Is there a Case for Exchange Rate Coordination in South Asia?

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Outline

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Introduction & Motivation

- Theoretically, exchange rate coordination among a group of countries poses several benefits for economies striving for greater integration.
  - It reduces the scope of exchange rate misalignment, which results in loss of competitiveness and leads to an increase in protectionism, which in turn could promote a round of beggar-thy-neighbor devaluations.
  - Large swings in bilateral exchange rates could also influence decisions about the location of new and existing investments.
  - In contrast, greater exchange rate stability would support investment by increasing price transparency and reducing currency-related hedging costs for companies.
- Despite these benefits, exchange rate coordination continues to be an arduous and long-drawn process at the best of times, involving intensive policy dialogue.
- We evaluate this option for South Asia, a region which has not been evaluated extensively from this prism:
  - South Asia has emerged as one of the fastest growing regions of the world.
  - While it has raised its trade integration with the rest of the world, it is characterised by low levels of intra-regional trade integration.
  - The economies of the region have witnessed significant integration with the global capital markets.

Outline

Trade Integration

- Historically, South Asia has lagged behind other regions in the world in integration with global markets.
- Apart from low integration with the rest of the world, intraregional trade among the South Asian economies is also very limited compared to other regions.

Figure: Trade Openness across Regions
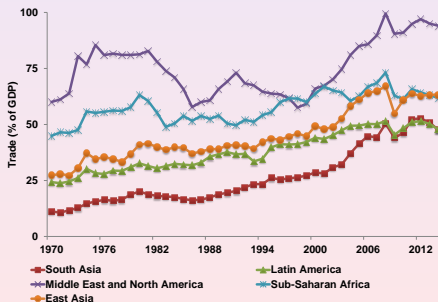
Trade Integration

- Since the mid-1990s a number of initiatives have been put in place to promote South Asian trade integration. These include a variety of trade pacts at the bilateral and regional levels.
- Most South Asian economies progressively reduced their tariff barriers since the mid-1990s under these initiatives as well as in line with the WTO obligations.
- The decline in weighted average tariff rate was associated with an increase in the growth rate of intra-regional trade.
- While current initiatives to bolster trade within the region promises to further increase intra-regional trade share, greater exchange rate coordination is likely to provide an additional incentive.

Table: Evolution of Trade across South Asia

	vis-a-vis South Asia			vis-a-vis World		
	Total Trade ($ Billion)	Growth (%)	Share (%)	Total Trade ($ Billion)	Growth (%)	Share (%)
1991 to 1995	2.95	20.71	3.65	79.48	10.02	100
1996 to 2000	5.46	8.16	4.4	124.4	6.53	100
2001 to 2005	11.43	23.48	5.33	212.2	18.42	100
2006 to 2010	26.76	15.45	4.87	553.68	18.41	100
2011 to 2014	47.95	12.37	4.91	977.31	1.12	100

Outline

Financial Integration and Global Shocks

- Apart from the trade benefits, a case for exchange rate coordination, also arises from the fact the economies of South Asia have been susceptible to similar external shocks in the form of volatile capital flows.
- In the last two decades, the region has significantly increased its integration with global capital markets, resulting in them being subject to waves of capital flows.

Figure: Financial Openness across South Asian Countries
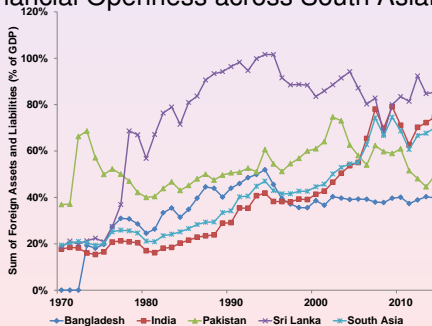
- Use the methodology in Forbes and Warnock (2012) to identify periods of sharp changes in inflows. Computation of these episodes involve calculating C_t where

$$C_t = \sum_{t=0}^{3} GINFLOW_{t-1} \tag{1}$$

- Compute $\Delta C_t = C_t - C_{t-4}$. Next, compute the rolling means and standard deviations of ΔC_t over a five-year period.
- Identify 'surge' and 'stop' episodes in 4 major South Asian economies. ▸ Episodes
- A surge episode is identified as one, which starts in the quarter when ΔC_t increases more than one standard deviation above its rolling mean. The episode ends once ΔC_t falls below one standard deviation above its rolling mean.
- Furthermore, there must be at least one quarter when ΔC_t increases by a minimum of two standard deviations above its rolling mean.

