

Capital Account Liberalisation in India: An Analysis of Onshore-Offshore Arbitrage

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Summary

- *Objective*: To decipher the openness of India's capital account
- *Methodology*: calculate CIP deviations between the onshore-offshore rupee market, and estimate no-arbitrage bands using a SETAR model
- *Key Result*: India - financially integrated with the global markets in recent years
- *Policy Implication(s)*: Greater capital account openness + Independent monetary policy → limited room for stabilising currency fluctuations

Just a few days back..

“Capital account convertibility would be a continued process, rather than an event, even as the country had progressed quite considerably in its quest towards full convertibility and internationalisation of its financial markets”

- Shaktikanta Das, RBI Governor, 27-11-2020

Has India's capital account become more open? Is there any evidence?

Background

- Two viewpoints:
 - 1 **Favour:** more efficient allocation of resources → improves productivity and economic growth, risk diversification, access to financial savings to finance domestic investment
 - 2 **Against:** risks associated with large and volatile cross-border capital flows → economic distortions and policy challenges, asset bubbles
- Implications for macro-policy - the trilemma of independent monetary policy, stable exchange rates and capital account liberalisation
- Last three decades, cross-border flows have increased, yet EMEs keep experimenting for multiple reasons
- Whether capital account liberalisation is hurting or helping an economy, it is important to first understand how open or closed a country's capital account truly is.

Measuring Capital Account Openness

Two measures:

- 1 **De-jure**: are constructed from the legal restrictions by collecting data on changes in regulations
 - ▶ The Chinn-Ito index or the Schindler index → use the detailed capital controls published by the IMF
 - ▶ Fail to capture the intricacies owing to their low frequency and binary approach
- 2 **De-facto**: help to understand how open a country's capital account truly is, based on the data
 - ▶ Two categories: quantity based and price-based
 - ▶ Our focus on the price-based measures - the Covered Interest Parity (CIP)

Why India?

- Since 1990s legal restrictions that govern cross-border flows have been gradually relaxed
- But, new restrictions are imposed from time to time
- Frequent changes make India a good-case study to analyse capital account liberalisation

Research Design

- 1 Calculate CIP deviations between the NDF implied interest rate and the domestic interest rate
- 2 Identify regimes in CIP deviations
- 3 Estimate no-arbitrage bands

Rupee NDF Market - What is it?

- Capital account restrictions prevent access to the onshore currency market to either hedge or to speculate on the currency movements → offshore NDF market to address this gap
- Characteristics:
 - 1 No physical settlement, Largely a USD settled market
 - 3 Over The Counter (OTC) market
 - 4 Situated at Singapore, HongKong, London, Dubai and New York; Singapore largest given the time overlap
- It is also mostly unregulated
- The offshore NDF rate is a market-determined forward rate free of capital controls → the implied yield is the return that would be available on Indian short-term financial instruments in the absence of capital controls

Rupee NDF Market - Facts

- *Volume*: Reported a staggering three-fold increase, from around USD 16.4 billion in 2016 to USD 50 billion in 2019.
- *Market Share*: The offshore NDF market now accounts for roughly 82 percent of the total outright forwards in USD/INR in 2019 as against 74.3 percent in 2016.
- *Global Share*: India accounts for about 18.2% of the global trade in NDFs (Thorat (2016)).

Offshore-Onshore Yield - Theory

NDF implied interest rate ('r') based on the CIP equation,

$$r = \frac{F_N}{S} (1 + i_{USD}) - 1 \quad (1)$$

- S is the spot exchange rate of the US dollar in terms of the Indian Rupee
- F_N is the NDF rate of a certain maturity
- i_{USD} is the interest rate on dollar deposits of the corresponding maturity (LIBOR rate)

