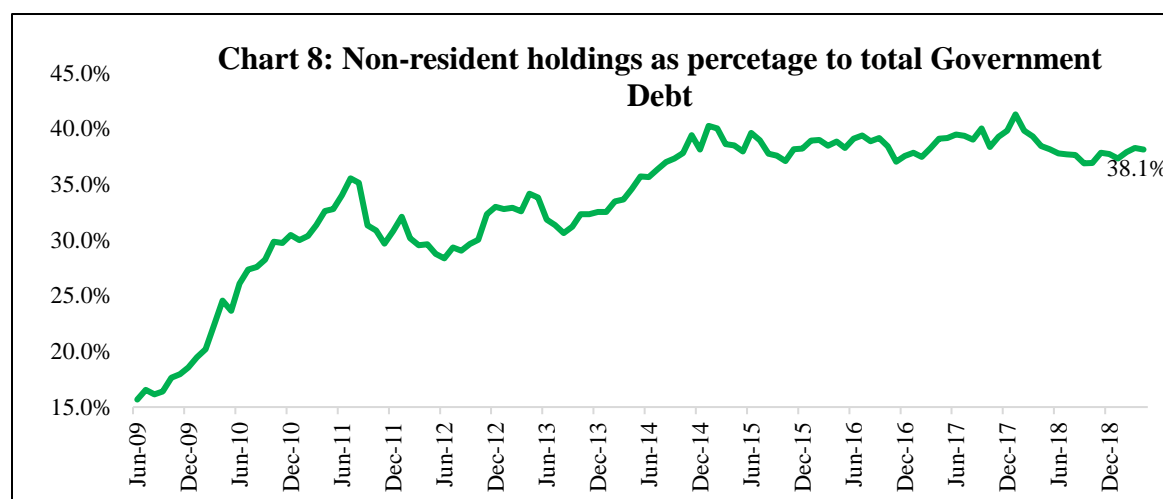
The development of NDF market in Indonesia Rupiah traces back to the year 2001, when Bank Indonesia (BI) prohibited onshore banks from lending to non-resident accounts in an attempt to reduce the speculative pressure on the Indonesian Rupiah (IDR). These restrictions paved the way for development of offshore rupiah NDF market to cater to the demand of international investors.

Prior to this, an active offshore deliverable market existed for IDR following the pursuit of liberalisation policies beginning as early as 1970s, which allowed the IDR to be freely convertible and at the same time permitted its internationalisation. Consequently, the international use of rupiah increased but was confined mostly to financial transactions mainly due to limited invoicing of trade-related transactions in IDR terms. This easy access to rupiah from onshore centres due to internationalisation allowed non-resident to speculate on the currency during the 1997 crisis in Asian countries. As a result of heightened activity in times of stress, exchange rate volatility increased, making it difficult for the central bank to maintain stability of rupiah. In response to the crisis, the currency was freely floated replacing the intervention band but weakness in the currency and high volatility continued to persist compared to currencies of other Asian countries during the first three years of its floating rate regime. Taking cognizance of this disparity, the central bank began to evaluate the extant regulations relating to rupiah transactions with non-residents. Thereafter, during the year 2001, the BI imposed extensive regulations limiting non-resident



rupiah transactions and shrinking the pool of offshore rupiah funds with the potential to be used for speculation identifying spill overs from offshore market as conduit of excessive volatility.

In general, Indonesia has opened up its domestic bond markets for non-residents completely with no entry/exit barriers except having to appoint a local custodian. Foreign exchange hedging is allowed only with underlying documentation/asset in place for non-residents. On the portfolio equity investments, regulation clearly provides that a listed company is exempt from any foreign investment restrictions. However, there are sectoral restrictions on FDI in Indonesia which are decided by BKPM (Investment Coordinating Board in Indonesia) which provides a DNI list (Government's negative investment list). The share of non-residents in Indonesia Government Bonds has been increasing over years from a mere 15.70 per cent of the total government bonds in June 2009 to 38.10 per cent in April 2019 (Chart 8).



Source: HSBC

Research from BI in 2012 found disproportionate impact of NDF market to spot market during the period 2008-11. Results suggests that there is evidence of unidirectional mean spill-over from NDF to both spot and forward rupiah markets with an exception of Europe crisis. On volatility spillover, the study obtained significant results from NDF market to spot market for entire period. However, in crisis situation, the study found interdependence between volatility in offshore NDF and onshore spot rate changes, while information transmission is only valid from NDF to forward rate changes, not the other way around (Cadarajat and Lubis, 2012).

To reduce the unwarranted influence of NDF market on spot market, BI took initiatives beginning the year 2014 to bridge the gap between onshore and offshore rupiah rate. In 2014, the central bank

with the help of key offshore centre, Singapore moved the foreign exchange rate fixing that is used to settle the NDF contracts to the onshore market. Earlier, Association of Banks in Singapore (ABS) and the Singapore Foreign Exchange Markets Committee (SFEMC) was publishing IDR reference rate, computed as weighted average of 1-month NDF trades done by then Singapore based brokers. Post March 27, 2014, BI started publishing reference rate termed as Jakarta Interbank Spot Dollar Rate (JISDOR) which was to be used to settle existing and new contracts. Jakarta Interbank Offered Rate (JIBOR) is more transparent in a way that it is based on actual transactions being done in the inter-bank onshore market.

In late 2018, BI in its efforts to further deepen the domestic foreign exchange market and to mitigate IDR exchange rate risk, BI established the Domestic Non-Deliverable market (DNDF) for IDR. It will serve as a parallel market to NDF with the key difference that it is rupiah settled in onshore market. This alternative tool will provide foreign investors additional avenues to hedge their IDR exposure without principal exchange other than enhancing the central bank's intervention capabilities. At this juncture, the market is relatively new and hence significant impact assessment of the same cannot be outlined. However, currently Indonesia has not been able to move significant turnovers from offshore NDF to Domestic NDF market.

### ***Brazil***

Brazilian Real is the second most actively traded currency in NDF market after the Korean Won with an average daily turnover of USD 18.7 billion as per BIS and USD 15.4 billion according to the London survey. The growth and development of NDF market is attributed to the existence of large and well developed foreign exchange futures market.

The development of derivatives market in Brazil is attributed to the hedge culture that has been prevalent due to periods of high and persistent inflation and exchange rate volatility amidst political shocks. During 1980s and early 1990s, inflation was soaring above 100 per cent, which peaked over 2700 per cent in 1993 and thus promoted widespread indexation to manage the inflation risks. Subsequently, the “Real plan” which comprised of fiscal and monetary reform and introduction of new currency helped to bring down inflation and stabilise the currency. Amidst stable macroeconomic conditions, private sector was encouraged to borrow foreign funds at a

lower cost and the consequent surge in foreign indebtedness during 1994 to 1998 led the central bank issue dollar denominated securities as a hedging instrument. Following the currency crisis in 1999, the Brazilian Real was floated amongst adoption of new set of economic policies which was also accompanied by providing unrestricted access to non-residents to financial markets (including derivatives) in 2000.

The distinguishing feature of Brazilian foreign exchange is the non-deliverable nature of derivatives contracts without any significant limitations, even though participation in deliverable instruments *i.e.*, spot, outright forwards and foreign exchange swaps is constrained. Only chartered banks are authorised by the central bank to hold foreign exchange spot positions. All these factors have facilitated the growth of foreign exchange futures market over spot market, which is closed and highly restricted. Against the backdrop of large and sophisticated foreign exchange derivatives with high depth and liquidity, foreign exchange futures prices have key influence on spot price as suggested by various studies (Ventura and Gracia 2009, Kaltenbrunner, 2010 and Chamon and Gracia, 2013). As pointed out by Kaltenbrunner, 2010, the existence of a deep futures market has made it possible for foreign banks with branches in Brazil to sell real offshore (NDF) and simultaneously hedge their real exposure in the onshore futures market. For the Brazilian Real, derivatives, especially offshore NDFs are the main vehicle for investors looking to implement carry trades (Santaelaa, 2015).

### ***Taiwan***

The NDF market for Taiwanese Dollar (NTD) existed since 1990s and the central bank permitted domestic and foreign legal entities to trade in NTD NDF market with authorised banks in 1995. This came after opening up of local securities market to foreign institutional investors (QFII) in 1990 which allowed FIIs meeting certain requirements to apply for investment in Taiwan's stock market. Subsequently, significant relaxations were made, and security market was completely opened up with the abolition of QFII scheme. While onshore institutions were eligible for trading in NTD NDF, the central bank initially imposed limits on trading position in NTD NDF to one third of their total foreign exchange position with a view to prevent speculative pressure.

Following the Asian financial crisis in July 1997, the central bank introduced measures to regulate NDF market with only authorized banks permitted to carry NDF trading with other authorised counterparts and their overseas branches or headquarters. This move came after the speculative positioning which was believed to cause sharp depreciation of the NTD. The central bank outlined that although there was ceiling on NTD NDF trading positions, some banks were engaged in selling NDFs to foreign entities and simultaneously created long NDFs positions and shorted DFs with domestic entities, in a bid to offset the NDF trading positions on their balance sheets and thus creating more room for further NDF trading (Bank of Taiwan, Annual Report, 2014). The central bank has intervened in foreign exchange market to curb speculative activity, also post 2008 financial crisis, when emerging markets witnessed resurgence of capital flows. The measures introduced then by the central bank focused on reducing local banks' foreign exchange positions in both onshore and NDF markets, including discouraging non-resident deposits by imposing punitive reserve requirements with an intent to limit local banks' capacity to provide liquidity to NDF markets. The National Supervisory Commission also took steps to limit non-resident investments in local bank deposits and government securities.

However, recognising the dominance of foreign banks in NDF trading activity, the central bank announced that overseas branches of domestic banks are eligible to apply for NTD NDF business from September 2014. In current scenario, whilst, there are no restrictions on the fixed income investments in general, but investments in local/domestic bonds by non-residents cannot exceed 30 per cent of their investments in equity instruments which has kept the investments in local bonds low by non-residents, who tend to take exposure in USD bonds issued by Taiwan offshore. Moreover, ability for local banks' to access the TWD NDF market up-to 20 per cent of each banks' net open position results in partial integration between onshore and offshore markets. Since TWD is not fully convertible, any onshore spot transactions must be declared to the central bank and in most cases require supporting documentation which keeps the differential between onshore and offshore rate.

To conclude, cross county experience shows that increasing role of any economy globally is accompanied by emergence of growing offshore trading of their currencies in the presence of restricted access or cumbersome regulations. Additionally, emerging market economies cannot afford to have unrestricted access to their onshore market as revealed by the studies of Indonesia

and Malaysia during the Asian crisis 1997, which exposed them to global impulses. Most of these countries have followed a gradual approach surrounding non-resident access to their forex markets. As emerging markets open up and become sophisticated in respect of forex markets, the case study of the Republic of Korea exemplify that country-specific factors have to be considered when designing the financial regulatory toolkit aimed at curbing foreign and domestic agents' speculative strategies in the search for yield. The experience of Brazil suggests deepening onshore hedging market will go a long way in promoting the price setting role of onshore market over its offshore counterparts. Indonesia has recently introduced domestic NDFs in line with Brazil. Additionally, the experience of Korea and Taiwan suggests that the participation of domestic banks ensures that any price differential between the two segments is arbitrated. However, in both the cases participation is governed to evade any potential build-up of vulnerabilities on banks' balance sheet.

## Chapter 3<sup>4</sup>

### Linkages between Offshore NDF and Onshore Rupee Markets: New Evidence

#### Overarching Motivation

India's trade integration with the rest of the world began to rise sharply from the turn of the millennium. Between 2000 and 2012, total trade (imports + exports) as a percentage of GDP more than doubled from 26% to 56%, before moderating to 43% in 2018, as the effects of de-globalization took over post the global financial crisis. Simultaneously, policymakers persevered with gradual but consistent capital account liberalization. Unsurprisingly, therefore, currency markets – both to trade and hedge – rose in tandem with the growing external integration. The onshore Rupee market<sup>5</sup> monthly average turnover has grown from USD 60 billion in 2000 to USD 687 billion in 2018. However, given data limitations, uncertainty still exists on the exact size of the NDF market, and how it has grown relative to the onshore market. As Chapter- 2 illustrates, the BIS Triennial Survey finds average daily turnover of Rupee NDF in 2016 was USD 16 billion. However, the Bank of England's Semi-Annual Forex Turnover Survey finds average daily turnover of Rupee NDF in London increased from USD 8 billion in October 2016 to USD 23 billion in October 2018.

The idea behind trying to size the NDF market – and therefore implicitly compare its size and growth to onshore markets – is, in part, to try and make sense of how important a role NDF markets play in the “price discovery” of the Rupee<sup>6</sup>. With the Indian Rupee's “Forward” price being determined across segmented markets – both the onshore deliverable forward market and the offshore non-deliverable market -- the key is to ascertain the relative importance of each of these markets in driving price discovery.

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<sup>4</sup> This chapter is a joint work of Shri Sajjid Chinoy, Chief Economist, J. P. Morgan India and Shri Harendra Behera, Assistant Adviser, Department of Economic and Policy Research, Reserve Bank of India.

<sup>5</sup> Spot, OTC & ETCD.

<sup>6</sup> To be sure, estimating the size of the NDF market is important not just for the influence it exerts on price discovery, but also instructive in understanding the cumulative “view” on the Rupee, and how much is expressed onshore versus offshore. This is because, if NDF volumes are substantial, policymakers may desire to shift these volumes on shore both to (i) deepen the onshore market, and (ii) move this business/economic activity on shore.

However, simply using (offshore versus onshore) volumes as a means to proxy relative price discovery is imperfect at best. The ability of NDF volumes to drive price discovery, for any given quantum of volumes, is ultimately a function of how inter-connected onshore and offshore markets are, and the ability of economic agents – hedgers, arbitrageurs, speculators -- to link these markets.

For example, if NDF markets have grown sharply, but it is found that price linkages between the two markets are still tenuous or have not increased commensurately with volumes, -- say, because arbitrage opportunities between the two markets have not grown in tandem -- then the growth of NDF markets, and the consequent “loss of control” will be of less concern to Indian policymakers. Conversely, if price linkages have grown over time – proportionately to volume increases – then policymakers would rightly worry about the growing role of NDF markets in driving price discovery.

The fundamental motivation for this chapter is therefore to empirically examine price linkages between the NDF and onshore markets, as this is the ultimate manifestation of the influence that NDF markets exert.

### **The Question**

This chapter seeks to ask two fundamental questions. Is there a stable, long-term equilibrium relationship between onshore and offshore markets? Second, if so, what is the directionality of influence? Do NDF markets drive onshore markets? Or do onshore markets drive the NDF market? Or is the influence bi-directional?

Furthermore, we try and empirically answer this questions across two dimension. First, what is the direction and quantum of influence during “normal times versus “stressed times”? Second, what is the relationship, and how does it change, when assessing “average returns” (means) versus “volatility” (variance)?

### **Specific Motivation to India**

While there is a meaningful, and growing, literature trying to empirically ascertain price linkages between the onshore and offshore markets around the world, the literature that focuses on India remains sparse, dated and inconclusive. This constitutes the specific motivation for this chapter.

The literature studying NDF markets around the world has steadily grown over time. For example, much work has been done on Asian NDF markets and their relationship with onshore markets, both for the region as a whole (Ma et al. 2004; Colvecchio et al. 2006; Wang et al 2007; Gu and McNelis, 2009) and individual currencies, such as the Korean Won (Park, 2001), the Indonesian Rupiah (Cadaraajat and Lubis, 2012), the Chinese Yuan (Fung et al. 2004; Hideki, 2006; Colavecchio and Funke, 2008; Huszár et al. 2016; Song and Gao, 2016; McCauley and Shu, 2018) and the Indian Rupee (Misra and Behera, 2006; Guru, 2009; Behera, 2011; Darbha, 2012; Goyal et al 2013).

Results remain mixed. Some studies find the NDF markets influence the evidence onshore forward market (Park, 2001; Wang et al. 2007; Cadaraajat and Lubis, 2012); others find they influence onshore spot markets (Behera 2011, Goyal et al 2013), while some document its influence on onshore futures markets (Behera 2011). Conversely, some studies also find the direction of influence runs from onshore markets to NDF markets (Wang et al 2007; Misra and Behera, 2006).

In the case of India, there are only a few studies on this subject – with the last one back in 2013 – and the results are mixed, and inconclusive. For example, Misra and Behera (2006) find that it's the onshore markets that influenced the NDF market between 2004 to 2007, largely because of restricted participation of domestic players in the offshore market. In a subsequent study, Behera (2011) found that there are volatility spillovers from the NDF market to spot and forward markets in India and the magnitude of volatility spillover has become higher after the introduction of currency futures in 2008. Guru (2009) finds qualitatively the same results, and the role of currency futures in India. Darbha (2012) find that offshore markets play an important role in price discovery. Finally, in the most recent work on India, (Goyal et al. 2013) find evidence of a long-term relationship between NDF and onshore markets and find evidence that the relationship is bidirectional as both markets adjust to any deviations from the equilibrium state.

What's clear, however, is the evidence on India is patchy, inconclusive and dated, with the last study conducted more than 6 years ago.

### **Some Theory**

Recall, if there are no capital controls, forward rates are tied down by the no-arbitrage, “covered interest parity” hypothesis:



$$F = S(1+r)/(1+r^{\$})$$

Where F is the Forward rate, S is the spot rate, r is the relevant interest rate on the home currency and  $r^{\$}$  is the equivalent dollar rate. The equation holds when (i) there is capital account convertibility, and there are no barrier for cross-border transactions, and (ii) there is equivalent credit risk in the assets across the two jurisdictions.