Figure: Surge and Stop Episodes

(a)   Surge Episodes
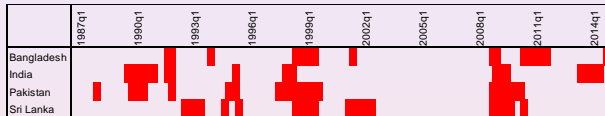
(b)   Stop Episodes

- Though the number of surge and stop episodes differ across the economies, there are considerable overlap of these episodes.
  - In case of surge episodes, during 1993 Q2 to 1994 Q3 all the 4 economies experienced quarters with a surge in foreign inflows.
  - A similar experience was observed during 1996 Q2 to 1997 Q1, and again between 2005 Q1 and 2007 Q2.
  - The earliest stop episode occurred in late 1989 and continued till early 1991 while two other stop episodes that engulfed the entire region are the 1997 Q4 to 1998 Q4 (Asian Financial Crisis), and during the 2008 Q2 to 2009 Q4 (Global Financial Crisis).

Outline

EMPI

- Volatility in capital flows along with greater trade integration has increased susceptibility to global shocks, with the exchange rate coming under pressure.
- Focusing on the EMPI of the 4 countries we find that despite some volatility there is a declining trend in EMPI.
- Greater trade integration within South Asia, along with symmetric flow of foreign capital and these economies being subject to similar EMP raise the issue of greater exchange rate coordination among these countries.
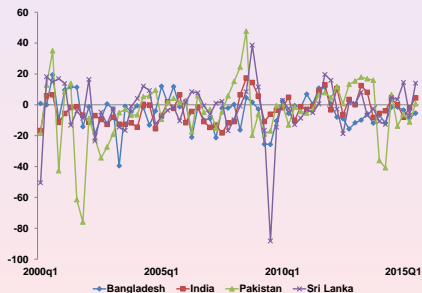
(a) EMPI
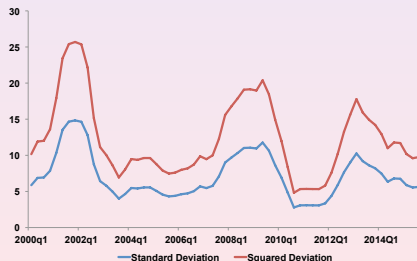
(b) EMPI Deviation

Outline

Proposing a SACU

- Out of the 8 economies in South Asia, we focus on Bangladesh, India, Pakistan and Sri Lanka, which account for more than 80% of economic activity.

- Assign weights to the various participating currencies, with economic indicators reflecting the economic size and the extent to which countries will use the RCU – GDP (PPP) and intraregional trade.
  - Bangladesh - 20.6%
  - India - 38.9%
  - Pakistan - 21.3%
  - Sri Lanka - 19.2%

- Identify the base period, i.e. a period when deviations among macroeconomic indicators are least – 1999.

- We choose the USD as the numeraire currency given that the United States continues to be the dominant trade partner for most of the economies and most of the capital account transactions continue to be invoiced in USD.

● The value of the South Asian Currency Unit in terms of the numeraire currency basket is given as

$$\varepsilon_{SACU,t}^{NUM} = \sum_i \omega_i \varepsilon_{i,t}^{NUM} \qquad (2)$$

● SACU depreciated against the USD by about 40% between 1999 and 2015, but not in a monotonic manner – 4 breaks and 5 periods.