CIP Deviations,

$$Deviations = d - r \quad (2)$$

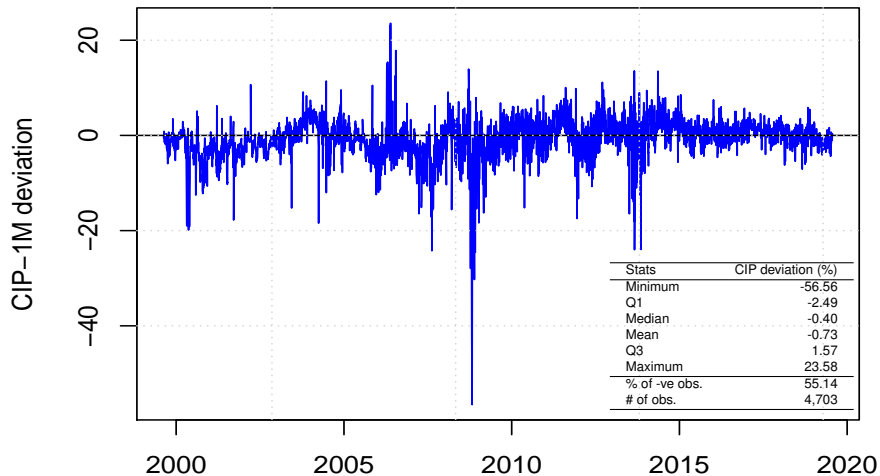
- d is the domestic onshore rate - MIBOR

What do these deviations mean?

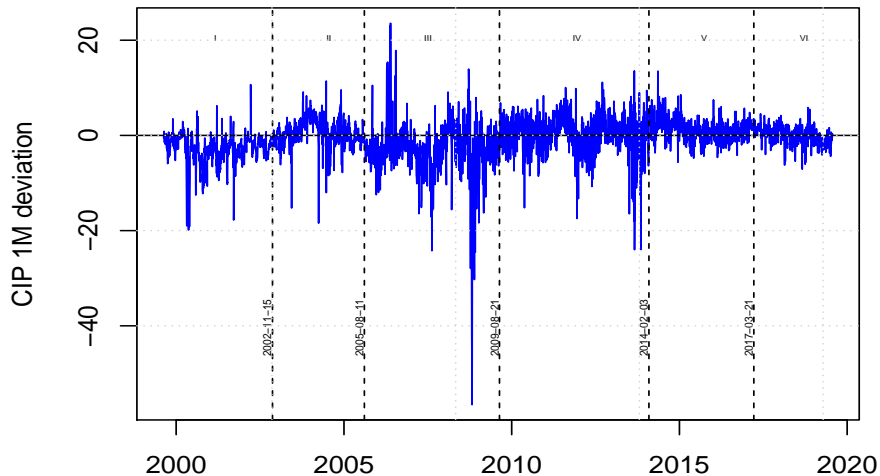
- Ideally zero, a one-off deviation should go to zero due to arbitrage
- Persistent deviations are due to effective capital controls that prevent the equation to hold
- Persistent negative deviations, $d < r \rightarrow$ effective capital controls on outflows, depreciation pressure on the home currency
- Persistent positive deviations, $d > r \rightarrow$ effective capital controls on inflows, appreciation pressure on the home currency

- Sources:
 - ▶ 1-month NDF contracts and the spot INR/USD rate - Thomson Reuters Eikon Database
 - ▶ 1-month London Inter Bank Overnight Rate (LIBOR) - Federal Reserve Board
 - ▶ 1- month Mumbai Inter Bank Overnight Rate (MIBOR) - Reserve Bank of India
- Time Period - August 1999 to July 2019
- Frequency - Daily