However, if there are capital-account barriers, we would expect F to only be approximated by the equation above, and not hold exactly.

$$\text{So, } F \sim S(1+r)/(1+r^{\$})$$

Similarly, the NDF rate should be anchored by the onshore forward rate to the extent that arbitragers can link these markets.

$$\text{So NDF} \sim F \sim S(1+r)/(1+r^{\$})$$

Furthermore, the sign of the onshore-offshore yield spread can indicate the underlying market pressure on the currency. If the domestic interest rate is higher than the NDF implied yield, it implies appreciation pressures on the currency. However, capital controls may restrict inflows to close the gap. Similarly, a lower domestic interest rate than implied by the NDF yield would suggest depreciation pressures, while a zero spread would likely reflect an absence of market pressure on both the domestic and offshore market.

All told, however, we would expect that both onshore and offshore markets would have a long-run relationship and there is the likelihood of “mean” spillovers on a regular basis. Furthermore, hedging, arbitrage and speculative activities may also result in volatility spillovers from one market to another on various occasions.

### **Testing for “Mean” Spillovers**

We start, therefore, by empirically testing for linkages between onshore (spot and forward prices) and offshore (NDF forward prices) markets. The goal is to assess:

1. If there is a stable long-term relationship between onshore and offshore markets?
2. Which drives which? Do onshore prices drove offshore prices? Or vice versa?

- To see whether the direction of influence is a function of context? Are the results different for “normal” times versus “stressed periods” (i.e. taper tantrum, emerging market stress)?

### Non-stationary but co-integrated

So as to decide the empirical course of action, we start by testing whether the key variables of interest (i) the Onshore Spot Exchange Rate (SPOT), (ii) the Onshore Forward Rate (FORWARD), and (iii) the Offshore Non-Deliverables Forward exchange rate (NDF) are stationary.

Augmented Dickey Fuller Tests reveal that all three variables are non-stationary in levels. However, as Figures 1 and 2 suggest, the spreads between SPOT and NDF and ONSHORE FORWARDS and NDF are mean-reverting, suggesting the presence of a long-term relationship, and suggesting stationarity in the first differences.

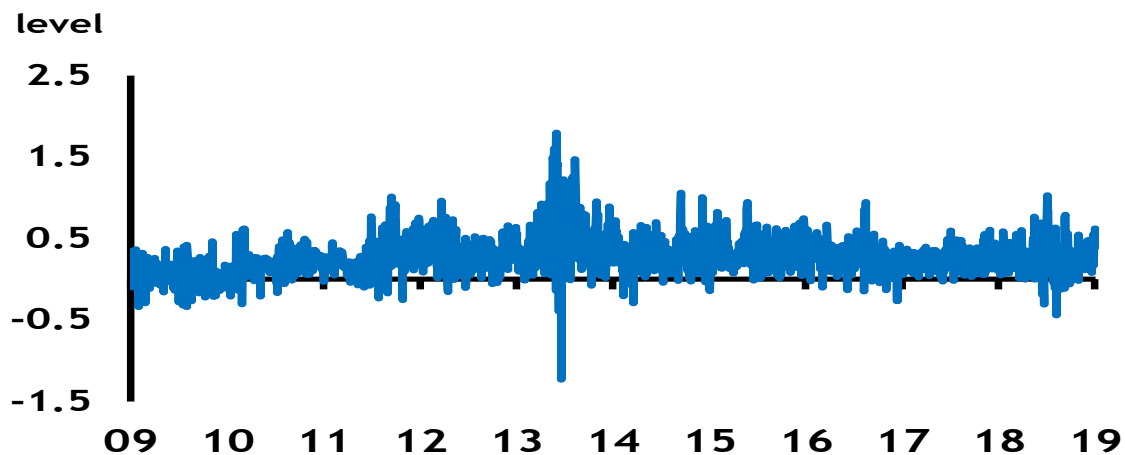
**Table 1: ADF unit root test**

Null Hypothesis: Variables have a unit root

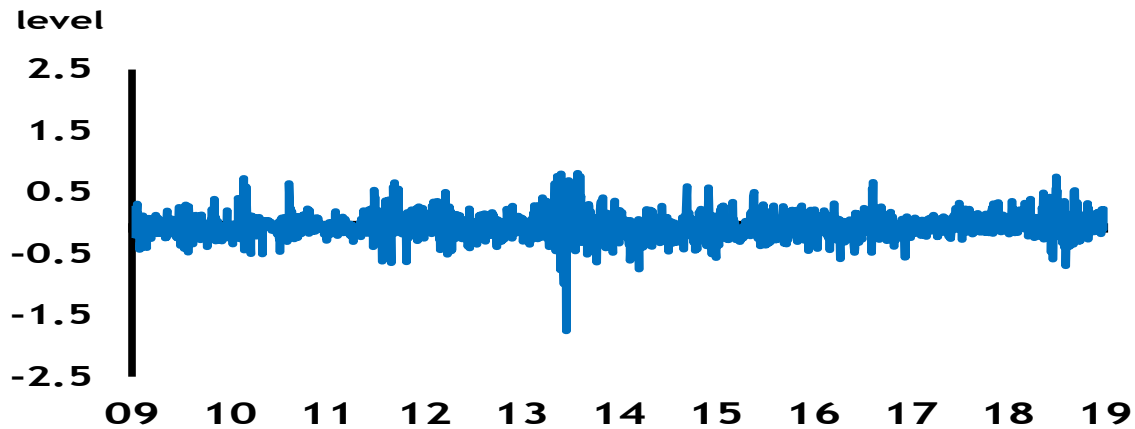
	ADF t-Stat	Prob
Spot	-0.6	0.9
Augmented Dickey-Fuller test st	-0.7	0.8
Augmented Dickey-Fuller test st	-0.7	0.8

Formal co-integration tests –Tables 2 and 3 – confirm that both pairs of variables NDF-SPOT and NDF-FORWARD – are indeed co-integrated. The Max Eigenvalue tests reveal there is at least one co-integrating vector that can be found at the 5% level.

**Figure 1: Spreads (1M NDF- Spot)**



**Figure 2: Spreads (1M NDF- 1M Forward)**



**Table 2: Co-integration SPOT and NDF**

Sample (adjusted): January, 2005 to March, 2019

Included observations: 2608 after adjustments

Trend assumption: No deterministic trend (restricted constant)

Series: LOG(SPT) LOG(NDF)

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized	Trace			
No. of CE(s)	Eigenvalue	Statistic	Critical Val	Prob
None *	0.11	313.10	20.26	0.00
At most 1	0.00	2.10	9.16	0.76
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized	Max-Eigen 0.05			
No. of CE(s)	Eigenvalue	Statistic	Critical Val	Prob
None *	0.11	311.00	15.89	0.00
At most 1	0.00	2.10	9.16	0.76

Both Trace and Max-eigenvalue tests indicates 1 cointegrating eqn(s) at the 0.05 level

**Table 3: Co-integration FORWARD and NDF**

Sample (adjusted): January, 2005 to March, 2019

Included observations: 2608 after adjustments

Trend assumption: No deterministic trend (restricted constant)

Series: LOG(FORWARD) LOG(NDF)

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized	Trace			
No. of CE(s)	Eigenvalue	Statistic	Critical Val	Prob
None *	0.18	530.51	20.26	0.00
At most 1	0.00	2.17	9.16	0.74
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized	Max-Eigen 0.05			
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob
None *	0.18	528.35	15.89	0.00
At most 1	0.00	2.17	9.16	0.74

Both Trace and Max-eigenvalue tests indicates 1 cointegrating eqn(s) at the 0.05 level

### Stable Long Term Relationship

The finding of co-integration allows us to use ordinary least squares (OLS) to estimate the long-term relationship between SPOT and the NDF as well as FORWARD and the NDF. In particular, using the equation below, we estimate parameters  $\beta_0$  and  $\beta_1$ , which tells us about the long-term relationship between SPOT and NDF.

$$\log(\text{spot})_t = \beta_0 + \beta_1 \log(\text{NDF})_t + e_t$$

We then repeat the same exercise between the FORWARD and the NDF.

### But what’s driving what? An “Error Correction Mechanism” approach

While establishing a long-term relationship is important, a finding in the affirmative will not come as a particular surprise. Instead, the real question is whether onshore prices drive offshore prices, or vice versa? The natural framework to answer this is the work-horse Error Correction Mechanism (ECM) approach used by Engel and Granger in 1987, where changes in each of the variables are run on changes on its own lags and the lags of the other variables.

$$dlog(spot)_t = \alpha_0 + \alpha_{spot}(e_{t-1}) + \sum_{i=1}^n \alpha_{11}(i)(dlog(spot_{t-1})) + \sum_{i=1}^n \alpha_{12}(i)(dlog(NDF_{t-1})) + \varepsilon_{st} \quad (1)$$

$$dlog(NDF)_t = \alpha_0 + \alpha_{ndf}(e_{t-1}) + \sum_{i=1}^n \alpha_{21}(i)(dlog(spot_{t-1})) + \sum_{i=1}^n \alpha_{22}(i)(dlog(NDF_{t-1})) + \varepsilon_{nt} \quad (2)$$

For example, as Equation 1 lays out, changes in (the log of) SPOT – the dependent variable -- are run on its own lags and the lags of NDF. Equation 2 – in which the dependent variable is NDF -- does the same for NDF. Because both variables are co-integrated – as shown above – using OLS to estimate these coefficients, using standard criterion to choose lag lengths (e.g. Akaike Information Criterion), and standard F-Tests are all valid.

The coefficients of interest in the above equation are  $\alpha_{spot}$  and  $\alpha_{ndf}$  – the ECM terms -- because these coefficients tell us, when the system is in disequilibrium, the direction and the speed of adjustment back to equilibrium. This will determine the directionality of influence.

For example, if  $\alpha_{spot} = 0$  and if all values of  $\alpha_{12}(i) = 0$  then  $dlog(NDF)$  does not granger cause  $dlog(spot)$ . In contrast, if the value of  $\alpha_{spot}$  is negative and statistically significant, that implies that (the log of) NDF in the long run “ganger-causes” spot market movements. The same intuition applies for equation 2 where NDF is the dependent variable, and we test for convergence between the NDF rate and the onshore forward rate. Direct convergence requires  $\alpha_{spot}$  and  $\alpha_{ndf}$  to be oppositely sign. Intuitively, the larger the value of  $\alpha$ , the faster is the speed of adjustment.

In summary, while the  $\beta$ 's tell us about the existence and strength of a long run relationship between onshore and offshore markets, the  $\alpha$ 's tell us about whether (i) the directionality of influence and (ii) the speed of convergence from disequilibrium.

We therefore use this approach to test for linkages between both sets of variables – NDF and onshore SPOT – and NDF and onshore FORWARDS.

## Data

We use end-of- India-day closing values for the onshore spot exchange rate, for the 1-month a forwards, and the corresponding 1-month non-deliverable-forward (NDF) rates. We use daily data and our full sample runs from 2009 through 2019.

## Results: Full Sample

Table 4: ECM and Long run coefficients (Full sample)

Time Period: April, 2009 to March , 2019

	$\alpha_{spot}$	$\alpha_{forward}$	$\alpha_{ndf}$	$\beta_1$	$\beta_2$
Onshore Spot and NDF	-0.18*		0.07**	0.99*	
Onshore Forwards and NDF		-0.32*	0.23*		1.00*

The first row are the linkages between the onshore spot and NDF markets, while the second row is that of the onshore forwards and NDF market.

In both cases the betas ( $\beta$ ) are positive, statistically significant and with a magnitude very close to or at 1, implying an almost one-for-one movement between both the markets in the long run. For example, the estimated  $\beta_1$  of 0.99 suggests that for a 1% increase in NDF rates there is 0.99% increase in spot rates in the long run. Meanwhile, between onshore FORWARDS and NDF, there is a complete pass-through in long run. More generally, a beta ( $\beta$ ) close to 1, suggests there is no permanent friction between onshore and offshore markets in the long run.

### Convergence

However, the real interest is in the alphas. In the first case both  $\alpha_{spot}$  and  $\alpha_{ndf}$  are statistically significant and oppositely signed. This suggests that they both converge towards each other. Put differently, the NDF rate moves towards the onshore SPOT rate, and vice-versa. In other words, there is a bi-directional relationship between both variables. The magnitude of the coefficients (0.07-0.18) suggests a moderate speed of convergence to the long-run equilibrium, when a shock causes the system to go into disequilibrium.

The same results are obtained when studying linkages between the onshore forward and NDF markets. Both  $\alpha_{forward}$  and  $\alpha_{ndf}$  are statistically significant, oppositely signed (suggesting they converge towards each other), with coefficients that are slightly larger than the SPOT-NDF pair. This suggests that both NDF and the onshore FORWARD rates influence each other, and gradually converge towards their long-term relationship when hit by a shock – a speed of adjustment that is modestly faster than the NDF-SPOT relationship.

For the full sample as a whole from 2009 to 2019, we find that there is a bi-directional relationship, *on average*, between SPOT and NDF and FORWARD and NDF, and that all variables converge gradually to their long-term relationship.

### Results: Stressed Times

Our results should be thought of as “average” results across the entire time period. But are these results a function of context? Does the direction of influence change, for example, during periods of currency stress versus periods of calm? We explore this next.

To test for this, we start by isolating clearly-identifiable periods of stress, *ex post facto*, in our sample. Two episodes naturally come to mind, the taper tantrum of 2013 (where the Rupee depreciated 26% between May, 2013 and August, 2013) and the emerging market (EM) turmoil – characterized both by the Fed raising rates and oil prices firming – such that the Rupee depreciated almost 10% between August, 2018 and October, 2018.

### 2013: The Taper Tantrum

We test interlinkages from the start of May to the end August, 2013 – during the Taper Tantrum – when the Rupee was under intense pressure, and easily amongst the worst performing currencies in the emerging market (EM) universe. Results are presented in Table 5 below.

Table 5: ECM and Long run coefficients

Time Period: May, 2013 to August, 2013					
	$\alpha_{spot}$	$\alpha_{forward}$	$\alpha_{ndf}$	$\beta_1$	$\beta_2$
Onshore Spot and NDF	-1.1*		-0.28	0.94*	
Onshore Forwards and NDF		-0.8***	0.15		0.97*

As one can observe,  $\alpha_{ndf}$  in both equations is statistically insignificant. What this implies is onshore spot and forward rates were playing very little role in influencing NDF rates<sup>7</sup>. In contrast,  $\alpha_{spot}$  and  $\alpha_{forward}$  are correctly signed and statistically significant (the former at the 1% level and the latter at the 10% level), which suggests it was the NDF rate that was driving the onshore spot and forward rates. Interestingly, the speed of adjustment is much faster for onshore spot rates in this sample (-1.1) compared to the full sample (-0.18) and also relative to the onshore forward market (-0.8). An

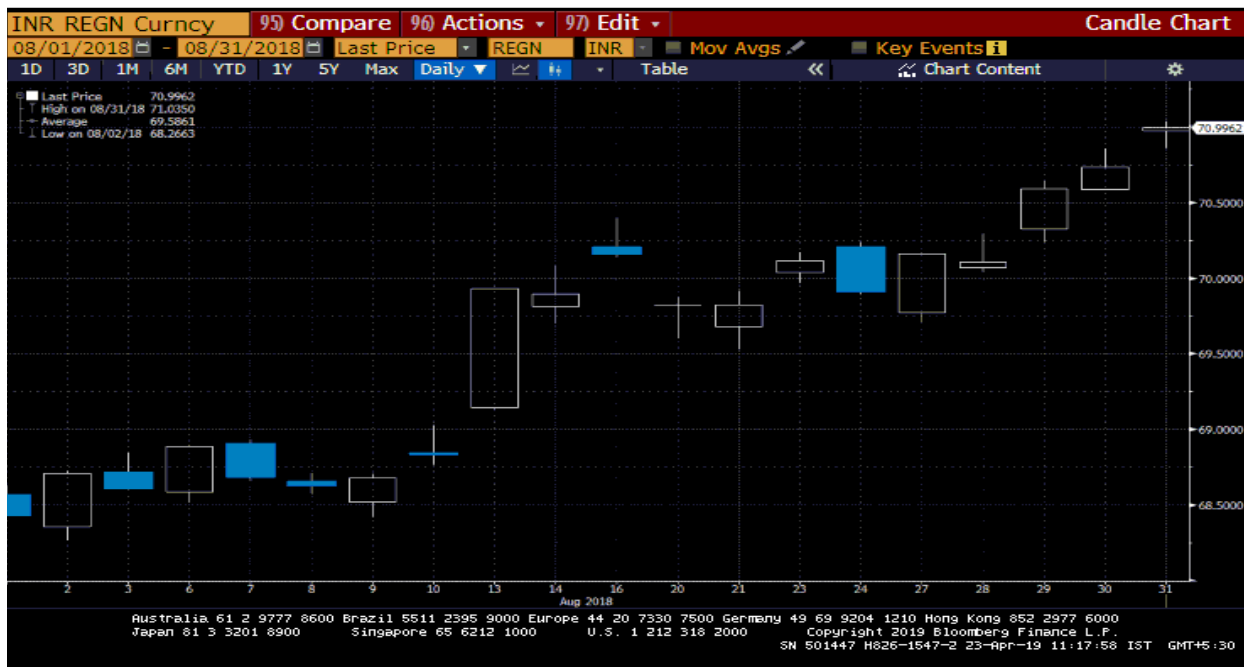
<sup>7</sup> In fact onshore spot and forward rates do not granger cause NDF as none of the lags of  $\alpha_{21}(i)$  in equation 2 are statistically significant during this period.

ECM (alpha) coefficient of greater than 1, suggests the witnesses an oscillating convergence. Since a coefficient greater than 1 is, prime facie, surprising, we also conduct a robustness exercise (described below) by running Granger Causality tests for this time period and find it is the NDF that Granger-causes onshore rates, and not the other way around.