Figure: Movement of SACU vis-a-vis USD

Outline

Deviation of Participating Currencies from SACU

- The regional currency unit would allow one to evaluate the performance of the individual participating currencies vis-a-vis the regional currency unit.

$$\varepsilon_{i,t}^{SACU} = \varepsilon_{i,t}^{NUM} \varepsilon_{NUM,t}^{SACU} \tag{3}$$

- Evaluate the deviation of the individual participating currencies from SACU according to

$$D_{i,t} = \frac{\varepsilon_{i,t}^{SACU} - \varepsilon_{i,0}^{SACU}}{\varepsilon_{i,0}^{SACU}} \tag{4}$$

- It is clearly evident that there is great deal of divergence in the performance of the individual South Asian currencies, against the regional benchmark. ▸ Deviations
- Large deviations in nominal exchange rate movements could be driven by different inflation rates prevailing in these economies, with countries aspiring for a stable real exchange.
- Focus on the real exchange rates, and deviation of real exchange rates from the regional benchmark.

$$\theta_{i,t}^{SACU} = \varepsilon_{i,t}^{SACU} \frac{P_t^{SACU}}{P_t^i} \tag{5}$$

- The extent of real exchange rate deviations, which take into account inflation differentials, are considerably different from the nominal exchange rate deviations. ▸ Deviations
- The disparities in real exchange rate deviations are considerably smaller than in the case of nominal exchange rate.

Outline

Estimates of Coordination among South Asian Currencies

- To empirically check the extent of convergence among the major currencies of South Asia, apply the unit root test to examine whether the difference is stationary.
- However, as shown by Fan and Wei (2006) a constraint of these tests is that they have low power as they tend to reject overly the stationarity hypothesis of a time series so we also focus on panel unit root tests. ▸ Panel Tests
- We also attempt to correct for cross sectional dependence but find little evidence of convergence, across the entire time period or even the individual years.
- We also look at the convergence in the real exchange rate where we find some evidence of convergence. ▸ Panel Tests
  - Sub-sample analysis shows that this driven primarily by the results of the initial years, with some convergence occurring in the final period.

Allowing for Structural Breaks

- Studies have argued the biasness of unit root tests toward accepting the false unit root null hypothesis in the presence of a structural break (including Amsler and Lee (1995)).
- Compute the extension of the Hadri (2000) test for stationarity in panel data with multiple structural changes under the null hypothesis, proposed in Carrion-i-Silvestre et al. (2005).
- Clear evidence of variation in both the number and timing of structural breaks experienced by the various countries as well as duration. ▶ Breaks
- We use these breaks in the procedure outlined in Carrion-i-Silvestre et al. (2005).

Table: Panel Data Stationarity Tests with Multiple Structural Breaks

	Nominal Deviation	Real Deviation
Homogenous	-1.923**	-0.107
	(0.034)	(0.142)
Heterogenous	-2.103**	-1.812**
	(0.034)	(0.042)

- Null hypothesis of stationarity can be rejected when the test is computed using the heterogenous long run variance estimate for both nominal and real deviation.
- Only in the case of real deviations from the SACU under the assumption of homogenous long run variance, the null hypothesis cannot be rejected.
- With overall evidence in favour of a rejection being quite overwhelming, South Asian currencies have shown very little indication of convergence in nominal terms.
- The evidence of real deviation is slightly more mixed with the homogenous and heterogenous long run variance presenting conflicting evidence.

Outline

Diverse Exchange Rate Regimes

- The IMF, in its 2014 AREAER, classifies:
  - India – *Floating*
  - Bangladesh & Sri Lanka – *Stabilized Arrangement*, which implies a soft peg
  - Pakistan – *Other Managed Arrangement*, which is a residual category.

- In recent years, the literature has classified exchange rate regimes in operation using a variety of alternative algorithms.

- Bleaney and Tian (2014) classify the exchange rate regimes based on regression results, although the classification is quite broad with only four major categories. ▸ Regimes
  - Considerable diversity among the four economies, with all the four economies transitioning between peg and floating.
  - On average it can be seen that India had the most flexible exchange rate regime, followed by Sri Lanka, Bangladesh and finally Pakistan.

- Ilzetzki et al (2008) provides a a finer classification, with 15 types of classification of exchange rate regimes. ▸ Regimes
  - Considerable divergence across the different countries.
  - While India moved from de facto peg to de facto crawling peg to finally de facto crawling band, while Bangladesh went the other way from de facto crawling peg to de facto peg.
  - Pakistan transitioned from de facto crawling peg to de facto crawling band, while Sri Lanka moved from pre-announced crawling band to de facto peg.