CIP 1-Month Deviations

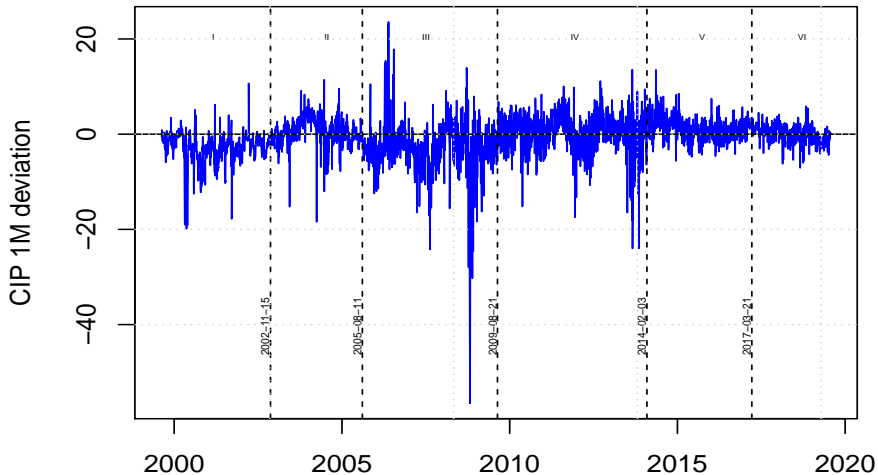


Structural Breaks



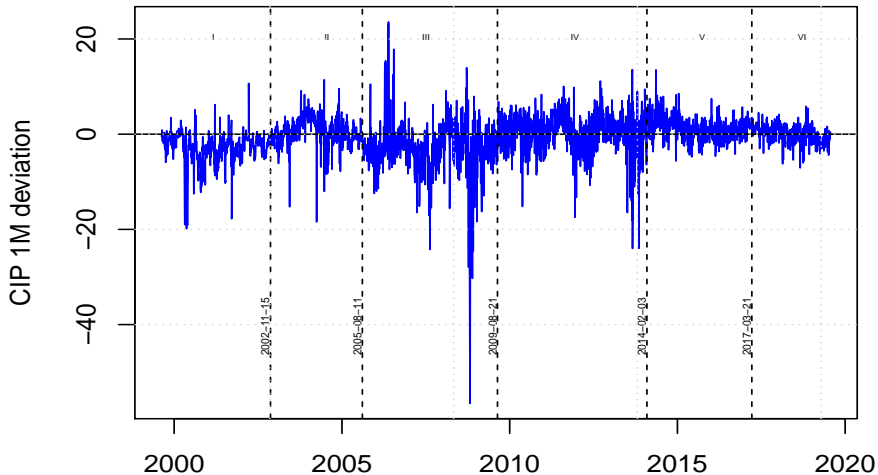
Structural Breaks

Regime 1	
Obs.	762
Mean	-2.9
S.D.	3.1
-ve (%)	90
GDP(%)	5.3



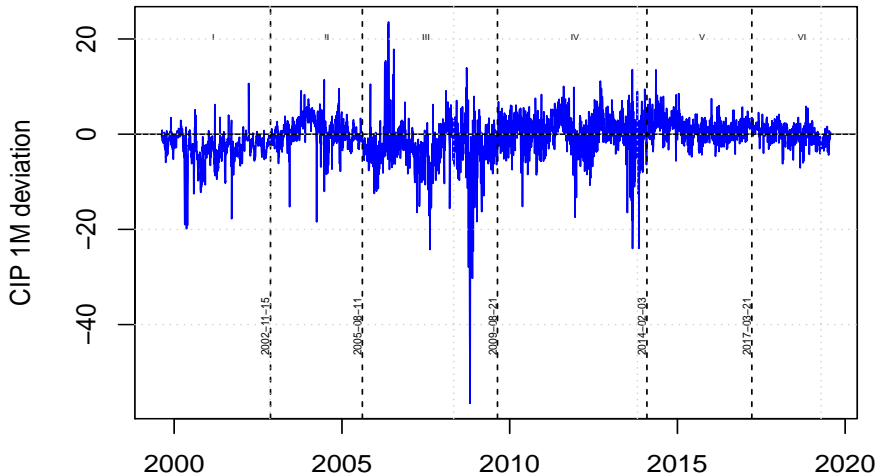
Structural Breaks

Regime 1		Regime 2	
Obs.	762	Obs.	642
Mean	-2.9	Mean	0.6
S.D.	3.1	S.D.	2.9
-ve (%)	90	-ve (%)	40
GDP(%)	5.3	GDP(%)	8.4