This finding likely reflects the growing volumes – potentially speculative – in the NDF market in the 2013 period of stress, relative to the volumes in the onshore market. This also, prime facie, reduced the efficacy of foreign currency intervention by the central bank, because intervention was used to shape the spot exchange rate at the end of India’s business day. But because the NDF is a 24 hour market, NDF rates evolved overnight and when the Indian market opened the next day, onshore rates were influenced by NDF developments overnight. This rendered ineffective the previous day’s intervention because there was often little correlation between the closing exchange rate of the previous day and the opening rate of the next day, and therefore necessitated additional intervention the next day.

Visually, this is evident in the “gap-up” movements of the exchange rate when the Indian market opened – vis-a-vis the previous day’s close – during those three months. Figure 3, for example, captures this for the month of August 2013.

Figure 3: Gap-up opening in USD/INR (August, 2013)



Source: Bloomberg



## 2018: More of the Same

Emerging markets came under renewed stress in the summer of 2018 against the back drop of the Fed’s hiking cycle accompanied by the rally in crude prices which had surged 50% over the course of a year. As some large emerging markets – Argentina, Turkey – came under some stress, there was a contagion to all emerging markets with current account deficits, of which India was one. Between May and October 2018, the Rupee depreciated almost 10% against the U.S. Dollar.

What were the offshore-onshore linkages during that period of time? Results are presented in Table 6.

**Table 6: ECM and Long run coefficients**

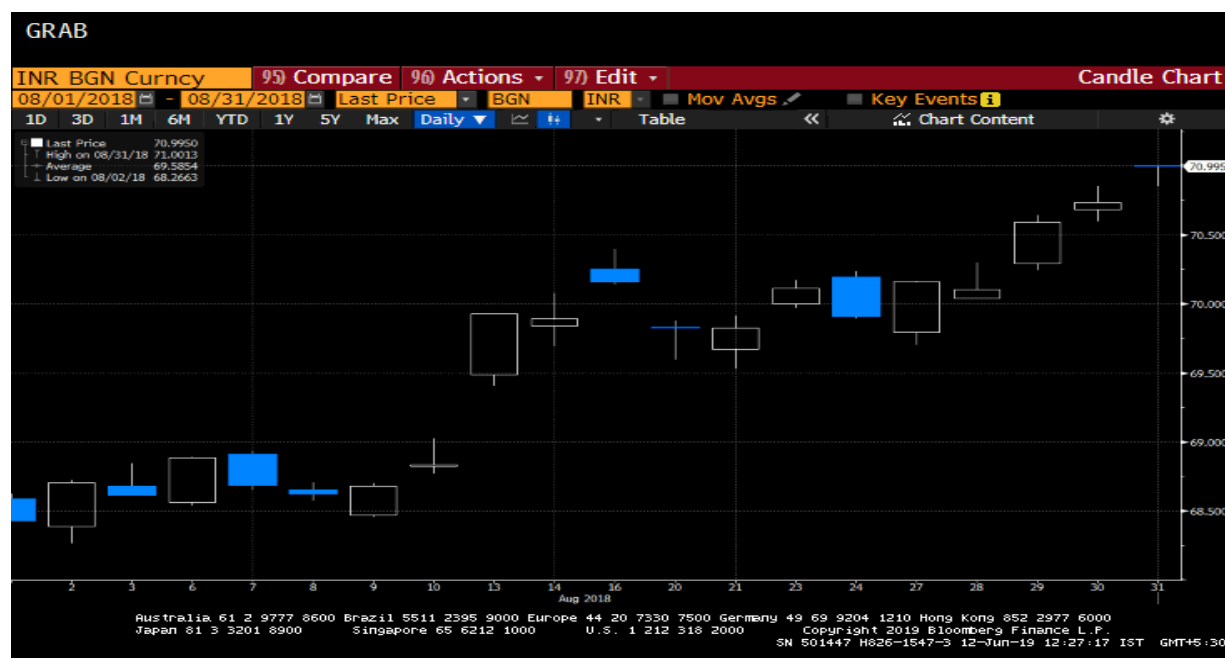
Time Period: August, 2018 to November, 2018

	$\alpha_{spot}$	$\alpha_{forward}$	$\alpha_{ndf}$	$\beta_1$	$\beta_2$
Onshore Spot and NDF	-1.0*		-0.5	0.96*	
Onshore Forwards and NDF		-1.15*	-0.5		0.96*

The linkages mimic 2013. The coefficient on whether onshore drives offshore  $\alpha_{ndf}$  is insignificant in both regressions. This re-affirms that, in line with 2013, onshore spot and forwards were not driving the NDF rate<sup>8</sup>. In contrast,  $\alpha_{spot}$  and  $\alpha_{forward}$  are both correctly signed, quantitatively meaningful, and statistically significant. This suggests that it was the NDF rate that drove the onshore spot and forward during this period, likely reinforcing the presumption that volumes rise sharply in NDF markets during periods of stress, which then become the hub of price discovery and influences onshore rates. As Figure 4 reveals, this is visible in the “gap-up” movement of the Rupee at the start of the day for several days in the month of August 2018.

<sup>8</sup> Onshore spot and forward rates does not granger cause NDF as none of the lags of  $\alpha_{21}(i)$  in equation 2 are statistically significant

Figure 4: Gap-up opening in USD/INR (August, 2018)



Source: Bloomberg

Our analysis also reveals that the speed of adjustment is very rapid relative to the baseline.

### Robustness test

The results are robust to the selection of time and tenure of the NDF. For example, instead of India end-of-day (EOD) time as the NDF cut-off, if we consider New York EOD as the NDF cut-off, there are no qualitative changes in the results. Similarly, instead of considering the 1-month-NDF, if we consider the 3-month-NDF, the results essentially stay the same. Furthermore, given the short time periods involved during stressed times (May to August, 2013 and August to November, 2018) one can argue that co-integration equations may not be relevant. We therefore also carry out Granger causality tests for these time-periods and find the direction of causality to be just above, i.e. NDF rates are driving onshore rates during stress periods and not vice versa.

### Controlling both “Mean” and “Volatility” spillovers

Thus far, our focus has been on mean spillovers. However, as found by Misra and Behera (2006), there are also potential “volatility” spillovers from the NDF market to the spot and forward market. To model the coexistence of both mean and volatility spillovers, we use a multivariate generalised autoregressive conditional heteroskedasticity (MGARCH) model. The degree of volatility

spillovers is measured by estimating dynamic conditional correlations between the markets. The empirical analysis is conducted using daily data from April 1, 2009 through March 29, 2019 and using the currency pairs for (i) NDF-Spot; (ii) NDF-Forwards; and (iii) NDF-Futures.

This model examines simultaneous interactions of conditional returns and volatilities across the markets. In this modelling framework, we examine the Granger-causality in mean and variance as discussed in Behera (2018). The results corroborate the earlier results that there is bi-directional mean spillovers between onshore and offshore markets (Table 7).

An important finding using this approach is that the impact of price spillover from offshore to onshore remains up to substantial lags while that from onshore to offshore dissipate after one day (Annexure II). This ensues from the result that the individual coefficient estimates in the mean equations of BEKK-MGARCH model are found to be statistically significant up to 5 lags in the regression of returns in onshore market on that of offshore market, while in the opposite case, the coefficient of onshore return is statistically significant only for the first lag.

**Table 7: Granger-causality tests in Mean**

Direction of Causality	Results
Spot to NDF 1-Month	Yes
Spot to NDF 3-Month	Yes
Spot to NDF 6-Month	Yes
NDF 1-Month to Spot	Yes
NDF 3-Month to Spot	Yes
NDF 6-Month to Spot	Yes
Forward 1-Month to NDF 1-Month	Yes
Forward 3-Month to NDF 3-Month	Yes
Forward 6-Month to NDF 6-Month	Yes
NDF 1-Month to Forward 1-Month	Yes
NDF 3-Month to Forward 3-Month	Yes
NDF 6-Month to Forward 6-Month	Yes
Futures 1-Month to NDF 1-Month	Yes
Futures 3-Month to NDF 3-Month	Yes
Futures 6-Month to NDF 6-Month	Yes
NDF 1-Month to Futures 1-Month	Yes
NDF 3-Month to Futures 3-Month	Yes
NDF 6-Month to Futures 6-Month	Yes

Note: Null hypothesis is rejected if the p-value in the Wald test is less than 5 per cent.

Volatility spillover between markets are studied by examining the statistical significance of individual coefficients, Granger causality in variance tests and estimating the dynamic conditional correlations. Beginning with granger causality test, results imply a bidirectional causal relationship between volatilities in both onshore and offshore markets of 1-month maturity segments only (Table 8). In normal times, no volatility spillovers are observed across the markets in other maturity segments, which reverses in the period of increased uncertainty (as found from Granger-causality-in-variance tests taking into account asymmetric effects). The results from individual coefficient estimates indicate about the presence of short-term volatility spillover between the markets, while the long-term volatility transmission is statistically significant from NDF market to onshore spot, forward and futures markets. Moreover, the asymmetric coefficients in variance equation provide interesting insights – with the evidence of rise in volatility spillover from onshore to offshore market in case of rupee appreciation while the opposite happens, i.e. the volatility spillover increases from NDF market to onshore market in the episodes of rupee depreciation (Annexure II).

**Table 8: Granger-causality tests in Variance**

Direction of Causality	Results	
	Without Asymmetry Effect	With Asymmetry Effect
Spot to NDF 1-Month	No	Yes
Spot to NDF 3-Month	No	Yes
Spot to NDF 6-Month	No	Yes
NDF 1-Month to Spot	No	Yes
NDF 3-Month to Spot	No	Yes
NDF 6-Month to Spot	No	Yes
Forward 1-Month to NDF 1-Month	Yes	Yes
Forward 3-Month to NDF 3-Month	No	Yes
Forward 6-Month to NDF 6-Month	No	Yes
NDF 1-Month to Forward 1-Month	Yes	Yes
NDF 3-Month to Forward 3-Month	No	Yes
NDF 6-Month to Forward 6-Month	No	Yes
Futures 1-Month to NDF 1-Month	Yes	Yes
Futures 3-Month to NDF 3-Month	No	Yes
Futures 6-Month to NDF 6-Month	No	Yes
NDF 1-Month to Futures 1-Month	Yes	Yes

NDF 3-Month to Futures 3-Month	No	Yes
NDF 6-Month to Futures 6-Month	No	Yes

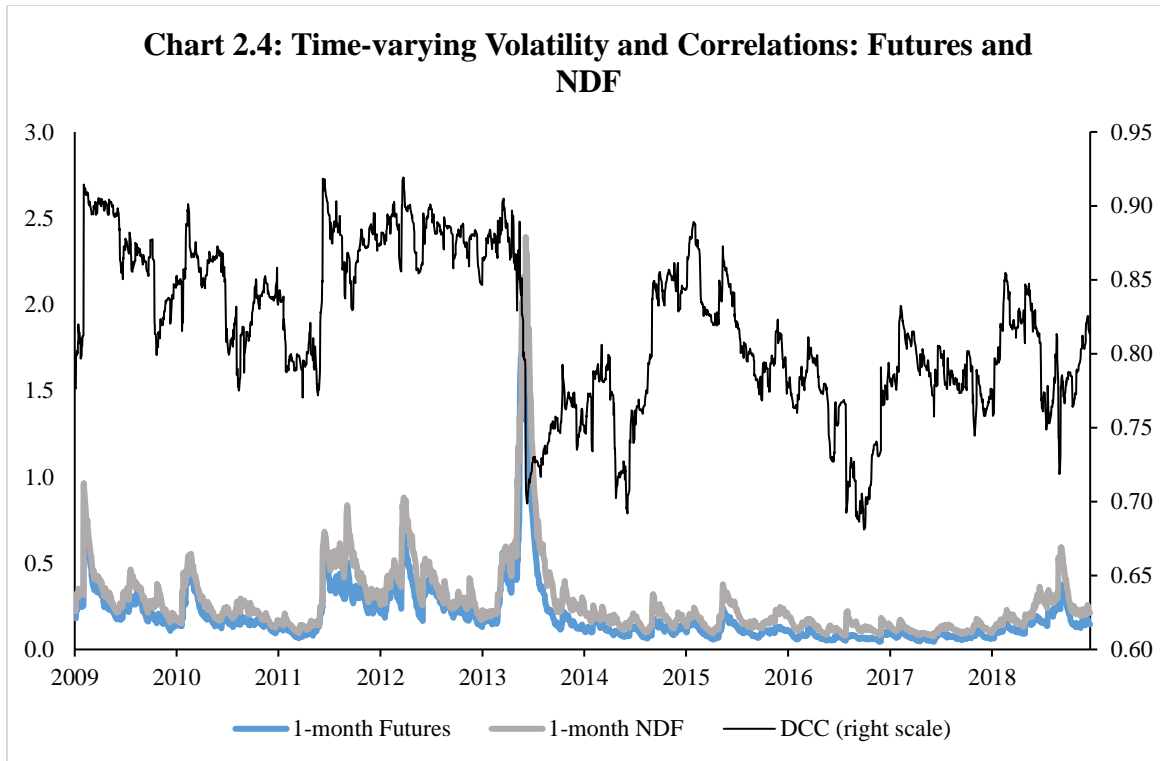
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Note: Null hypothesis is rejected if the p-value in the Wald test is less than 5 per cent.

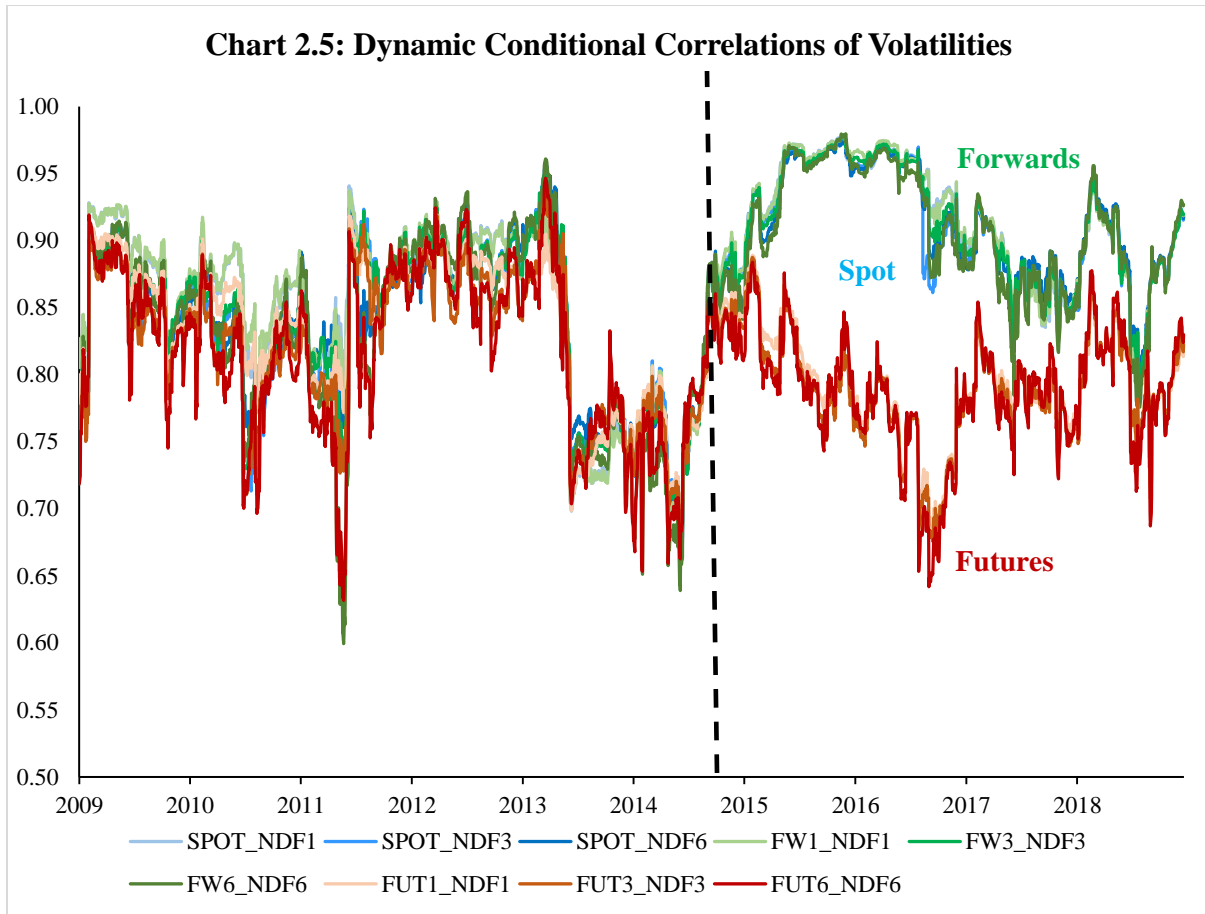
In order to understand how the volatility spillover between the markets changed over time, a variant of MGARCH model, viz. dynamic conditional correlation (DCC) model as proposed by Engle (2002), is estimated taking the same pair of onshore-offshore exchange rate returns. The conditional volatility of 1-month NDF, 1-month futures and their dynamic correlations are plotted in Chart 2.4<sup>9</sup>. The chart shows a sudden and significant rise in volatility during the episodes of European debt crisis, taper tantrum and latter part of 2018 coinciding with the rise in offshore-onshore spreads resulting from the concerns regarding high current account deficits and large capital outflows. It is important to note that the volatility in NDF market is higher compared to futures market and the divergence between the two gets accentuated in the times of heightened uncertainty. This in turn, in conjunction with the rise in information asymmetry, results in a drop in correlations. Since volatility spillover increases from offshore to onshore markets, as discussed earlier, during periods of heightened uncertainty, the volatility in onshore market increases following the heightened volatility in offshore market. In subsequent periods, the correlation increases indicating about the rise in spillovers. A closer examination of the data on the volatilities in two markets shows that volatility increases in offshore market first before it increase in onshore markets with a lag of 1 to 2 days. The correlations being positive and substantially higher imply a significant degree of spillovers between the markets.