Outline

Movement against Major Global Currencies – EMPI

- Employ empirical measures using the movement of the South Asian currencies vis-a-vis major international currencies. to evaluate the exchange rate regimes.
- The EMP index is based on the relationship between exchange rate and international reserves used to halt the change in exchange rate.
- Following Cavoli and Rajan (2013) we use the following measure as the exchange market flexibility index

$$I_t = \frac{|\Delta \varepsilon_t|}{|\Delta \varepsilon_t| + |\Delta IR_t|} \tag{6}$$

If the pressure in the forex market results only in a change in the exchange rate (international reserves) and no change in international reserves (exchange rate) i.e. $\Delta IR_t \to 0$ ($\Delta \varepsilon_t \to 0$), then $I_t \to 1$ ($I_t \to 0$), and the regime is deemed flexible (fixed).

- The value of the index against the USD is lower compared to Euro and Yen, implying that these economies are pegging their currencies more to the USD than others. ▶ EMPI
- The value of the exchange market flexibility index for India against USD is significantly higher than others, indicating that India has a less of a USD peg.
- Recursive estimates show that throughout 2000 to 2014, Bangladesh, Pakistan and Sri Lanka, pegged their currencies more to the USD, and the extent of the peg has remained relatively same. ▶ EMPI
- In India, from 2000 to 2003, the INR was pegged to the USD, but the extent of peg started to decline from 2004 onwards, which continued till 2012.

Movement against Major Global Currencies – Frankel-Wei

- Investigate the extent of the individual currency's linkages with the three major global currencies using the methodology Frankel-Wei (1994).

$$\Delta \log \varepsilon_{i,t}^{NZD} = \alpha_0 + \beta_1 \Delta \log \varepsilon_{USD,t}^{NZD} + \beta_2 \Delta \log \varepsilon_{EUR,t}^{NZD} + \beta_3 \Delta \log \varepsilon_{YEN,t}^{NZD} + \mu_{i,t} \qquad (7)$$

- The coefficients represent the weights of the respective currencies. ▶ FW
- Recursive estimates show that across all the four major South Asian economies, the USD exerts the maximum influence over the movement of the domestic currencies.
- The extent of influence of the USD is maximum in the case of Bangladesh,followed by Pakistan and Sri Lanka. India became a managed floater as the weight on the USD declined from 2005 onwards.
- The different exchange rate regimes in the four South Asian economies reflect the differences in the priorities of the macroeconomic policy.

Exchange Rate Coordination

- The different exchange rate regimes in the four South Asian economies reflect the differences in the priorities of the macroeconomic policy.

- The diverse exchange rate regimes across the various South Asian economies implies that a great deal of political commitment would be required if these economies are to move towards a path of exchange rate coordination.
    - South Asian economies have already established a network of Finance Secretaries and Central bank Governors (SAARCFINANCE) with greater monetary and exchange rate cooperation being one of the key objectives.

- A move towards exchange rate coordination will have to be accompanied by crisis prevention and crisis resolution mechanisms.
    - Crisis prevention mechanism will include independent and credible macroeconomic surveillance that can foretell macroeconomic imbalances being created in these economies.
    - The crisis resolution mechanism can take the form of reserve pooling and currency swap lines.
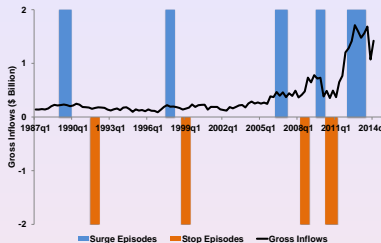
Conclusion