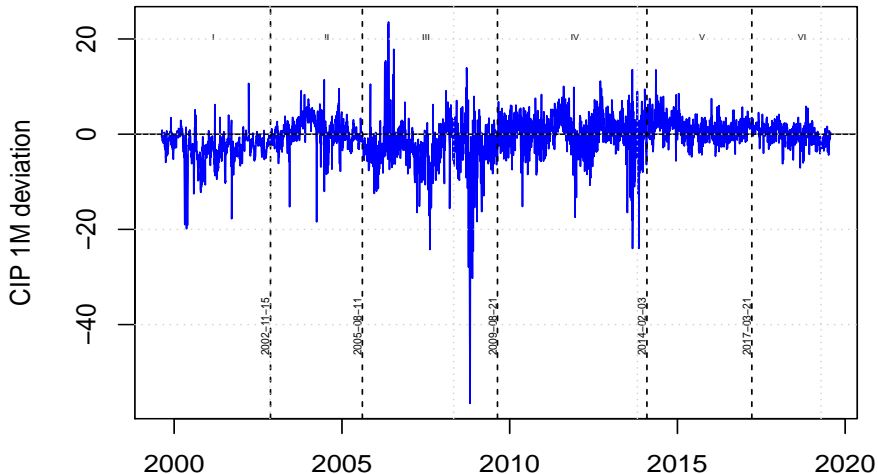
Structural Breaks

Regime 1		Regime 2		Regime 3	
Obs.	762	Obs.	642	Obs.	955
Mean	-2.9	Mean	0.6	Mean	-3.0
S.D.	3.1	S.D.	2.9	S.D.	5.8
-ve (%)	90	-ve (%)	40	-ve (%)	78
GDP(%)	5.3	GDP(%)	8.4	GDP(%)	7.9



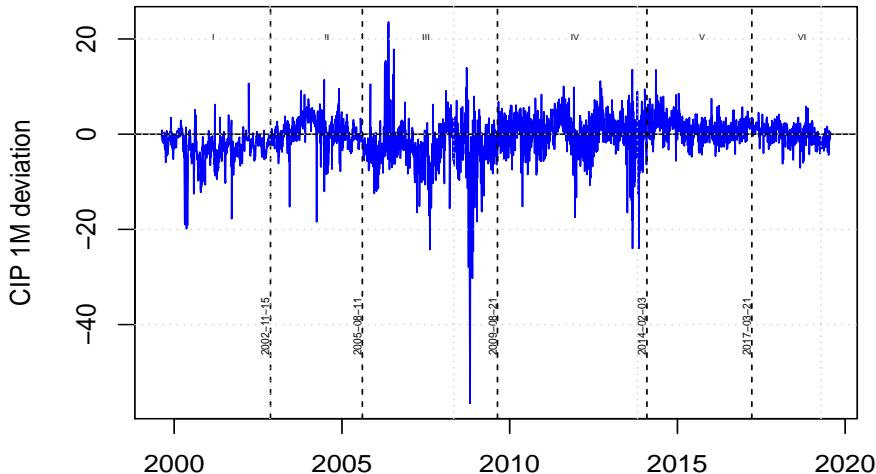
Structural Breaks

Regime 1		Regime 2		Regime 3		Regime 4	
Obs.	762	Obs.	642	Obs.	955	Obs.	1043
Mean	-2.9	Mean	0.6	Mean	-3.0	Mean	0.4
S.D.	3.1	S.D.	2.9	S.D.	5.8	S.D.	3.9
-ve (%)	90	-ve (%)	40	-ve (%)	78	-ve (%)	40
GDP(%)	5.3	GDP(%)	8.4	GDP(%)	7.9	GDP(%)	3.9