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<sup>9</sup> The conditional volatilities for other pairs are qualitatively almost similar though their dynamic correlations are different; the dynamic correlations are provided in Chart 2.5.



The dynamic correlations of volatilities for different pairs are presented in Chart 2.5 reveal that that all the correlations were highly integrated and moving together alike until end December 2014. However, the apparent structural changes in correlation process were observed since then with the trends of correlations of NDF with spot and forward moving in one direction and that of NDF and Futures moving on the opposite direction until mid-2017. The correlations have started coupling though still continuing with some gaps between them since July 2017.



### Conclusions and Implications

Since the work on establishing onshore-offshore price linkages in India was relatively sparse, outdated and inconclusive, the goal of this Chapter was to create an updated, empirical fact base, given the rapidity with which capital markets have developed and integrated, and the pace at which the NDF market has grown. The overall results present a bidirectional relationship between onshore and offshore markets.

First that, for full sample, the price linkages – both mean and volatility – are found to be bidirectional. Both onshore and offshore rates have a strong long-term relationship and that, when a shocks throws that relationship into disequilibrium, both onshore (spot and forward) and offshore rates converge towards each other. This suggests both influence each other. This is consistent with earlier findings in literature and should not be surprising. Relative volumes across these market are very dynamic and vary significantly. When the bulk of the volumes flow through the onshore

market, it becomes the locus of price discovery. The converse is true when the bulk of volumes are routed through the NDF market, which then becomes the principle pole of price discovery.

During the last two stress episodes (the taper tantrum and the 2018 EM crisis), however, the relationship turned unidirectional, with the NDF market driving onshore spot and forwards, and the speed of adjustment from any disequilibrium increasing very sharply compared to “normal” times. Furthermore, volatility spillovers also increased from offshore markets to onshore during the periods of heightened uncertainty. There is, however, an interesting asymmetry. There is evidence of rise in volatility spillover from onshore to offshore market in case of rupee appreciation while the opposite happens, i.e. the volatility spillover increases from NDF market to onshore market in the episodes of rupee depreciation.

All told, as NDF volumes have increased, they have begun to play an important role in both price discovery and driving volatility, particularly during heightened uncertainty periods.



## Chapter 4

### International Financial Service Centre (IFSC)<sup>10</sup> – Use of Rupee derivatives

The Task Force (TF) is vested to examine the role, if any, IFSC can play in addressing the concerns arising out of offshore Rupee markets. Presently, Rupee is not permitted to be traded in the IFSC. This chapter discusses the aspects relevant to availability of non-deliverable Rupee derivatives in the IFSC and permitting banks (IFSC Business Units or IBUs) to deal in such derivatives. Before discussing the potential benefits and concerns from the aforesaid proposition it is important to address this issue – Are markets in IFSC onshore or offshore? In the context of the Rupee market, a critical test for deciding the residency of the market would be applicability of capital controls, in respect of taking and exiting positions, under FEMA, 1999. Inter alia, this is the critical aspect in difference between the price discovered in onshore and offshore market. As the IFSC functions outside the capital controls under FEMA, 1999, type of participants and the price discovered in Rupee markets here will align with the existing offshore markets and therefore it cannot be treated as onshore market. To sum up, while legally IFSC is very much an entity on the shores of India, from the point of view of Rupee markets it has to be treated as an offshore entity.

#### Potential benefits of permitting non-deliverable Rupee derivatives in the IFSC

- i. **Bringing NDF market volume to the IFSC:** Over the last decade or so a significant market share in financial services related to India has moved to other international financial centres like Singapore, Hong Kong and London. Bringing this business to India is clearly beneficial in terms of economic activity and employment gains for India. Further, the size and growth of the offshore Rupee derivative market poses a significant challenge to the efficiency of price discovery as well as the effectiveness of exchange rate management policy. The possibility that the exchange rate of the Rupee, not a fully convertible currency, being materially determined by transactions largely outside the legal and regulatory influence of India is a matter of concern. Given the favourable tax regime tax and by virtue

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<sup>10</sup> International Financial Services Centre or 'IFSC' has the same meaning given in Section 2 (q) of the Special Economic Zones Act, 2005 (28 of 2005).

of it being outside the capital controls under FEMA, 1999, IFSC may bring volumes and price discovery to India.

- ii. Complete bouquet of financial services in the IFSC:** Currently exchanges in IFSC are permitted to offer a well-diversified range of products spanning various asset classes which include derivatives on Indian indices, derivatives on Indian stocks, derivatives on foreign stocks, cross currency derivatives, commodity futures on Gold, Silver and base metals etc. Further, while listing and trading of Masala Bonds is permitted in the IFSC, hedging Rupee exchange rate risk on it is not permitted. Thus, introduction of Rupee derivatives will complete the entire range of asset classes available for trading in the IFSC.
- iii. Access to market information:** The offshore Rupee market has been the subject matter of interest for all stakeholders, as these markets have an impact on onshore markets. However, in the absence of any authentic data, there are varying estimates about the volumes traded in these markets, nature of participation, extent of open interest and the extent to which these markets are used for hedging purposes. If by opening up the IFSCs to Rupee trades, there is some migration of offshore Rupee market volumes, it will help the cause of better information flow regarding the market.
- iv. Level playing field for Indian banks:** Foreign bank's branches outside India can deal in the offshore market as they are not bound by the RBI's regulations. On the other hand, overseas branches of Indian banks cannot deal in Rupee derivatives in the offshore market. By introducing Rupee derivatives in IFSC and permitting IBUs to deal in such derivatives, a more level playing field can be provided to Indian banks to service non-residents.

### **Concerns from non-deliverable Rupee derivatives trading in the IFSC and dealing by IBUs such derivatives**

- i. Cannibalizing onshore business:** One major concern arising out of the introduction of non-deliverable Rupee derivatives in the IFSC is whether it would cannibalize the business of the onshore market instead of importing volumes from abroad. Since the products in both IFSC and the onshore market would be more or less similar in terms of characteristics, the domestic futures market getting gradually cannibalized by the IFSC, on the face of it, appears probable. But a deeper analysis of the comparative regulatory framework would allay such concerns to a large extent. The domestic currency futures market is majorly

made up of resident participation. Non-residents are nearly absent in these markets and hence their shift to the IFSC is more a theoretical proposition. Since the Indian residents are not permitted to participate in the IFSC, they cannot contemplate a move-over. It also important to note that the onshore market settles in INR, whereas derivative contracts in the IFSC would settle in dollars and hence these markets will cater to two distinct classes of participants.

**ii. Impact on exchange rate management policy and development of the onshore market:**

Presently Indian banks are not allowed to deal in Rupee derivatives in the offshore market. A detailed discussion on the issue of allowing such dealing is presented in Chapter 5. In consideration of the risk that participation of Indian banks may improve liquidity in the offshore market and undermine the development of the onshore market the TF is of the view of that Indian banks should not be permitted to deal in offshore Rupee market. IFSC being an offshore centre, all concerns expressed in Chapter 5 in this regard are valid on Rupee market in IFSC also. However, unlike other offshore Rupee market venues, IFSC has the potential of providing certain benefits to India, as discussed earlier in this chapter, and therefore a distinction could be made between the two while examining the case of permitting Rupee derivatives to be traded in the IFSC.

**iii. Spillover of risks from IFSC to onshore market:** This is a concern, since the two markets, being geographically contiguous, could create porous leakage channels. This concern can be addressed by stipulating distinct net open position limits for entities operating in both IFSC and on-shore. In other words, the open positions of entities operating in the IFSC should not be permitted to be netted off with the open position on-shore.

**What does a volatile Rupee exchange rate in the IFSC imply for the RBI and onshore market?**

Chapter 3 establishes the linkages between the offshore and onshore Rupee market. IFSC being an offshore jurisdiction will have the same impact. The RBI, as the monetary authority, has the authority under RBI Act to maintain the stability of the rupee. A volatile onshore foreign exchange market could act as the trigger point of volatility in other financial markets like money, bonds and

equities. The spill over impact of financial market volatility casts its shadow on asset prices and, in turn, it could have an impact on the capital flows and financial stability. Given that a separate regulator is envisaged for the IFSC, the issue of RBI's role in the IFSC was extensively deliberated by the TF. There are two possible approaches:

- i. **RBI plays a pivotal role in framing the Rupee derivative regulation in the IFSC:** In order to allow the RBI to take measures in line with the objectives of exchange rate management policy, the sine qua non for allowing Rupee derivatives in the IFSC is to ensure that RBI, vested with the obligations to maintain financial and monetary stability, should continue to perform its statutory role in determining the regulatory framework for Rupee market in the IFSC.
- ii. **Treat it akin to any other offshore market and maintain a hands-off approach:** The objective of introducing Rupee derivatives in the IFSC is to provide an alternative to non-residents for dealing in non-deliverable Rupee derivatives. The expected transition of investors is likely to be successful only if the IFSC functions with same freedom as other offshore markets. At the same time, from an exchange rate management perspective, permitting Rupee trading in IFSC should not make a material difference to local authorities as long as there is a barrier between the onshore market and IFSC. In that case, IFSC would be exactly of the same status as any other offshore market.

The TF feels that in line with the objectives of permitting Rupee derivatives in the IFSC the latter approach - that the regulatory environment in which Rupee trades in IFSC is exactly similar to the environment that prevails in any other offshore centre - is preferable. As IFSCs are treated on par with a foreign jurisdiction in terms of FEMA, the regulation of the trade and capital flow channels between the two jurisdictions (on-shore and IFSCs) should be so designed as to restrict the transmission of volatility through these channels (in terms of participants, products, limits etc.).

## **Recommendation**

While there are concerns around impact on the onshore market due to trading in Rupee derivatives in the IFSC, there are potential benefits in terms of IFSC's ability to offer complete bouquet of financial services and availability of market information to all stakeholders. Further, given India's

economic growth, it may be appropriate to prepare for greater financial integration with the rest of the world. Sequencing and timing of measures relating to currency markets is a critical component of such integration. Although, at the moment, there is no definite path ahead in terms of such integration but a thriving Rupee market in the IFSC may provide a system which can be leveraged towards this end, in the way and manner deemed fit in future. IFSC being outside the capital controls provides an opportunity to policymakers to test new regimes and products in an environment whose repercussions may not significantly impact the stability or efficiency of the onshore system. On balance, the TF is of the view that non-deliverable Rupee derivatives may be introduced in the IFSC. However, a phased approach may be adopted and, to start with, trading may be permitted only on exchanges due to the inherent transparency and risk management benefits offered by it. Introducing OTC contracts may be considered at a later stage after the experience gained from trading on exchanges. RBI may in its Financial Stability report assess the impact of the functioning of IFSC on the financial stability of the country.

Further, the TF is of the view that entities regulated and permitted by the RBI may be permitted to make market and run positions in Rupee derivatives market in the IFSC. In order to prevent spill over of risks from IFSC to onshore market through these entities, a distinct net open position limit may be stipulated for their operations in the IFSC. In other words, the open positions of entities operating in the IFSC should not be permitted to be netted off with their open position in the onshore market.

Finally, given the mandate of RBI to implement exchange rate policy it may not be in benefit of things to introduce Rupee derivatives in the IFSC without it being on board and therefore the TF feels that Rupee derivatives may be permitted in the IFSC subject to agreement of the RBI.

## Chapter 5

### Issues and Recommendations

The Task Force (TF) is entrusted to recommend measures to incentivize non-residents to access the onshore Rupee derivative market and address concerns, if any, arising out of the offshore Rupee derivative market. As discussed in Chapter 1, the TF had interactions with various categories of stakeholders to understand their perspective on the matter and identify the issues that needs to be addressed.

Chapter 2 and 3 have clearly brought out the increased importance of offshore Rupee markets, both in terms of their size and in terms of their impact on the exchange rate of the Rupee. The price and volatility spillovers from one market to the other are almost complete, they are bi-directional and when rupee is under pressure they are unidirectional from offshore markets to onshore markets. The speed of convergence of the markets is also quite quick. The TF's recommendations have been made in the light of available information, results of statistical analysis, and most importantly, on the feedback received from various consultations.

While increased participation of non-residents would be expected to enhance liquidity in the onshore market, it may also bring along with it additional volatility and transfer of incremental risk to the domestic system. This is particularly so as historically the rupee is a currency that has generally depreciated and the demand for forward dollars is usually more than the supply especially in times of stress. Hence it is pertinent to examine the impact of incremental hedging by non-residents in the onshore market. While volatility in the rates have a clear impact on the real sector, events in the domestic derivatives markets in the late 2000s constantly remind us of issues related to transfer of risk to entities that are not capable of understanding and managing it. The big question then is whether our system today is ready for incremental demand for hedging from non-residents. Available data is inadequate to measure the contribution of hedgers and speculators in the offshore market turnover. Using the best available information, it can be estimated that an additional daily average Rupee derivative turnover of around 0.8 billion – 2.4 billion could be generated in the onshore market if all the INR NDF hedging transactions are transferred from the offshore market (see Box 1). Such an incremental flow is not significant enough to cause any adverse impact on volatility in the onshore market given that the user-driven deliverable forwards market in India is quite liquid with daily average turnover of USD 16.3 billion (as per BIS

Quarterly Review December 2016). As regard transfer of risk to the domestic system, the concern is more regarding transfer of risk to the Indian companies and less towards market-makers as they are in the business of managing risk. There is a possibility that the said incremental positions created in the onshore market may get transferred to Indian companies (in part or full depending upon the level of these positions retained by the market-makers). However, in comparison with the late 2000s, Indian companies today are only allowed to enter into Rupee derivatives depending on their underlying exposure and no leveraged structures are permitted. Also, banks are bound by stringent suitability and appropriateness norms. Therefore, the chances of Indian companies acquiring unmanageable risk positions or risks due to mis-selling by market-makers are very low. Further, there has been a significant growth in the external sector and consequently the foreign exchange market has also grown (although one could argue on the incommensurate growth). To summarize, in the last decade or so the ecosystem on the whole has evolved and is less prone to adverse impact from transfer of risks from non-residents.

**Box 1**

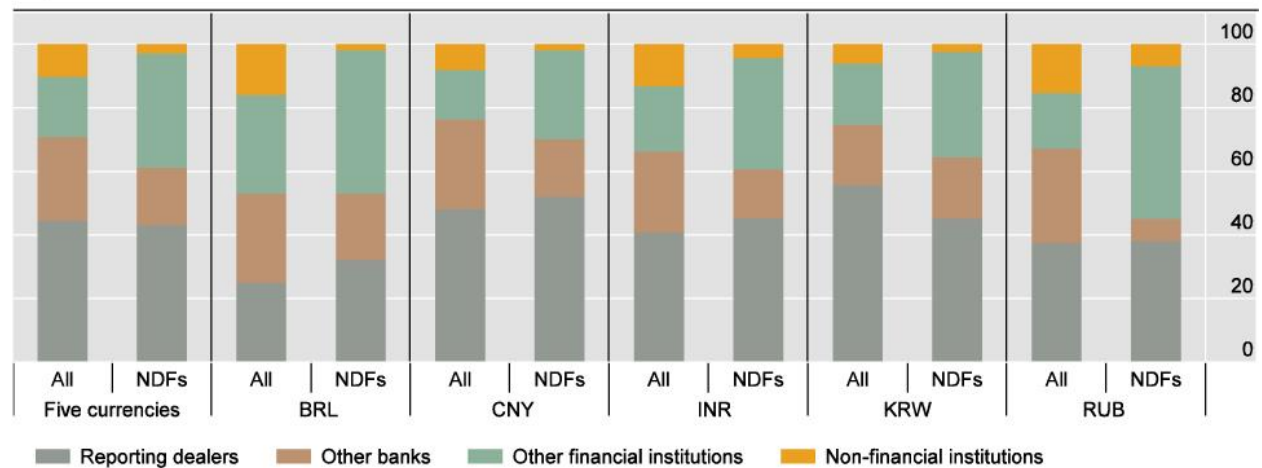
**Approximation of share of hedging transactions in INR NDF turnover**

The graph presented below is extracted from BIS Quarterly Review December 2016.

EME currency trading composition by counterparties: all instruments vs NDFs<sup>1</sup>

In per cent

Graph 2



<sup>1</sup> NDF turnover is against the US dollar only (thus understating total NDFs by an average of 3%); deliverable forwards are outright forwards less US dollar NDFs and are correspondingly overstated.

Sources: London Foreign Exchange Joint Standing Committee; BIS Triennial Central Bank Survey; authors' calculations.

It can be observed from the above graph that non-financial and other financial institutions contribute around 5% and 35% respectively to the turnover of INR NDFs in the offshore market. If one were to make an informed guess that all transaction by non-financial companies are hedging transactions and that hedging transactions by other financial companies (e.g. funds) would constitute maximum 25% of their transaction then it can be approximated that hedging transactions constitute around 5% - 15% of the daily average turnover in INR NDF market, which was reported as USD 16.4 bn.

**Comparison of turnover in forwards in onshore and offshore market** - In the same publication it is also reported that the average daily turnover in onshore deliverable forwards is USD 16.3 bn. It may be noted that for fair comparison with the turnover in offshore market (where deliverable spot and swap market doesn't exist) this turnover includes both deliverable forwards and FX swaps. A comparative analysis of volumes in onshore and offshore market – both OTC and exchange traded Rupee derivatives - is given in Annexure IV.