- Rising intra-regional trade integration and the regional economies being buffeted by similar shocks raise the question for greater exchange rate cooperation among the economies of the region.
- Using a hypothetical South Asian Currency Unit, we find limited evidence of comovement of South Asian currencies in nominal terms, while the evidence for degree of comovement in real terms is slightly stronger.
- Much of the divergence in the movement of currencies is derived from the varied exchange rates being pursued in these economies so a key prerequisite is the presence of institutions that would help prevent and resolve crises.
- Macroeconomic imbalances in any kind of a coordinated system will give rise to economic tensions
- South Asian economies have a long way to go towards exchange rate coordination, and should proceed gradually towards this path that will allow for greater flexibility and room for adjustment.
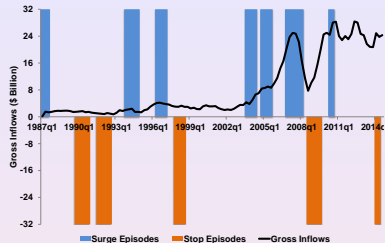
Thank You For Your Attention!
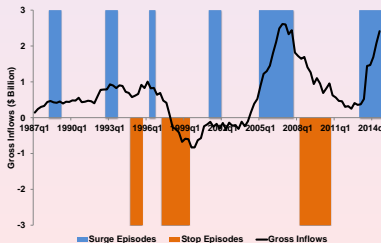
Appendix Outline

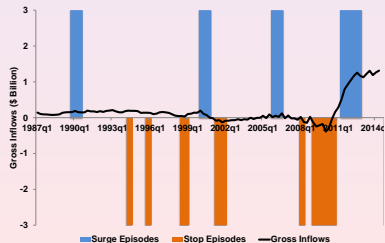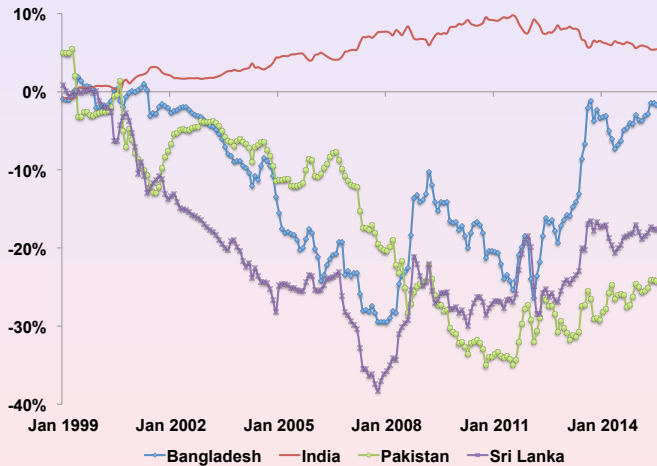# Surge & Stop Episodes
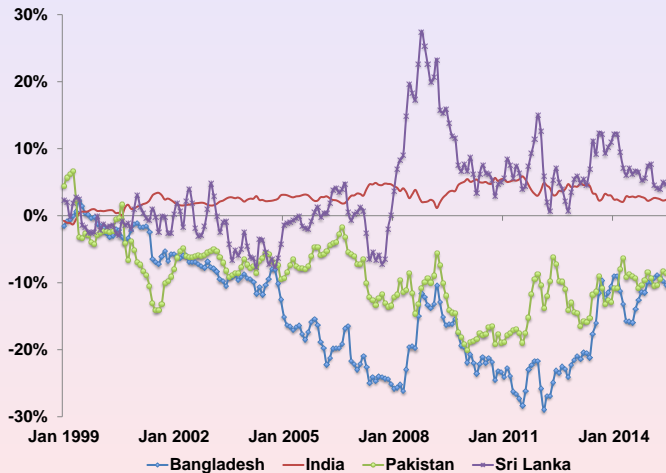

(a) Bangladesh

(b) India

(c) Pakistan

(d) Sri Lanka

Deviations from SACU (Nominal)

▸ Deviation

Deviations from SACU (Real)