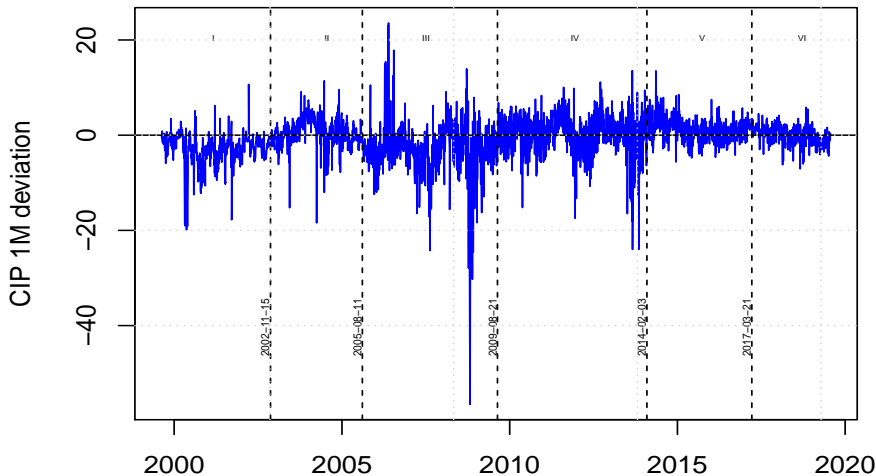
Structural Breaks

Regime 1		Regime 2		Regime 3		Regime 4		Regime 5	
Obs.	762	Obs.	642	Obs.	955	Obs.	1043	Obs.	756
Mean	-2.9	Mean	0.6	Mean	-3.0	Mean	0.4	Mean	1.3
S.D.	3.1	S.D.	2.9	S.D.	5.8	S.D.	3.9	S.D.	2.2
-ve (%)	90	-ve (%)	40	-ve (%)	78	-ve (%)	40	-ve (%)	26
GDP(%)	5.3	GDP(%)	8.4	GDP(%)	7.9	GDP(%)	3.9	GDP(%)	7.9



Structural Breaks

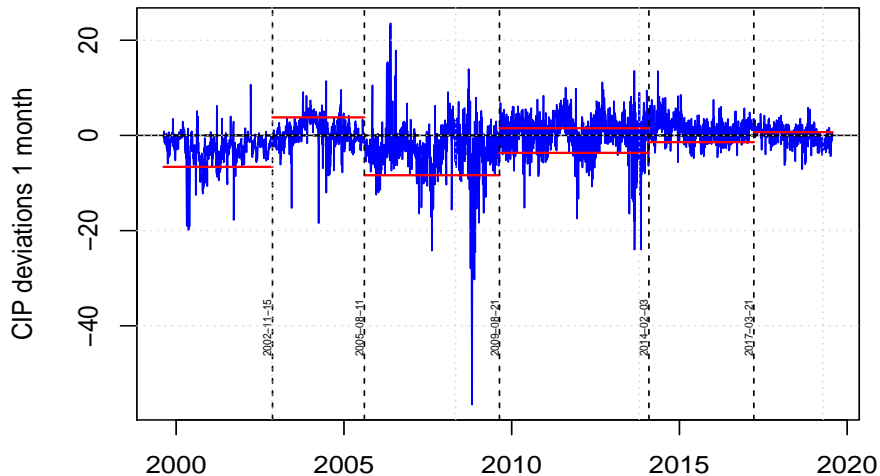
Regime 1		Regime 2		Regime 3		Regime 4		Regime 5		Regime 6	
Obs.	762	Obs.	642	Obs.	955	Obs.	1043	Obs.	756	Obs.	565
Mean	-2.9	Mean	0.6	Mean	-3.0	Mean	0.4	Mean	1.3	Mean	-0.0
S.D.	3.1	S.D.	2.9	S.D.	5.8	S.D.	3.9	S.D.	2.2	S.D.	1.8
-ve (%)	90	-ve (%)	40	-ve (%)	78	-ve (%)	40	-ve (%)	26	-ve (%)	49
GDP(%)	5.3	GDP(%)	8.4	GDP(%)	7.9	GDP(%)	3.9	GDP(%)	7.9	GDP(%)	5.8



No-Arbitrage Bands - Why?