## **Issues and recommendations**

### **1. Market hours**

An important reason for the existence of the offshore Rupee derivative market is simple geography. That domestic markets are closed when major users in certain regions (e.g., the United States) are working creates a natural access for offshore markets. Also, significant international developments impacting the Rupee exchange rate take place outside the onshore market hours, thereby creating a natural clientele for the offshore markets. The feedback received from non-resident investors as well as corporates highlighted the closure of the local market as an important reason for them accessing the offshore market. Exchanges have for some time been requesting an extension of market hours citing increasing Rupee transaction volumes in offshore exchanges situated in Singapore and Dubai. A straightforward way of taking care of such requirements is to extend the onshore market hours (both OTC and exchange traded derivative markets). While extending market hours might involve simultaneously keeping support services (payment and settlement systems) or support markets (funding markets) open, it is also possible to treat such transactions as part of the operations of the next day, in which case the need for settlement or funding does not



arise. In this regard, the TF supports the recommendations relating to market timings outlined in the draft Report of the Internal Working Group on Comprehensive Review of Market Timings published by RBI on July 10, 2019.

**Recommendation #1**

The TF recommends that the onshore market hours be suitably extended to match the flexibility provided by the offshore market and thereby incentivize non-residents to hedge in the onshore market.

**2. Competitive pricing**

One important feedback from foreign portfolio investors (FPIs) as well as global corporates was that they are unable to access multiple competitive quotes in the onshore market. Effectively, they are limited to using the prices of their custodian banks. Generally, FPIs deal only with their custodian banks due to the existing rules whereby the custodian is responsible for tracking of outstanding hedges vis-à-vis portfolio size. This “friction” issue can be addressed by shifting the monitoring to a centralized agency which can use a technology solution to track exposures as well as outstanding hedges. This is further explained in recommendation no. 4 ahead relating to underlying exposure.

Also, the process to be setup documentation, such as KYC, and other trading arrangements with multiple counterparties in India is a long and difficult exercise resulting in most FPIs either trading with their custodian bank or using the offshore market to hedge. Some of the documentation related challenges can be minimized if the centralized KYC registration currently in place for SEBI regulated entities is extended to all the entities i.e. both custodial banks as well as non-custodial banks. This is elaborated in recommendation no 11 on the KYC process.

Another issue highlighted by FPIs in this context was unavailability of multi-dealer electronic dealing platforms for them. One way of making onshore prices more widely accessible to non-residents is to allow Indian banks to freely offer prices as liquidity providers to non-resident customers at any time, whether or not the domestic market is open. They can extend to non-resident corporates the same choices that domestic corporates have in choosing among various market makers. This can be done either by a domestic sales team or by using staff located at overseas

branches. In addition, making an all-to-all trading platform (like the FX-Retail being introduced in August 2019) available to non-residents would supplement that effort.

### **Recommendation #2**

The TF recommends that banks may be allowed to freely offer prices to non-residents at all times, out of their Indian books, either by a domestic sales team or by using staff located at overseas branches. Also, wide access to the FX-Retail trading platform to non-residents would be a major incentive to use the onshore market.

### **3. Effect of offshore Rupee derivative market on onshore price discovery and exchange rate management policy**

The size and growth of the offshore Rupee derivative market, especially in the last few years, poses a significant challenge to the efficiency of price discovery as well as the effectiveness of exchange rate management policy. A comparison of onshore and offshore Rupee derivative market is given in Annexure IV. The possibility that the exchange rate of the Rupee, not a fully convertible currency, will be materially determined by transactions largely outside the legal and regulatory influence of India is a matter of concern. The most straightforward approach to deal with that concern would be to completely liberalize the onshore market and bring it at par with the offshore market in all aspects. Such a scenario would imply an effective absence of local regulation and intervention, which is incompatible with the current status of capital account convertibility. Another option is to liberalise the onshore market to the extent possible, but this in itself may not necessarily mean a fall in importance or size of the offshore market. In this connection, the TF extensively discussed the proposition of creating a connection between the offshore and onshore markets by permitting Indian banks to deal in the offshore market. The various implications of such a step are discussed below:

- i. **Reduction in volatility:** In theory, a segmented market would be less liquid and therefore more volatile compared to an integrated market. One could also infer that offshore market activity is maximum during onshore working hours, e.g. almost three-fourths of the offshore rupee futures are traded when Indian markets are open. It is also observed that

offshore spreads are larger which indicates a relative scarcity of market-making entities. Linking the two markets may increase both the customer base as well as the liquidity providers, thereby improving liquidity as well as efficiency of the price discovery process.

- ii. **Better customer pricing through increased transparency in the offshore market:** Today, very little information is available regarding the offshore Rupee market, other than that of exchange traded instruments. Such opacity is not in the interest of customers as liquidity provision is limited to entities that have a presence both onshore and offshore, resulting in a premium (in terms of high bid-ask spreads) being charged for market access. Broadening this access to onshore banks would drive away such premium through wider competition. At the same time, access to information improves for the local authorities. Since better information leads to better price efficiency, it is in the interest of local authorities to disseminate such information, leading to an overall improvement in market transparency.
- iii. **Level playing field for Indian banks:** Foreign bank's branches outside India can deal in the offshore market as they are not bound by the RBI's regulations. On the other hand, overseas branches of Indian banks cannot deal in Rupee derivatives in the offshore market. Allowing them access to the offshore Rupee derivative market would create a level playing field for Indian banks.
- iv. **Impact on development of the onshore market:** Liquidity in onshore market is better than the offshore market due to participation of real sector and market making by Indian banks which obviously are the major Rupee liquidity providers. Consequently, non-residents have the ability to exit positions with less impact cost in unfavourable times. This is a strong incentive for them to hedge in the onshore market (given dynamic hedging and other operational issues are now being ironed out). Also, higher liquidity in the onshore market results in tighter bid-ask spread compared to the offshore market which allows non-residents to get better pricing in the onshore market. The aim of policy measures is to develop the onshore market. Accordingly, policymakers strive to protect the advantages of onshore market and at the same time develop and liberalise the onshore market to overcome the gap vis-à-vis NDF markets in other aspects such as ease of access, market infrastructure and taxation. There is of course the risk that participation of Indian banks will improve

liquidity in the NDF market and undermine the development of the onshore market. Such a situation will be challenging for implementing exchange rate management policy.

**Recommendation #3**

The onshore Rupee derivatives market is currently more deep and liquid as compared to the offshore Rupee market and participation of the Indian banks in the offshore market might, over time, take away this advantage. The TF feels that the downside of permitting Indian banks to deal in the offshore Rupee derivative market outweighs the advantages and, therefore, recommends that Indian banks should not be permitted to deal in the offshore Rupee derivative market for the present.

**4. Requirement of underlying exposure and documentation therefor**

There is no requirement of an underlying exposure to enter into a derivative contract in the offshore Rupee derivative market. Hence, non-residents can freely trade in this market to hedge risk on an underlying Rupee exposure or create exposure to Rupee. However, as per extant regulations, non-residents can enter into Rupee derivative contracts in the onshore market only for the purpose of hedging risk arising from an underlying exposure. Non-residents are classified into Foreign Portfolio Investor (FPI), investors having Foreign Direct Investments, Non-Resident Indian, Non-resident Exporters and Importers and Non-Resident lenders having ECBs designated in INR, with each category being subjected to a different set of rules for establishing underlying exposure.

FPIs are allowed to hedge only on the basis of existence of underlying exposure, with the hedge size capped at the market value of investment in equity and debt in India as on a particular date including any coupon receipts arising out of investment in debt securities falling due during the following twelve months only. The explicit mention of only equity and debt investments creates regulatory ambiguity on hedging of other FPI exposures in India such as margin deposits, cash, etc. Hence, any FPI having investment in India will be able to only buy USD forward against INR onshore and will not be allowed to sell USD against INR in forward market as that would result in increasing the exposure rather than hedging the exposure. To prove the exposure, a valuation certificate is required to be provided by a designated AD bank (Custodian) as a proof of underlying. FPIs are also required to provide a declaration to the effect that their total outstanding hedges are within the market value of their investments. The only exception to establishing underlying

exposure requirement is dealing in exchange traded market where FPIs are allowed to take positions, without having to establish existence of underlying exposure, up to USD 100 million. FDIIs are allowed to hedge both their existing investment as well as proposed foreign direct investments; with the latter being allowed only after an AD bank ensures that all necessary approvals for the investment have been obtained by the FDI. With respect to non-resident corporates, users can hedge their exposures invoiced in INR and intercompany loans denominated in INR (ECBs). They can book the hedge either directly with an AD bank in India or on a back-to-back basis. Prior to hedging, they must furnish a declaration certifying that the underlying exposure has not been hedged with any other AD bank(s) in India. They are required to cancel the hedge contract immediately if the underlying exposure is cancelled. In case of a central treasury, an authorization from the entity having INR exposure to hedge on its behalf is also required. Irrespective of the category of the investor, the requirement to establish underlying exposure creates practical difficulties for many non-residents. Funds who intend to execute macro hedge for various schemes or MNC parents wanting to consolidate exposures across subsidiaries and executing a single hedge find it easier to execute consolidated hedge in the offshore market. Also, hedging of anticipated and economic exposures is not permitted.

Recently, the RBI has released<sup>11</sup> draft regulation regarding risk management facilities for public feedback. The TF reviewed it in detail and also received feedback on it during interaction with stakeholders. The proposed regulation satisfactorily addresses a lot of pertinent issues. Measures on simplifying eligible underlying exposure criteria, simplifying documentation requirement, flexibility to hedge dynamically, ability to hedge anticipated exposures, user classification (retail and non-retail) and choice of products are welcome and much needed. It is noted that the requirement of having an underlying exposure for entering into Rupee derivative contract is retained and it is felt that it is justified for effectiveness of exchange rate management policy and ensuring financial stability. Given that only hedging transactions are going to be permitted in the onshore market there will remain a requirement to establish or declare existence of underlying exposure to risk and also to ensure that notional of hedge contracts is in line with the value of underlying exposure. As discussed above such requirement acts as a deterrent for non-residents to hedge in the onshore market. It would be optimum if a solution can be found that fulfils the

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<sup>11</sup> Vide press release dated February 05, 2019.

requirement of verification of underlying exposure without the investors being required to undertake the efforts to prove it. This can be achieved by consolidating the existing data on investments and hedge transactions residing with various regulated entities.

**Recommendation #4**

The TF recommends that a technology-based solution be explored to centrally aggregate the investments of non-residents and derivative contracts entered into by them in the onshore market (both OTC and exchange traded) using LEI or any other unique identifier to start with. ADs should be allowed access to such aggregate data so that they can verify the quantum of derivative positions and underlying investments of the non-residents. This mechanism can, potentially, completely remove the requirement of efforts from the non-residents to prove the existence of underlying exposure to Rupee.

Further, to simplify procedures and provide ease of access to the exchange traded currency derivative market the RBI has allowed users to enter exchange traded instruments (futures and options) to take exposure up to USD 100 million without the requirement of establishing the existence of underlying risk. Such measures go a long way in encouraging users (especially MSMEs) to hedge their exchange rate risk by making the process easier. At the same time, such calibrated opening helps in addressing any concerns of systemic risk. The TF feels that such an incentive must be provided in the OTC market also as it will not only contribute to ease of doing business but also to restore parity in regulation between OTC and exchange markets.

**Recommendation #5**

While requirement of underlying exposure will continue for trading in the onshore market, users may be allowed to undertake positions up to USD 100 million in OTC as well as exchange traded currency derivative market without having to establish the underlying exposure.

**5. Products**

Non-residents can enter into only plain vanilla forwards and option contracts in the OTC foreign exchange market. Further, swaps are restricted to specific case of IPO and non-resident lenders of ECB denominated in INR. Non-residents who prefer to express their hedge using structured

options necessarily need to execute in the offshore market as current regulations do not allow non-residents to enter into structured options.

#### **Recommendation #6**

The aforesaid draft regulation addresses this issue by allowing ADs to offer any product to the non-residents (for non-retails users) which satisfies the purpose for which they are permitted to enter into Rupee derivatives i.e. hedging of underlying exposure to Rupee. In other words, ADs cannot offer any product that creates risk for the user instead of hedging the existing risk. The TF endorses this principle-based regulation approach.

### **6. Restrictions on dynamic management of risk**

Non-residents trading in the offshore market are free to cancel and rebook their trades depending on their future expectations and/or risk management policy. On the other hand, in the onshore market non-residents, in general, are not allowed to rebook a contract once cancelled. Only in the case of FPIs rebooking up to 10% of the value of contracts cancelled is permitted. Inability to manage risk dynamically deters non-residents who look for flexibility while hedging their risks.

The aforesaid draft regulation proposes to remove restrictions on rebooking of cancelled contracts and thereby allow users to hedge dynamically. For contracts entered into for hedging contracted exposure, gains (or losses) on cancellation will be passed on to the user as and when they accrue but in case of contracts entered into for hedging anticipated exposures net gains will be transferred only when the underlying cash flow has occurred. The prime purpose of such stipulation is to curb incentives for speculation by using the liberal position limits available under anticipated exposure hedging. However, a consequent drawback is that in some instances, e.g., contingent contracts such as bidding for projects involving currency risk, such a provision would not be equitable. This provision could be suitable amended to enable all types of hedging, without compromising the essential control that the cash flow requirement provides to ensure underlying in a hassle-free way. The TF is of the view that providing suitable discretion to banks to pass on net gains even without cash flows in such cases would address this shortcoming. This will ensure that genuine hedgers

will access the onshore market without worrying about retention of gains if underlying transaction does not fructify due to reasons beyond their control.

#### **Recommendation #7**

In line with the objective of bringing onshore market at par with offshore market the most obvious path is to not have any restrictions on transfer of gains in case of anticipated exposure hedging. However, a balancing act is necessary between liberalizing the market while preventing speculative positions which can create undue volatility in the onshore market. Keeping this in mind, while endorsing free dynamic hedging (without any restriction on cancellation and rebooking) for hedging contracted exposure, the TF recommends that in case of hedging of anticipated exposures, gains from cancellation of contract may be allowed to be passed on even in cases where there are no cash flows at the discretion of the bank, where the bank considers the cancellation of underlying cash flow is due to external factors which are beyond the control of the user.

### **7. Gross settlement and credit risk management**

In the case of offshore Rupee derivative market, non-residents clear and settle OTC trades either through a prime broker/custodian or bilaterally with the counterparty. In both these cases, the non-residents usually execute a bilateral multi-currency master service agreement which includes provisions for exchange of margin (ex- ISDA master agreement including Credit Support Annex) with the counterparty. These agreements necessitate periodic settlement of marked-to-market gains and losses across products and provide the flexibility to net off losses against gains. Hence, these agreements significantly lower credit charges and provide strong netting efficiency. On the other hand, in the onshore market, the non-residents in an otherwise identical situation will face additional challenges in respect of settlement and exchange of margin due to the following reasons:

**Gross settlement of gains:** As mentioned above, non-residents clear and settle OTC trades in the offshore Rupee derivative market either through a prime broker or bilaterally with the counterparty. Typically, they settle deal across assets and currencies with either of these entities and are, therefore, able to net the cash flows and achieve efficiency in liquidity management.



However, as Rupee derivatives entered into in the onshore Rupee derivative market cannot be settled under such overseas arrangements, non-residents are unable to avail the benefits of netting on their onshore transactions.

**Credit risk management:** Signing a master service agreement locally and establishing credit lines with onshore banks increases the execution cost of hedging onshore. Typically, transactions of non-residents in the offshore market are collateralized (through collateral exchange provisions contained in the master service agreement) while those in the onshore market are non-collateralized. Depending on the credit rating of the non-resident, the onshore banks may not necessarily be open to providing exposure/credit limits on uncollateralized basis for entering into deliverable contracts. If a collateralized credit line is set up through a master service agreement with provision for exchange of collateral in USD outside India, restrictions under FEMA, 1999 on exchanging margin outside India by onshore banks poses issues. If exchange of collateral is in INR in India, then the non-residents will have to either assume the exchange rate risk on the cash margin deposited or will have to additionally hedge the margin money placed. Moreover, this attracts regulatory ambiguity such as minimum tenor restrictions as per deposit regulations, ability to hedge the margin through FX swap, interest to be paid on cash in SNRR account, etc. If interest cannot be paid on the collateral placed with onshore counterparties, it creates a strong economic disincentive for the investor to hedge onshore.

These issues can be addresses in two ways. First, facilitating the non-residents to utilize their existing overseas custodian/prime broker relationship and master service agreements for settlement of their transactions onshore and exchange of collateral therefor. Second, by creating the regulatory framework for exchange of margin for non-centrally cleared derivatives in India to make it consistent with evolving clearing mechanism offshore. Both the solutions are discussed below.

To help non-residents retain their economic neutrality with respect to the prevailing multi-currency master service agreement executed offshore, a central clearing and settlement mechanism may be established for non-residents' deals with onshore counterparties, along the lines of central clearing and settlement of onshore interbank deals by the CCIL. The overseas bank of the non-resident will clear and settle the deals execute by them onshore. To be sure, the proposal is to introduce the centralized clearing mechanism while retaining the existing bilateral settlement mechanism so that

investors who want to continue using it do not face disruption. For the suggested central clearing and settlement mechanism to be set up, inter alia, the following permissions would also be required:

- i. Permission under FEMA, 1999 for CCIL to accept foreign currency denominated collateral in India or outside India,
- ii. Enhancement of CCIL's infrastructure to accept wide range of securities (foreign currency cash, securities issued by foreign governments etc.) as collateral, and
- iii. Other regulatory clearances required for non-residents/overseas banks in other jurisdictions to clear and settle through CCIL.

Further, back-to-back hedging by non-residents proposed in the aforesaid draft regulation will also allow effective utilization of their prevailing multi-currency CSA arrangement offshore. This entails allowing non-residents to hedge their exposure with their banking counterpart overseas, which in turn will hedge the position back-to-back with an onshore bank. This ensures that existing dealing arrangements between non-residents and their overseas counterparties remain unchanged but at the same time the market risk gets transferred to onshore banks and hence is managed locally. The overseas bank should be allowed to settle the onshore leg either bilaterally with the onshore bank or through the proposed central clearing and settlement mechanism. Also, this will require permissibility under FEMA, 1999 to exchange margin, with the overseas banker of non-residents, outside India. In such a model the approach should be to recognize the intermediary offshore bank as a facilitator purely for the convenience of the non-resident investor. Experience from other markets that have implemented such models like Malaysia and China suggest that putting the onus of monitoring compliance in terms of quantum of hedge, underlying documentation, etc. on the intermediary bank is inefficient. Such a requirement leads to the intermediary bank asking for various indemnities from the client and these are often difficult and time consuming to negotiate and sign. The approach should be to monitor compliance by the non-residents as the regulated user using available onshore infrastructure as well use of technology solutions to track the hedges vis-a-vis underlying exposure as detailed in recommendation 5.

With regard to regulation and infrastructure for exchange of margin for non-centrally cleared derivatives in India, the RBI released a discussion paper on this issue in May 2016. However, the final directions have not been issued yet. It is understood that ambiguity in netting legislation is

one of the main issues holding the release of these directions. Also, it is understood that the GoI is in the process of making legislative changes to address this issue.

### **Recommendation #8**

For ease of entering into hedge transactions for non-residents, the TF recommends:-

- i. Establishment of a central clearing and settlement mechanism for non-residents' deals in the onshore market.
- ii. Back-to-back hedging by non-residents proposed under the draft regulation is endorsed. The overseas bank should be allowed to settle the onshore leg either bilaterally with the onshore bank or through the proposed central clearing and settlement mechanism.
- iii. Implementation of margin requirement for non-centrally cleared OTC derivatives in the onshore market at the earliest.
- iv. Allowing Indian banks to post margin outside India. This is not only relevant for credit risk management for their transactions with non-resident users but also for their cross-border inter-bank transactions.

## **8. Taxation**

Under the extant regulatory framework, non-residents are permitted to enter into Rupee derivative contracts only for hedging risk on their investments/lending/trade in India. As per discussions with stakeholders, the following position is, generally, adopted with regard to the gains from such contracts:

- Where currencies under the contract are delivered – Not a taxable event (i.e. conversion of one currency into another does not give rise to taxable income)
- Where contract is cancelled, and price difference is settled – If the derivative contract is entered into for hedging exchange rate risk on a capital asset then gains on cancellation are treated as capital gains. If it is entered into for hedging exchange rate risk in relation to a trading/business asset, such gains are treated as business profits.

However, it is understood that, there is ambiguity in the rules in this connection and the position taken by the Assessing Officers (AOs) differs between zones and is at variance with the aforesaid position. Oftentimes such gains on cancellation are treated as ‘Other Income’ or ‘Speculation Business Profits’. During interaction with the non-residents it was suggested that such uncertainty of tax treatment is one of the prime reasons why they do not access the onshore market and instead hedge Rupee exposures in the off-shore market.

**Recommendation #9**

The TF recommends that the competent authorities may examine the issue of taxation in respect of foreign exchange derivative contracts with the objective of overcoming gaps between tax regime in India and other major international financial centres (Singapore, Hong Kong and London), to the extent possible, and thereby incentivizing non-residents to hedge in the onshore market.

**9. Allow non-deliverable Rupee derivatives in the IFSC and permit IBUs to deal in such derivatives**

The proposition of introducing non-deliverable Rupee derivatives in the IFSC and permitting banks (IFSC Business Units or IBUs) to deal in such derivatives is discussed in detail in Chapter 4. While there are concerns around impact on the onshore market due to trading in Rupee derivatives in the IFSC, there are potential benefits in terms of IFSC’s ability to offer complete bouquet of financial services and availability of market information to all stakeholders. Further, given India’s economic growth, it may be appropriate to prepare for greater financial integration with the rest of the world. Sequencing and timing of measures relating to currency markets is a critical component of such integration. Although, at the moment, there is no definite path ahead in terms of such integration but a thriving Rupee market in the IFSC may provide a system which can be leveraged towards this end, in the way and manner deemed fit in future. IFSC being outside the capital controls provides an opportunity to policymakers to test new regimes and products in an environment whose repercussions may not significantly impact the stability or efficiency of the onshore system. On balance, the TF is of the view that non-deliverable Rupee derivatives may be introduced in the IFSC. However, a phased approach may be adopted and, to start with, trading may be permitted only on exchanges due to the inherent transparency and risk management

benefits offered by it. Introducing OTC contracts may be considered at a later stage after the experience gained from trading on exchanges. RBI may in its Financial Stability report assess the impact of the functioning of IFSC on the financial stability of the country.

Further, the TF is of the view that entities regulated and permitted by the RBI may be permitted to make market and run positions in Rupee derivatives market in the IFSC. In order to prevent spill over of risks from IFSC to onshore market through these entities, a distinct net open position limit may be stipulated for their operations in the IFSC. In other words, the open positions of entities operating in the IFSC should not be permitted to be netted off with their open position in the onshore market.

**Recommendation #10**

The TF recommends that non-deliverable Rupee derivatives (with settlement in foreign currency) may be allowed to be traded in the IFSC and IBUs may be allowed to deal in such derivatives with a distinct FCY-INR position limit. To start with exchange traded currency derivatives involving Rupee may be introduced and with experience, non-deliverable OTC currency derivatives involving Rupee may also be allowed.

**10. KYC process**

The extant directions issued by the Reserve Bank of India stipulates the documents required for conducting KYC process to open accounts of non-residents. Similarly, SEBI has also prescribed documents required for the granting of FPI license by Domestic Depository Participants (DDP). Further, KYC documents for FPIs are available to SEBI regulated entities through KRAs subject to approval from either the FPIs or the domestic custodians. Since access to KRAs is available only to SEBI regulated entities, most banks are not allowed to access KRA and hence seek complete documentation from FPIs again. Such repetitive submission of documents to various financial intermediaries results in long lead time for on-boarding and makes the entire process operationally cumbersome for non-residents.

**Recommendation #11**

The TF recommends that the KYC registration may be centralized across the financial market with uniform documentation requirement. All regulated financial market intermediaries should be provided access to the centralized registry and they should be allowed to rely on online registry

for confirmation that KYC has been completed and it's valid. This will ensure that non-residents undertake the KYC process only once and not with each financial intermediary that they deal with in the onshore market. Also, such a mechanism offers cost and efficiency benefits for the financial intermediaries.

## Annexure I

### Key features of currency market of major EMEs

#### I. USD-RMB Market – China

	Onshore Deliverable - CNY	Offshore Deliverable - CNH												
<b>Market Turnover</b>	<table border="1" style="width: 100%;"> <tr> <td>Daily average turnover</td> <td style="text-align: center;">USD 28 billion</td> </tr> <tr> <td>Daily average swap and forward turnover</td> <td style="text-align: center;">USD 62 billion</td> </tr> <tr> <td>Daily average options turnover</td> <td style="text-align: center;">USD 1.5 billion</td> </tr> </table>	Daily average turnover	USD 28 billion	Daily average swap and forward turnover	USD 62 billion	Daily average options turnover	USD 1.5 billion	<table border="1" style="width: 100%;"> <tr> <td>Daily average turnover</td> <td style="text-align: center;">USD 15-20 billion</td> </tr> <tr> <td>Daily average forward turnover</td> <td style="text-align: center;">USD 25-30 billion</td> </tr> <tr> <td>Daily average Options turnover</td> <td style="text-align: center;">USD 5-6 billion</td> </tr> </table>	Daily average turnover	USD 15-20 billion	Daily average forward turnover	USD 25-30 billion	Daily average Options turnover	USD 5-6 billion
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Daily average turnover	USD 15-20 billion													
Daily average forward turnover	USD 25-30 billion													
Daily average Options turnover	USD 5-6 billion													
<b>Spot foreign exchange</b>	<ul style="list-style-type: none"> <li>▪ Onshore CNY foreign exchange spot is available with documentary proof of an underlying transaction.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Participating banks in Hong Kong provide two types of spot RMB exchange rate transactions: <ul style="list-style-type: none"> <li>- For trade, service and direct investment purposes, where resulting foreign exchange positions can be offset with the clearing bank or onshore correspondent banks; and</li> </ul> </li> <li>For general purposes where banks need to warehouse the risk or offset the position in the interbank USD-CNH market.</li> </ul>												
<b>Forward FX/Swaps</b>	<ul style="list-style-type: none"> <li>▪ CNY forwards and foreign exchange swaps with maturities of up to five years are available to onshore institutions to hedge foreign exchange exposure subject to documentary proof of the same.</li> </ul> <p>Most liquid is in the tenor of one year or less.</p>	<ul style="list-style-type: none"> <li>▪ CNH deliverable offshore forwards are available out to five years. Liquidity has improved significantly and has surpassed turnover in the NDF market.</li> </ul>												
<b>FX Options</b>	<ul style="list-style-type: none"> <li>▪ Onshore market participants can buy or sell common European options of CNY against foreign currencies on a real needs basis.</li> <li>▪ Tenors are available out to three years, with further tenors on a case-by-case basis. Most liquid is in the tenor of one year or less.</li> </ul> <p>The State Administration of Foreign Exchange (SAFE) started allowing corporates to sell FX options from August 2014, on a real needs basis, and with net settlement allowed.</p>	<ul style="list-style-type: none"> <li>▪ Deliverable CNH options are available without restrictions to any non-individual counterparty that has a physical CNH Nostro account in Hong Kong.</li> </ul> <p>Options on USD-CNH and CNH crosses are available out to five years, and beyond on a case-by-case basis.</p>												

<p><b>Access to domestic participants</b></p>	<ul style="list-style-type: none"> <li>▪ On the current account, the CNY is convertible, subject to genuine documentation. Onshore entities can access the local forwards market provided these contracts are used to cover current account transactions subject to documentary proof available on settlement.</li> <li>▪ On capital account, CNY conversions may be settled by way of voluntary settlement in banks, if these are required in the Companies' / institutions' actual business operation. Typically, all capital account transactions need to be registered with SAFE for local forwards.</li> </ul>	<p>Not easily accessible to onshore residents, approvals required for transfer of funds from Onshore to Offshore.</p>						
<p><b>Access to Offshore participants</b></p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td data-bbox="397 821 602 1121" style="width: 25%;"><b>Qualified Foreign Institutional Investor</b></td> <td data-bbox="602 821 906 1121">All allowed subject to principle of actual needs (Quota restrictions exists on underlying investments) Can trade <i>via</i> their custodian or domestic financial institution</td> </tr> <tr> <td data-bbox="397 1121 602 1325" style="width: 25%;"><b>Central Banks</b></td> <td data-bbox="602 1121 906 1325">No quota restrictions; ability to trade as interbank counterparty in the domestic market – bilateral or anonymous trading</td> </tr> <tr> <td data-bbox="397 1325 602 1759" style="width: 25%;"><b>China Interbank Bond market (CIBM)/Bond Connect</b></td> <td data-bbox="602 1325 906 1759">For OIIs (Overseas Institutional Investors) accessing making CIBM investment, can enter into all FX products on actual needs basis with settlement agent banks Change in CIBM investment position requires adjustment to the FX hedges within 5 working days</td> </tr> </table>	<b>Qualified Foreign Institutional Investor</b>	All allowed subject to principle of actual needs (Quota restrictions exists on underlying investments) Can trade <i>via</i> their custodian or domestic financial institution	<b>Central Banks</b>	No quota restrictions; ability to trade as interbank counterparty in the domestic market – bilateral or anonymous trading	<b>China Interbank Bond market (CIBM)/Bond Connect</b>	For OIIs (Overseas Institutional Investors) accessing making CIBM investment, can enter into all FX products on actual needs basis with settlement agent banks Change in CIBM investment position requires adjustment to the FX hedges within 5 working days	<p>All customers can open a RMB account in Hong Kong. Banks can provide customers with general purpose RMB accounts, which allow free transfers of funds (offshore) for any purpose, In general, all FX products are allowed in CNH for offshore investors</p>
<b>Qualified Foreign Institutional Investor</b>	All allowed subject to principle of actual needs (Quota restrictions exists on underlying investments) Can trade <i>via</i> their custodian or domestic financial institution							
<b>Central Banks</b>	No quota restrictions; ability to trade as interbank counterparty in the domestic market – bilateral or anonymous trading							
<b>China Interbank Bond market (CIBM)/Bond Connect</b>	For OIIs (Overseas Institutional Investors) accessing making CIBM investment, can enter into all FX products on actual needs basis with settlement agent banks Change in CIBM investment position requires adjustment to the FX hedges within 5 working days							
<p><b>Trading Hours</b></p>	<p>10 A.M. – 4 P.M. Local China Hours</p>	<p>10 A.M. – 4 P.M. Local China Hours</p>						



## II. USD-KRW Market - Korea

Features	Onshore Deliverable	Offshore Non-Deliverable																																
<b>Market Turnover</b>	<p style="text-align: center;"><b>Average daily turnover</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">USD Billion</th> <th style="text-align: center;">Spot</th> <th style="text-align: center;">Forward</th> <th style="text-align: center;">Swaps</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2011</td> <td style="text-align: center;">19.1</td> <td style="text-align: center;">7.5</td> <td style="text-align: center;">19.2</td> </tr> <tr> <td style="text-align: center;">2012</td> <td style="text-align: center;">18.0</td> <td style="text-align: center;">6.6</td> <td style="text-align: center;">19.8</td> </tr> <tr> <td style="text-align: center;">2013</td> <td style="text-align: center;">18.3</td> <td style="text-align: center;">7.1</td> <td style="text-align: center;">19.6</td> </tr> <tr> <td style="text-align: center;">2014</td> <td style="text-align: center;">17.5</td> <td style="text-align: center;">7.6</td> <td style="text-align: center;">19.0</td> </tr> <tr> <td style="text-align: center;">2015</td> <td style="text-align: center;">20.0</td> <td style="text-align: center;">8.3</td> <td style="text-align: center;">19.2</td> </tr> <tr> <td style="text-align: center;">2016</td> <td style="text-align: center;">19.4</td> <td style="text-align: center;">9.6</td> <td style="text-align: center;">18.4</td> </tr> <tr> <td style="text-align: center;">2017</td> <td style="text-align: center;">19.6</td> <td style="text-align: center;">10.1</td> <td style="text-align: center;">19.8</td> </tr> </tbody> </table> <p style="text-align: center;"><i>Source: Bank of Korea</i></p>	USD Billion	Spot	Forward	Swaps	2011	19.1	7.5	19.2	2012	18.0	6.6	19.8	2013	18.3	7.1	19.6	2014	17.5	7.6	19.0	2015	20.0	8.3	19.2	2016	19.4	9.6	18.4	2017	19.6	10.1	19.8	<ul style="list-style-type: none"> <li>▪ As per London clearing house (LCH) Ltd. the daily turnover of NDF cleared by them on April 16, 2019 is a total of USD 11.9 billion (Source: LCH)</li> <li>▪ As per SEF, turnover as on April 12, 2019 is USD 379 million (Source: SEF).</li> <li>▪ Daily NDF turnover has increased from USD 19.5 billion in 2013 to USD 30 billion in 2016 (Source: BIS 2016 survey)</li> </ul>
USD Billion	Spot	Forward	Swaps																															
2011	19.1	7.5	19.2																															
2012	18.0	6.6	19.8																															
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2016	19.4	9.6	18.4																															
2017	19.6	10.1	19.8																															
<b>Access to domestic participants</b>	<ul style="list-style-type: none"> <li>▪ Residents can hold unlimited amounts of foreign currency in foreign currency bank accounts and Korean firms can maintain foreign currency accounts abroad.</li> <li>▪ Financial institutional investors have access to the local forwards market and can hedge their investment exposure without confirming the ‘existence’ of the investment.</li> <li>▪ Forward position limits of foreign bank branches (FBBs) and local banks registered as FX Banks in Korea as below:               <ul style="list-style-type: none"> <li>- For FBBs, positions are capped at 200 per cent of the previous month-end equity capital</li> <li>- For local banks, forward positions are capped at 40 per cent of the previous month-end equity capital</li> <li>- Corporate customer foreign currency hedging limits are 100 per cent% of customers’ exposure or their transaction of underlying real assets</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Residents may hold foreign currency accounts domestically or abroad</li> <li>▪ Corporate investors and individual investors are required to confirm the existence of the investment</li> <li>▪ In the case of capital or current account transactions, domestic residents can remit up to USD 50,000 per year freely;</li> </ul>																																
<b>Access to Offshore participants</b>	<ul style="list-style-type: none"> <li>▪ Non-residents can hold KRW locally through bank accounts</li> <li>▪ Foreign investors must open special investment purpose accounts,</li> </ul>	<p>No restrictions and BoK does not regulate the same.</p>																																

	<p>which consist of an exclusive external account for investment and an exclusive non-resident domestic currency account for investment</p> <ul style="list-style-type: none"> <li>▪ Foreign investors are allowed to freely convert foreign currency into KRW without any underlying securities purchases, while the converted funds are being transferred within exclusive external investment accounts. However, the converted funds in the exclusive external account for investment should still be used for the purpose of securities investment.</li> <li>▪ Non-Resident Investors holding Investment Registration Certificates (IRC), sale proceeds from the investment in securities can be freely repatriated.</li> </ul>	
<b>Central Bank intervention</b>	BOK is now releasing a quarterly intervention report on a net basis. They generally only comment that they intervene only in exceptional basis for smoothing operations.	Bank of Korea does not access the NDF market
<b>Trading Hours</b>	9 AM – 3.30 PM local Korea time	Available through time zones
<b>Taxation and Repatriation of FX Gains</b>	All gains on unwind of deliverable transactions are freely repatriable without any tax.	All gains on unwind of non-deliverable transactions with onshore banks are freely repatriable without any tax