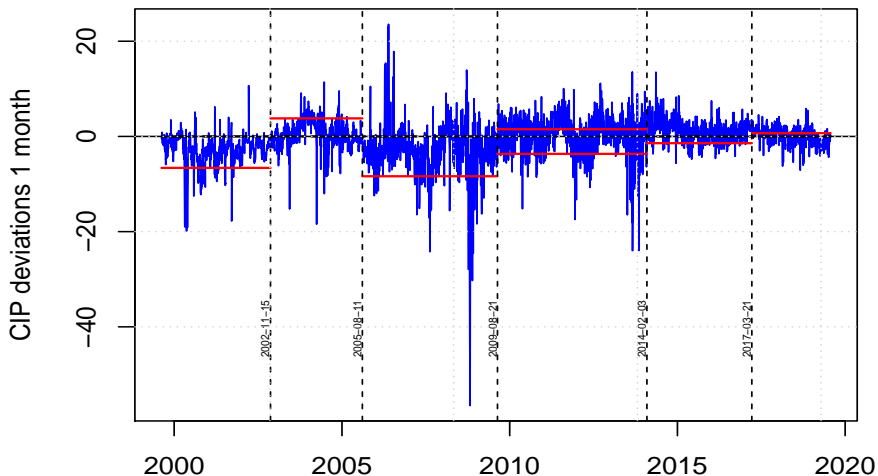
- Not all deviations would lead to arbitrage opportunities given capital account restrictions and transaction costs
- Would arbitrage ever trigger? Yes, if the deviations are large enough.
- How large should the deviations be? no-arbitrage bands help answer that question.
- The no-arbitrage bands are a function of capital controls restrictions, transactions costs as well as institutional factors
- Narrowing no-arbitrage bands imply easing of capital account restrictions, lower transactions cost, or both
- Within the bands - no arbitrage, outside the bands - arbitrage opportunities
- Use of a SETAR model to estimate these bands