Source: Bank of Korea, BIS, HSBC Research

### III. USD-MYR Market – Malaysia

	<b>Onshore Deliverable</b>	<b>Offshore Non-Deliverable</b>
<b>Market Turnover</b>	<p>Daily inter-bank market USD/MYR spot turnover around \$500 million.</p> <p>Daily inter-bank market USD/MYR swap turnover around \$3.0 billion</p>	<p>As per LCH Ltd., UK Clearing house the daily turnover of USD/MYR NDF cleared by them on April 16, 2019 is a total of USD 332 million from 82 trades (LCH website).</p> <p>As per SEF, a trading platform USD/MYR turnover as on April 12, 2019 is USD 20.5 million from 18 trades (SEF website).</p> <p>As per the Hong Kong exchange the NDF turnovers in 2016 were around USD 50 billion and have reduced to approximately USD 20 billion in 2018 (HKMA NDF report, 2018).</p>
<b>Access to Domestic participants</b>	<p>Resident counterparties, such as importers and exporters can use currency options and forward contracts to manage their foreign exchange risk.</p> <p>Residents are allowed to enter into hedging arrangements on committed current account transactions and financial account transactions.</p> <p>All forward contracts must be supported by an underlying trade or capital account-related transaction allowed under the Foreign Exchange Administration Rules.</p> <p>Residents are allowed to freely hedge and un-hedge their foreign currency exposure for USD-MYR, CNH-MYR, GBP-MYR, EURMYR and JPY-MYR currency pairs without documentary evidence up to an aggregate net open position of MYR 6 million per bank.</p>	Not allowed
<b>Access to Offshore participants</b>	Licensed onshore banks and approved investment banks are allowed to enter into FX forward	Open and not regulated by the central bank

	<p>contracts with non-residents as follows:</p> <ul style="list-style-type: none"> <li>▪ Forward FX purchase or sale contracts against MYR for current account transactions.</li> <li>▪ Forward FX purchase or sale contracts against MYR based on committed purchases or sales of MYR assets. The forward contracts can be entered into at the point when the non-resident commits to purchase or sell the MYR assets</li> </ul> <p>Dynamic hedging programme offers flexibility to actively manage FX risk exposure via forward hedging activities with onshore banks or Appointed Overseas Office (AOO) without any documentation.</p>	
<b>CCP used</b>	Malaysian Exchange	Not mandatory but LCH used regularly
<b>Central Bank intervention</b>	Through appointed agent banks	Not applicable
<b>Fixing to settle NDF</b>	NA	KL USD/MYR Reference rate
<b>Trading Hours</b>	<p>Trading hour is 9 AM to 6 PM Local Time. Limited FX liquidity available for non-residents post local trading hours.</p> <p>USD/MYR is also quoted by appointed overseas offices for spot value only for any underlying asset trades - post local trading hours. No forward prices are quoted.</p>	Quoted across time zones
<b>Taxation and Repatriation of FX Gains</b>	All gains on cancelled FX Contracts are freely repatriable and do not attract taxation in Malaysia.	Taxed based on jurisdiction

Source: Bank Negara Malaysia, BIS, HSBC Research

#### IV. USD-IDR Market - Indonesia

	Onshore Deliverable	Offshore Non-Deliverable	Onshore Non-Deliverable						
<b>Market Turnover</b>	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%;">Average daily spot turnovers</td> <td style="width: 50%;">USD 1bn</td> </tr> <tr> <td>Average daily swap turnovers</td> <td>USD 500 million</td> </tr> </table>	Average daily spot turnovers	USD 1bn	Average daily swap turnovers	USD 500 million	<ul style="list-style-type: none"> <li>▪ As per LCH Ltd - the daily turnover of USD/IDR NDF cleared by them on April 16, 2019 is a total of USD 4.1 billion from 832 trades.</li> <li>▪ As per SEF, USD/IDR turnover as on April 12, 2019 is USD 33 million from 11 trades (<i>Source: SEF</i>).</li> <li>▪ As per HKTR Jan 2018 reporting the outstanding IDR NDF turnover on the Hong Kong exchange of is around USD 40 billion. (<i>Source: HKMA NDF report, 2018</i>)</li> </ul>	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%;">NDF average size</td> <td style="width: 50%;">USD 5m</td> </tr> </table>	NDF average size	USD 5m
Average daily spot turnovers	USD 1bn								
Average daily swap turnovers	USD 500 million								
NDF average size	USD 5m								
<b>Access to Domestic participants</b>	Foreign currency against IDR transactions between banks and domestic parties over a certain amount must have an underlying transaction	Not Allowed	Allowed but will need to demonstrate underlying documents						
<b>Access to Offshore participants</b>	Non-residents must have underlying IDR asset/liability/receivable/payable to be able to enter into IDR cash FX and/or FX hedge. BI list all the permissible underlying activities, along with recommended documentation format.	Open and not regulated by Bank Indonesia.	<ul style="list-style-type: none"> <li>▪ Allowed but will need to demonstrate underlying documents.</li> <li>▪ BI published a more-stringent list of permissible underlying activities.</li> </ul>						
<b>Benefits</b>	Pricing uses onshore-curve, driven by onshore participants and BI intervention.	<ul style="list-style-type: none"> <li>▪ Not regulated and no need for underlying documentation;</li> <li>▪ Prices available across time zones;</li> <li>▪ Can generated IDR exposures without having an underlying asset in IDR.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Pricing uses onshore-curve, driven by onshore participants and BI intervention (explanation below). BI appears to have a much bigger-capacity to manage since the product is net-settled in IDR;</li> </ul>						

			<ul style="list-style-type: none"> <li>▪ Clients with IDR FX exposure, but no urgent need for principal-exchange. As example, long-term IDR bond investors;</li> </ul>
<b>Limitations</b>	<ul style="list-style-type: none"> <li>▪ Requirement for underlying docs limit the maximum exposure that foreign Clients can take;</li> <li>▪ BI restricts Domestic Banks from having residual-risk when dealing Derivatives with Related-Parties (locally incorporated banks only).</li> </ul>	<ul style="list-style-type: none"> <li>▪ Convertibility risk</li> </ul>	<ul style="list-style-type: none"> <li>▪ Requirement for underlying docs limit the maximum exposure Foreign Clients can take;</li> <li>▪ Clients with actual need for principal-exchange, due to basis-risk between [JISDOR fixing] vs [actual FX rate] e.g. Coupon repatriation and</li> <li>▪ BI restricts domestic banks from having residual-risk when dealing derivatives with related parties (locally incorporated banks only).</li> </ul>
<b>Central Bank intervention</b>	BI intervenes only in the onshore market <i>via</i> Cash FX, Onshore DF, and Onshore DNDF. These can be done via auctions or bilateral OTC trades, as there is no onshore futures market for IDR.	Bank Indonesia does not access the NDF market.	BI has the ability to intervene in the DNDF market although the market is very new.
<b>Fixing to settle NDF</b>	Not Applicable	JISDOR (USD-IDR)	JISDOR (USD-IDR)
<b>Trading Hours</b>	<ul style="list-style-type: none"> <li>▪ Trading hours is from 8 AM – 12 PM Local Time and 1 PM – 4 PM (Market breaks for lunch between 12 PM – 1 PM);</li> <li>▪ USD-IDR is also quoted by banks offshore for Spot value only for any underlying asset trades post local trading hours. No Forward prices are quoted.</li> </ul>	Quoted across time zones	<ul style="list-style-type: none"> <li>▪ 8 AM – 12 PM Local Time; 1 PM – 4 PM</li> </ul> <p>(Market breaks for lunch between 12 PM – 1 PM)</p>
<b>Taxation and Repatriation of FX Gains</b>	As per market practice, gains on any unwind/cancellation of FX hedges are not passed to Non-Residents.	Taxed as per jurisdiction.	As per market practice, gains on any unwind/cancellation of FX hedges are not passed to Non-Residents.

Source: Bank Indonesia, BIS, HSBC Research

### V. USD-BRL Market - Brazil

Features	Onshore Deliverable		Offshore Non-Deliverable	
<b>Market Features</b>	Average daily spot	USD 8 billion	Offshore NDF turnover daily	USD 4 billion
	Onshore B3	USD 14 billion		
	Average daily options turnovers	USD 1.5 billion		
<b>Market Hours</b>	Market hours is 0900 to 1800 Hours  However, liquidity is highest between 10 a.m. – 12 p.m. and 2 p.m. – 4 p.m. local hours.			

## VI. USD-TWD Market - Taiwan

Features	Onshore Deliverable	Offshore Non-Deliverable								
<b>Market Features</b>	<table border="1" style="width: 100%;"> <tr> <td style="width: 30%;"><b>Average Daily Spot Turnovers</b></td> <td>USD 3-4 billion</td> </tr> <tr> <td><b>Average Daily Swap turnovers</b></td> <td>USD 2-3 billion</td> </tr> <tr> <td><b>Average Options Turnovers</b></td> <td>USD 150 million</td> </tr> </table>	<b>Average Daily Spot Turnovers</b>	USD 3-4 billion	<b>Average Daily Swap turnovers</b>	USD 2-3 billion	<b>Average Options Turnovers</b>	USD 150 million	<table border="1" style="width: 100%;"> <tr> <td style="width: 30%;"><b>Average daily turnovers</b></td> <td>USD 2-4 billion</td> </tr> </table>	<b>Average daily turnovers</b>	USD 2-4 billion
<b>Average Daily Spot Turnovers</b>	USD 3-4 billion									
<b>Average Daily Swap turnovers</b>	USD 2-3 billion									
<b>Average Options Turnovers</b>	USD 150 million									
<b>Average daily turnovers</b>	USD 2-4 billion									
<b>Market Turnovers</b>	<ul style="list-style-type: none"> <li>- Onshore total Spot turnovers in USDTWD for March 2019 were USD 315.60 billion (Average daily turnover of ~ USD 10 billion).</li> <li>- Data related to USD/TWD swaps is not readily available but total swaps &amp; forwards dealt onshore (across currency pairs) is ~ 57.50% of the FX turnovers</li> </ul>	<p>USD 11.504 billion in April 2016 (last available data)  <i>[Source: BIS]</i></p>								
<b>Access to Domestic participants</b>	<p>There are no limits on the TWD's trading range <i>versus</i> other currencies, but there are convertibility limits on the capital account</p>	<ul style="list-style-type: none"> <li>- Access to domestic participants are not allowed.</li> <li>- Local banks' overseas branches to participate in the TWD NDF market. These banks will also be subject to the existing cap on net NDF positions, at 20 per cent of each bank's FX position (last revised lower from 33 per cent in December 2010).</li> </ul>								
<b>Access to Offshore participants</b>	<p><b>Non-Resident</b></p> <ul style="list-style-type: none"> <li>▪ Foreign investors are allowed to enter into onshore swap/forward contracts for hedging underlying investment in Taiwan.</li> <li>▪ FINIs (Foreign Institutional Investors) can only conduct "buy USD/sell TWD" contract and the total contract amount entered into by a foreign investor should not exceed FINI's USD and TWD net remitted-in capital (i.e. total remitted-in funds minus total remitted-out funds).</li> <li>▪ Access to foreign exchange is divided into three categories: <ul style="list-style-type: none"> <li>- import and export</li> </ul> </li> </ul>	<p>Open and not regulated by the central bank</p>								



	<ul style="list-style-type: none"> <li>- cost of trade-related services</li> <li>- Investments, capital repatriation, and dividends</li> <li>▪ Currency options are permitted.</li> <li>▪ For FINIs/FIDIs, all transactions must be documented regardless of the amount</li> <li>▪ On the maturity of FX forward (or forward leg of a swap deal), FINI may have the following decisions: <ul style="list-style-type: none"> <li>- To settle the contract on the maturity day as originally dealt; In this case, FINI needs to ensure sufficiency of existing account balance. That is, settlement of FX forward should come from the existing funds in Taiwan or funds from sale proceeds of underlying investments.</li> <li>- To extend (i.e. rollover) the contract to another period; in this case, on the maturity day, FINI has to settle the difference between the original forward contract rate and the mark-to-market rate.</li> </ul> </li> <li>▪ If FINI rollovers the contract upon maturity and incurs a gain upon rollover, the gain will be credited to the FINI's account in Taiwan. Such gain will be treated as other income derived in Taiwan</li> </ul>	
<b>CCP used</b>	Taipei Exchange (TPEX) acts as the Central Counter Party for and also covers all foreign exchange transactions made by authorized foreign exchange banks and offshore banking units.	Not mandatory but LCH used regularly
<b>Central Bank intervention</b>	Central bank's FX intervention is via agent banks in the OTC market where onshore TWD is traded. One of the mechanisms through which local currency pressure is absorbed is through modulation of hedge ratio of Lifers	Not applicable
<b>Fixing to settle NDF</b>	NA	Central bank's FX intervention is via agent banks in the OTC market where onshore TWD is traded;  Bloomberg TRY11<Index>
<b>Trading Hours</b>	<ul style="list-style-type: none"> <li>- 9 AM – 4 PM Local Time</li> <li>- Market breaks for lunch at 12 PM – 2 PM</li> </ul>	Quoted across time zones

<p><b>Taxation and Repatriation of FX Gains</b></p>	<ul style="list-style-type: none"> <li>▪ If FINI rollovers the contract upon maturity and incurs a gain upon rollover, the gain will be credited to the FINI's account in Taiwan. Such gain will be treated as other income derived in Taiwan and therefore subject to 20% standard withholding tax. In case that FX loss incurs due to rollover, FINI may arrange funding to cover the loss if necessary.</li>   <li>▪ FINI can choose one of the following methods to calculate and pay for the relevant tax. Please however note that the method is not changeable once it is decided. If FINI does not confirm which method to be used, the option 1) will be applied. <ul style="list-style-type: none"> <li>- Withhold related tax on FX gain from each rollover, or</li> <li>- Netting FX gains/losses from rollover within the same year, or</li> <li>- Netting FX gains/losses from rollover, and the total remitted-in principal's revaluation gain/loss in the year.</li> </ul> </li>   <li>▪ If the foreign investor adopts option 2) or 3) above, they must appoint or contact their existing local tax agent (if any) in Taiwan to file annual tax return.</li> </ul>	<p>Taxed based on jurisdiction</p>
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Source: CBC, BIS, HSBC Research

## Annexure II

### Appendix to Chapter 3

A bivariate BEKK-GARCH (1,1) model, as proposed by Engle and Kroner (1995), can be specified with the system of conditional mean equations consists of VAR(p) models ( $p = 1, \dots, n$ ) as given in eq. (1) and variance equation as in eq.(2).

$$Y_t = \mu + \sum_{i=1}^p \Gamma_i Y_{t-i} + \varepsilon_t \quad (1)$$

where  $Y_t = (y_{1t}, y_{2t})$ ,  $y_{1t}$  is exchange rate return in onshore market and  $y_{2t}$  is exchange rate return in offshore market at time t. The parameter vector  $\mu = (\mu_1, \mu_2)$  represents constants and  $\Gamma$  is a  $2 \times 2$  matrix of autoregressive terms. The diagonal elements  $\gamma_{ii}$  measure own lagged effect of the variables while the off-diagonal elements,  $\gamma_{ij}$ , capture the mean spillover from variable  $i$  to variable  $j$ .

Taking into account the asymmetric responses of volatility, i.e., volatility tends to increase more in response to negative shocks (bad news) than positive shocks (good news), in the variances and covariances, as proposed by Kroner and Ng (1998), a BEKK representation of conditional variance equation can be written as:

$$H_t = C'C + A' \varepsilon'_{t-1} \varepsilon_{t-1} A + B' H_{t-1} B + D' \xi'_{t-1} \xi_{t-1} D \quad (2)$$

where  $\xi_t$  would be  $\varepsilon_t$  if it is negative and zero otherwise. The Eq. (2) can be written in matrix form as follows:

$$\begin{aligned} H_t = & \begin{bmatrix} c_{11} & 0 \\ c_{21} & c_{22} \end{bmatrix} + \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}' \begin{bmatrix} \varepsilon_{1,t-1}^2 & \varepsilon_{1,t-1} \varepsilon_{2,t-1} \\ \varepsilon_{2,t-1} \varepsilon_{1,t-1} & \varepsilon_{2,t-1}^2 \end{bmatrix} \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \\ & + \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix}' \begin{bmatrix} h_{11,t-1} & h_{12,t-1} \\ h_{21,t-1} & h_{22,t-1} \end{bmatrix} \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix} \\ & + \begin{bmatrix} d_{11} & d_{12} \\ d_{21} & d_{22} \end{bmatrix}' \begin{bmatrix} \xi_{1,t-1}^2 & \xi_{1,t-1} \xi_{2,t-1} \\ \xi_{2,t-1} \xi_{1,t-1} & \xi_{2,t-1}^2 \end{bmatrix} \begin{bmatrix} d_{11} & d_{12} \\ d_{21} & d_{22} \end{bmatrix} \end{aligned}$$

In the above model, the dynamic process of  $H_t$  is a linear function of its own lagged values, lagged squared innovations and the cross-product of the innovations, and asymmetric terms. Volatility transmission channel between onshore and offshore markets is represented by the off-diagonal parameters in matrices A and B while the diagonal parameters in those matrices capture the effects of their own past shocks and volatility. The diagonal parameters in matrix D measure the response own past negative shocks while the

off-diagonal parameters  $d_{ij}$  show the response of one market to the negative shocks in the another market to be called the cross-market asymmetric responses.

### MGARCH-BEKK Parameter Estimates

Spot and 1-Month NDF			1-Month Forward and NDF			1-Month Futures and NDF		
Variable	Coeff	P-value	Variable	Coeff	P-value	Variable	Coeff	P-value
<b>Mean Equation</b>								
DSPOT(-1)	-0.63	0.00	DFW1M(-1)	-0.64	0.00	DFUT1M(-1)	-0.63	0.00
DSPOT(-2)	-0.52	0.00	DFW1M(-2)	-0.54	0.00	DFUT1M(-2)	-0.53	0.00
DSPOT(-3)	-0.31	0.00	DFW1M(-3)	-0.33	0.00	DFUT1M(-3)	-0.33	0.00
DSPOT(-4)	-0.15	0.00	DFW1M(-4)	-0.18	0.00	DFUT1M(-4)	-0.19	0.00
DSPOT(-5)	-0.10	0.00	DFW1M(-5)	-0.12	0.00	DFUT1M(-5)	-0.10	0.00
DNDF1M(-1)	0.62	0.00	DNDF1M(-1)	0.63	0.00	DNDF1M(-1)	0.62	0.00
DNDF1M(-2)	0.47	0.00	DNDF1M(-2)	0.49	0.00	DNDF1M(-2)	0.48	0.00
DNDF1M(-3)	0.30	0.00	DNDF1M(-3)	0.33	0.00	DNDF1M(-3)	0.35	0.00
DNDF1M(-4)	0.22	0.00	DNDF1M(-4)	0.23	0.00	DNDF1M(-4)	0.27	0.00
DNDF1M(-5)	0.13	0.00	DNDF1M(-5)	0.15	0.00	DNDF1M(-5)	0.16	0.00
Constant	0.01	0.29	Constant	0.01	0.03	Constant	0.01	0.13
DSPOT(-1)	0.13	0.00	DFW1M(-1)	0.13	0.00	DFUT1M(-1)	0.11	0.01
DSPOT(-2)	0.03	0.53	DFW1M(-2)	0.02	0.46	DFUT1M(-2)	0.00	0.98
DSPOT(-3)	0.05	0.42	DFW1M(-3)	0.03	0.33	DFUT1M(-3)	0.02	0.64
DSPOT(-4)	0.05	0.33	DFW1M(-4)	0.05	0.15	DFUT1M(-4)	0.04	0.41
DSPOT(-5)	0.02	0.67	DFW1M(-5)	0.01	0.68	DFUT1M(-5)	0.02	0.58
DNDF1M(-1)	-0.09	0.00	DNDF1M(-1)	-0.09	0.00	DNDF1M(-1)	-0.09	0.01
DNDF1M(-2)	-0.07	0.15	DNDF1M(-2)	-0.07	0.03	DNDF1M(-2)	-0.05	0.22
DNDF1M(-3)	-0.05	0.33	DNDF1M(-3)	-0.04	0.12	DNDF1M(-3)	-0.02	0.65
DNDF1M(-4)	0.01	0.86	DNDF1M(-4)	0.01	0.76	DNDF1M(-4)	0.03	0.52
DNDF1M(-5)	0.01	0.79	DNDF1M(-5)	0.02	0.52	DNDF1M(-5)	0.01	0.67
Constant	0.01	0.38	Constant	0.01	0.11	Constant	0.01	0.17
<b>Variance Equation</b>								
C(1,1)	0.05	0.00	C(1,1)	0.05	0.00	C(1,1)	0.03	0.00
C(2,1)	0.05	0.00	C(2,1)	0.05	0.00	C(2,1)	0.03	0.00
C(2,2)	-0.01	0.04	C(2,2)	0.01	0.00	C(2,2)	0.05	0.00
A(1,1)	0.27	0.00	A(1,1)	0.27	0.00	A(1,1)	0.14	0.00
A(1,2)	0.04	0.42	A(1,2)	0.05	0.32	A(1,2)	-0.12	0.04
A(2,1)	-0.04	0.29	A(2,1)	-0.04	0.34	A(2,1)	0.07	0.10
A(2,2)	0.19	0.00	A(2,2)	0.18	0.00	A(2,2)	0.29	0.00
B(1,1)	0.96	0.00	B(1,1)	0.96	0.00	B(1,1)	0.98	0.00
B(1,2)	-0.01	0.20	B(1,2)	-0.02	0.03	B(1,2)	0.03	0.04
B(2,1)	0.01	0.37	B(2,1)	0.01	0.29	B(2,1)	-0.01	0.48
B(2,2)	0.98	0.00	B(2,2)	0.98	0.00	B(2,2)	0.94	0.00
D(1,1)	-0.23	0.01	D(1,1)	0.27	0.00	D(1,1)	0.20	0.01

D(1,2)	-0.37	0.00	D(1,2)	0.35	0.00	D(1,2)	0.24	0.00
D(2,1)	0.22	0.00	D(2,1)	-0.25	0.00	D(2,1)	-0.16	0.00
D(2,2)	0.28	0.00	D(2,2)	-0.28	0.00	D(2,2)	-0.12	0.06

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### **Annexure III**

#### **Evolution of Onshore Exchange Traded Currency Derivatives Market**

Exchange Traded Currency Derivatives (ETCD) were launched in August 2008 in India with the introduction of futures contracts on US Dollar-Rupee currency pair as the underlying. Subsequently in the year 2010, Rupee future contracts were allowed to trade against three other currencies viz. Euro, Pound sterling and Japanese yen. The options contracts were introduced on US Dollar-Rupee currency pair in year 2010. The Reserve Bank of India (RBI) and Securities Exchange Board of India (SEBI) allowed participation for all resident individuals including corporates, Trading Members and Banks in proprietary capacity on ETCD.

In the year 2012, it was decided to lower the open position limits for banks on the back of volatility in rupee and to exclude the positions in ETCD from Net Overnight Open Position Limit (NOOPL). Thereafter in the year 2013, the Rupee depreciated sharply against USD due to huge capital outflows in both equity and debt markets, expectation of unwinding of Quantitative Easing by US FED and increase in current account deficit. Additionally, the open position limits for the participants were decreased and banks were restricted from participating on their own accounts in the ETCD market; further, the participants were also prohibited from taking positions beyond USD 10 million.

In June 2014, Banks were allowed to engage in proprietary trading in ETCD markets. Domestic participants were allowed to have open position beyond USD 15 million subject to the evidence of underlying exposure. In 2018, this limit was raised to USD 100 million across all currency pairs involving INR, put together, and combined across all exchanges.

Foreign Portfolio Investors (FPI) and Non-Resident Indians (NRIs) were permitted to participate in ETCD markets, for hedging currency risk arising out of their investments in India, in 2014 and 2017 respectively. In February 2018, SEBI and RBI permitted currency derivatives on cross currency pairs - EURUSD, GBPUSD and USDJPY- and currency options on EURINR, GBPINR, and JPYINR. In December 2018, weekly options on US Dollar - Indian Rupee currency pair were permitted. As on date, derivatives are available on seven currency pairs - USDINR, EURINR, GBPINR, JPYINR, EURUSD, GBPUSD and USDJPY.

The exchange traded currency derivatives draws participation from diverse categories of participants. Some of the key participant categories include banks, corporates, trading members, foreign investors and other investors. The following are the turnover of exchanges:

FY	National Stock Exchange of India (All figures in USD billions)		
	USD-INR futures	USD-INR Options (Notional turnover)	USD-INR Options (Premium)
2014-15	326.30	126.18	0.52
2015-16	373.74	266.00	0.92
2016-17	318.87	352.71	1.07
2017-18	338.18	377.14	1.17
2018-19*	579.13	541.83	2.04

FY	BSE (All figures in USD billions)		
	USD-INR futures	USD-INR Options (Notional turnover)	USD-INR Options (Premium)
2014-15	207.40	96.09	0.81
2015-16	277.13	137.72	0.44
2016-17	275.21	210.34	0.45
2017-18	301.46	375.52	0.41
2018-19*	459.56	593.50	0.51

FY	Metropolitan Stock Exchange of India (All figures in USD billions)		
	USD-INR futures	USD-INR Options (Notional turnover)	USD-INR Options (Premium)
2014-15	182.74	5.93	5.93
2015-16	84.33	6.46	6.46
2016-17	82.33	3.67	3.67
2017-18	30.32	4.91	4.91
2018-19*	10.60	2.45	2.45

**Present Regulatory Framework (client limits, open interest limits, need for underlying exposure, etc.)**

**a) Position limits for different client categories for FCY-INR currency pairs**

- **Position limits of clients and Category III FPIs-** The gross open positions of the client across all contracts in the respective currency pairs shall not exceed the limits as mentioned below:

<b>Currency Pairs</b>	<b>Position limits</b>
USD-INR	Gross open position across all contracts shall not exceed 6% of the total open interest or USD 10 million, whichever is higher.
EUR-INR	Gross open position across all contracts shall not exceed 6% of the total open interest or EUR 5 million, whichever is higher.
GBP-INR	Gross open position across all contracts shall not exceed 6% of the total open interest or GBP 5 million, whichever is higher.
JPY-INR	Gross open position across all contracts shall not exceed 6% of the total open interest or JPY 200 million, whichever is higher.

- **Proprietary position limits of non-bank stock brokers-** The gross open positions of the proprietary account across all contracts in the respective currency pairs shall not exceed the limits as mentioned below:

<b>Currency Pairs</b>	<b>Position limits</b>
USD-INR	Gross open position across all contracts shall not exceed 15% of the total open interest or USD 50 million, whichever is higher.
EUR-INR	Gross open position across all contracts shall not exceed 15% of the total open interest or EUR 25 million, whichever is higher.
GBP-INR	Gross open position across all contracts shall not exceed 15% of the total open interest or GBP 25 million, whichever is higher.
JPY-INR	Gross open position across all contracts shall not exceed 15% of the total open interest or JPY 1000 million, whichever is higher.



- **Position limits of stock brokers (bank and non-bank), Category I and II FPIs-** The gross open positions of trading members across all contracts in the respective currency pairs shall not exceed the limits as mentioned below:

<b>Currency Pairs</b>	<b>Position limits</b>
USD-INR	Gross open position across all contracts shall not exceed 15% of the total open interest or USD 100 million, whichever is higher.
EUR-INR	Gross open position across all contracts shall not exceed 15% of the total open interest or EUR 50 million, whichever is higher.
GBP-INR	Gross open position across all contracts shall not exceed 15% of the total open interest or GBP 50 million, whichever is higher.
JPY-INR	Gross open position across all contracts shall not exceed 15% of the total open interest or JPY 2000 million, whichever is higher.

Domestic clients shall ensure that the position across exchanges is within the prescribed limit of USD 100 million equivalent. If position is in excess of USD 100 million equivalent, clients are required to provide disclosure of underlying exposure to Trading Member as per existing practice.

- **Proprietary positions created in FCY-INR pairs (USD-INR, EUR-INR, GBP-INR and JPY-INR)**

<b>Single INR limit for proprietary position for bank stock broker</b>	<b>Single INR limit for proprietary position for non-bank stock broker</b>
Higher of 15% of total OI across all FCY- INR pairs or USD 200 million	Higher of 15% of total OI across all FCY-INR pairs or USD 100 million

**b) Position limit for Cross Currency Derivatives are given below.**

- **Position limits for stock brokers (banks and non-bank), Category I & II FPIs, Domestic Institutional investors (DIIs), as permitted by the respective sectoral regulators, and AD Category-I banks-**

<b>Currency Pairs</b>	<b>Position limits</b>
EUR-USD	Gross open position across all contracts shall not exceed 15% of the total open interest or EUR 100 million, whichever is higher.
GBP-USD	Gross open position across all contracts shall not exceed 15% of the total open interest or GBP 100 million, whichever is higher.
USD-JPY	Gross open position across all contracts shall not exceed 15% of the total open interest or USD 100 million, whichever is higher.

The aforementioned limits shall be the total limits available to the stock brokers for taking positions on proprietary basis and for positions of their clients.

- **Position limit for proprietary position of non-bank stock brokers-**

<b>Currency Pairs</b>	<b>Position limits</b>
EUR-USD	Gross open position across all contracts shall not exceed 15% of the total open interest or EUR 50 million, whichever is higher.
GBP-USD	Gross open position across all contracts shall not exceed 15% of the total open interest or GBP 50 million, whichever is higher.
USD-JPY	Gross open position across all contracts shall not exceed 15% of the total open interest or USD 50 million, whichever is higher.

- **Position limits for Clients and Category III FPIs-**

<b>Currency Pairs</b>	<b>Position limits</b>
EUR-USD	Gross open position across all contracts shall not exceed 6% of the total open interest or EUR 10 million, whichever is higher.
GBP-USD	Gross open position across all contracts shall not exceed 6% of the total open interest or GBP 10 million, whichever is higher.
USD-JPY	Gross open position across all contracts shall not exceed 6% of the total open interest or USD 10 million, whichever is higher.

## Annexure IV

### Comparison of onshore and offshore Rupee derivatives volumes

#### 1. Exchange Traded Market

All figures in USD billions

FY	Onshore				Offshore				Market Share	
	BSE	NSE	MSEI	Total	DGCX	SGX	CME	Total	Onshore	Offshore
2014-15	211.15	324.91	94.33	630.40	317.04	37.04	3.96	358.04	63.78%	36.22%
2015-16	279.04	372.41	45.39	696.85	327.25	139.06	10.01	476.31	59.40%	40.60%
2016-17	265.28	317.99	43.00	626.26	341.49	171.64	16.36	529.49	54.19%	45.81%
2017-18	303.60	337.29	17.61	658.51	334.58	280.47	52.32	667.37	49.67%	50.33%
2018-19*	448.20	572.37	6.48	1,027.05	354.52	375.99	74.75	805.26	56.05%	43.95%

Note-

- i. Data for BSE, NSE & MSEI is from Exchange websites for USD/INR Futures
- ii. Data for DGCX, SGX and CME is from Bloomberg and India INX Research
- iii. Data for DGCX includes INR/USD Futures (including mini contract), but excludes the USDINR Index Quanto futures
- iv. Data for CME includes the Mini and Micro contracts
- v. \*Data for FY 2018-19 is from April 01, 2018 to March 22, 2019

#### 2. OTC Market (as per BIS Quarterly Review December 2016)

Six currencies <sup>2</sup>	DFs	NDFs	Total	Memo: Share (%) <sup>3</sup>	DFs	NDFs	Total
Onshore	88,277	10,851	99,129	Onshore	32.9	4.0	37.0
Offshore	89,821	79,093	168,914	Offshore	33.5	29.5	63.0
<b>Total</b>	<b>178,098</b>	<b>89,945</b>	<b>268,043</b>	<b>Total</b>	<b>66.4</b>	<b>33.6</b>	<b>100.0</b>
<b>Brazilian real</b>				<b>Chinese renminbi</b>			
Onshore	3,036	2,527	5,563	Onshore	28,064	8	28,072
Offshore	2,810	16,126	18,936	Offshore	72,187	10,350	82,538
<b>Total</b>	<b>5,846</b>	<b>18,653</b>	<b>24,499</b>	<b>Total</b>	<b>100,252</b>	<b>10,359</b>	<b>110,610</b>
<b>Indian rupee</b>				<b>Korean won</b>			
Onshore	16,305	0	16,305	Onshore	14,454	7,357	21,811
Offshore	2,208	16,427	18,635	Offshore	2,985	22,718	25,703
<b>Total</b>	<b>18,513</b>	<b>16,427</b>	<b>34,940</b>	<b>Total</b>	<b>17,439</b>	<b>30,075</b>	<b>47,515</b>
<b>Russian rouble</b>				<b>New Taiwan dollar</b>			
Onshore	18,645	828	19,472	Onshore	7,773	131	7,905
Offshore	8,199	2,099	10,298	Offshore	1,430	11,373	12,804
<b>Total</b>	<b>26,844</b>	<b>2,926</b>	<b>29,770</b>	<b>Total</b>	<b>9,204</b>	<b>11,504</b>	<b>20,708</b>

DFs = deliverable forwards and FX swaps; NDFs = non-deliverable forwards.

<sup>1</sup> NDF turnover is against the US dollar only (thus understating total NDFs by an average of 3%); deliverable forwards are outright forwards and FX swaps less US dollar NDFs and are correspondingly overstated. Currency totals are reported on a "net-net" basis, ie adjusted for local and cross-border inter-dealer double-counting. Onshore is defined as all trades executed in the jurisdiction where a currency is issued on a "net-gross" basis (ie adjusted for local inter-dealer double-counting); offshore is calculated as the difference between total for the currency on a net-net basis and onshore transactions. <sup>2</sup> Brazilian real, Chinese renminbi, Indian rupee, Korean won, Russian rouble and New Taiwan dollar. <sup>3</sup> Six currencies onshore and offshore percentage shares.

Sources: BIS Triennial Central Bank Survey; authors' calculations.

## Annexure V

### Meetings held by the Task Force

Sr. No.	Date	Venue	External Participants Invited
1	March 19, 2019	RBI, Mumbai	
2	March 25, 2019	RBI, Mumbai	-Shri Ananth Narayan, Professor, SPJMIR -FEDAI -Select corporates
3	April 04, 2019	RBI, Mumbai	-Shri G. Padmanabhan, Former Executive Director, RBI -Dr. V. Anantha Nageswaran, Dean, IFMR, Chennai -GIFT City IFSC -National Stock Exchange Ltd. -BSE Ltd.
4	April 23, 2019	RBI, Mumbai	-Select FPIs (through audio conference)
5	May 14, 2019	RBI, Mumbai	-Select FDIIs (through audio conference)
6	May 31, 2019	RBI, Mumbai	-Shri G. Padmanabhan, Former Executive Director, RBI -FIMMDA -CCIL -IBA
7	June 20, 2019	RBI, Mumbai	-Smt. Shyamala Gopinath, Former Deputy Governor, RBI
8	July 04, 2019	SEBI, Mumbai	-Shri G. Padmanabhan, Former Executive Director, RBI
9	July 10, 2019	RBI, Mumbai	-Smt. Shyamala Gopinath, Former Deputy Governor, RBI

## Annexure VI

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