SETAR Model - No-arbitrage Bands



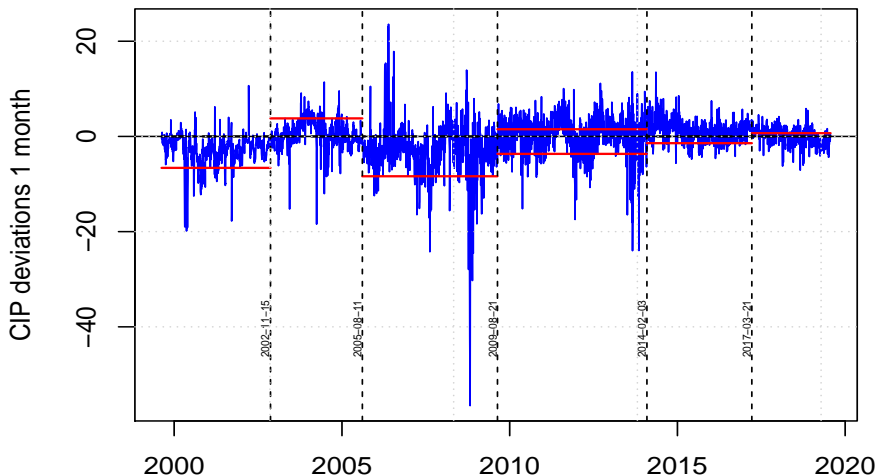
SETAR Model - No-arbitrage Bands

Regime 1	
L. Th.	-6.6
H. Th.	0
Diff.	6.6



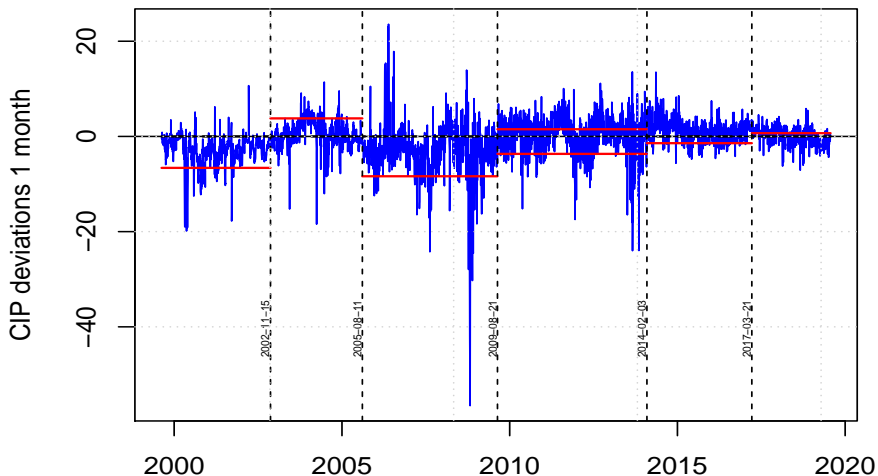
SETAR Model - No-arbitrage Bands

Regime 1		Regime 2	
L. Th.	-6.6	L. Th.	0
H. Th.	0	H. Th.	3.8
Diff.	6.6	Diff.	3.8



SETAR Model - No-arbitrage Bands

Regime 1	Regime 2	Regime 3
L. Th. -6.6	L. Th. 0	L. Th. -8.4
H. Th. 0	H. Th. 3.8	H. Th. 0
Diff. 6.6	Diff. 3.8	Diff. 8.4



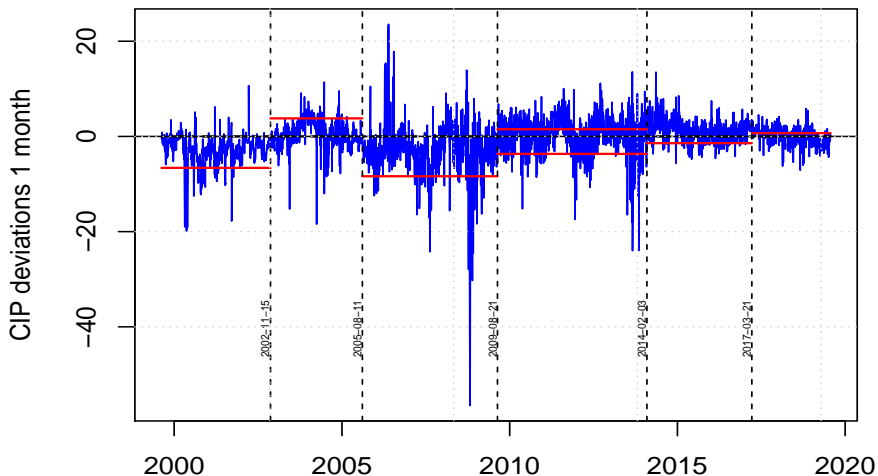
SETAR Model - No-arbitrage Bands

Regime 1	
L. Th.	-6.6
H. Th.	0
Diff.	6.6

Regime 2	
L. Th.	0
H. Th.	3.8
Diff.	3.8

Regime 3	
L. Th.	-8.4
H. Th.	0
Diff.	8.4

Regime 4	
L. Th.	-3.7
H. Th.	1.5
Diff.	5.1



SETAR Model - No-arbitrage Bands

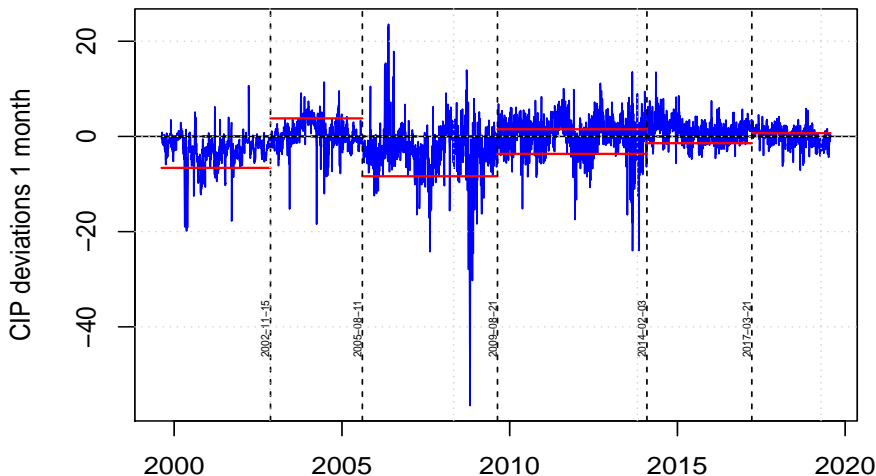
Regime 1	
L. Th.	-6.6
H. Th.	0
Diff.	6.6

Regime 2	
L. Th.	0
H. Th.	3.8
Diff.	3.8

Regime 3	
L. Th.	-8.4
H. Th.	0
Diff.	8.4

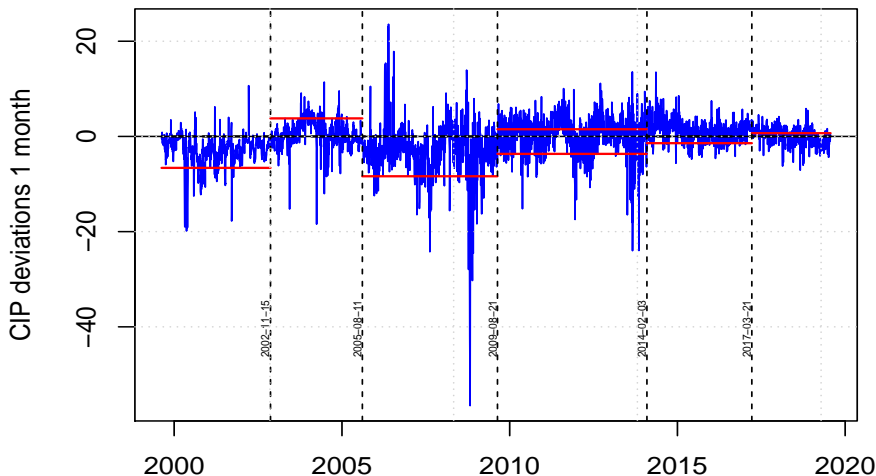
Regime 4	
L. Th.	-3.7
H. Th.	1.5
Diff.	5.1

Regime 5	
L. Th.	-1.4
H. Th.	0
Diff.	1.4



SETAR Model - No-arbitrage Bands

Regime 1	Regime 2	Regime 3	Regime 4	Regime 5	Regime 6
L. Th. -6.6	L. Th. 0	L. Th. -8.4	L. Th. -3.7	L. Th. -1.4	L. Th. 0
H. Th. 0	H. Th. 3.8	H. Th. 0	H. Th. 1.5	H. Th. 0	H. Th. 0.7
Diff. 6.6	Diff. 3.8	Diff. 8.4	Diff. 5.1	Diff. 1.4	Diff. 0.7



Conclusion

- Use a relatively under-utilised price bases measure that uses deviations from the Covered Interest Parity to study the changes in capital account openness.
- India seems to have become significantly more financially integrated with the global markets, as demonstrated by CIP deviations going to zero and narrowing arbitrage bands.
- *Policy Implication:* As an inflation targeting country since 2016 and greater capital account openness over time implies that there is limited room for stabilising currency fluctuations

Thank you!