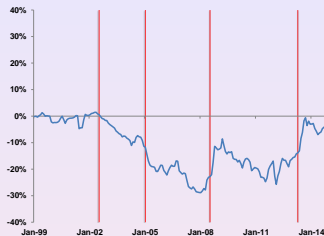|	Averaged Weighted Deviation		Panel Unit Root Test			
			Assuming Cross Section Independence		Removing Cross Section Mean	
	Aug Dickey-Fuller	Phillips-Perron	Im-Pes-Shin	Lev-Lin-Chu	Im-Pes-Shin	Lev-Lin-Chu
	(1)	(2)	(3)	(4)	(5)	(6)
2000-2015	-1.898	-2.001	-0.2650	-1.1178	0.1733	-0.3505
	(0.3332)	(0.2861)	(0.3955)	(0.1318)	(0.5688)	(0.3630)
1999	-1.909	-2.457	-3.0008**	-0.9332	-2.2593**	-0.6521
	(0.3279)	(0.1262)	(0.0013)	(0.1754)	(0.0119)	(0.2572)
2000	-2.024*	-2.200**	-0.7133**	0.2881	-0.5275*	0.3451**
	(0.0760)	(0.0064)	(0.0378)	(0.6134)	(0.0989)	(0.0275)
2001	-1.716	-2.078	-0.302**	1.3788	1.1756*	2.0950
	(0.4231)	(0.2536)	(0.8549)	(0.9160)	(0.8801)	(0.9819)
2002	-0.675	-4.185***	-4.3551***	0.9523	-2.8977***	0.9044
	(0.8532)	(0.0007)	(0.0000)	(0.8295)	(0.0019)	(0.8171)
2003	-1.304	-1.193	0.2435	-1.1841	-0.6689	-0.4027
	(0.6275)	(0.6766)	(0.5962)	(0.1182)	(0.2518)	(0.3436)
2004	-0.018	-0.553	1.1220	0.9047	0.3727	0.0985
	(0.9570)	(0.8813)	(0.8691)	(0.8172)	(0.6453)	(0.5392)
2005	-1.753	-1.973	-1.3267*	-0.6903	-2.1483**	-1.5402**
	(0.4041)	(0.2985)	(0.0923)	(0.2450)	(0.0158)	(0.0618)
2006	-0.413	-1.554	1.8690	2.6898	0.0253	1.8847
	(0.9079)	(0.5067)	(0.9692)	(0.9964)	(0.5101)	(0.9703)
2007	-1.456	-1.515	0.4588	-1.5229	0.3941	-0.9334
	(0.5550)	(0.5261)	(0.6768)	(0.0639)	(0.6532)	(0.1753)
2008	-1.104	-0.959	0.1011	-0.3213	1.2336	-0.4205
	(0.7133)	(0.7679)	(0.5403)	(0.3740)	(0.8913)	(0.3371)
2009	-0.863	-1.409	1.3172	1.4310	0.1228	0.9411
	(0.7998)	(0.5780)	(0.9061)	(0.9238)	(0.5489)	(0.8267)
2010	-1.970	-2.864	-1.0005	0.1420	0.0899	0.9475
	(0.2997)	(0.0498)	(0.1585)	(0.5565)	(0.5358)	(0.8283)
2011	0.267	-0.717	3.6796	3.9393	2.7092	3.3807
	(0.9758)	(0.8424)	(0.9999)	(1.0000)	(0.9966)	(0.9996)
2012	-2.215	-2.513	-1.4832*	-0.6158	-0.3965	-0.5464
	(0.2007)	(0.1124)	(0.0690)	(0.2690)	(-0.3965)	(0.2924)
2013	-1.143	-1.160	0.4336	-0.3130	0.6694	-0.1817
	(0.6977)	(0.6905)	(0.6677)	(0.3771)	(0.7484)	(0.4279)
2014	-1.721	-1.747	-0.4161	0.4679	-0.2061	0.2667
	(0.4202)	(0.4068)	(0.3387)	(0.6801)	(0.4184)	(0.6051)
2015	-1.511	-3.366**	0.1084	1.2716	-0.5004	1.5104
	(0.5279)	(0.0122)	(0.5432)	(0.8983)	(0.3084)	(0.9345)

▸ Estimate

	Averaged Weighted Deviation		Panel Unit Root Test			
			Assuming Cross Section Independence		Removing Cross Section Mean	
	Aug Dickey-Fuller	Phillips-Perron	Im-Pes-Shin	Lev-Lin-Chu	Im-Pes-Shin	Lev-Lin-Chu
	(1)	(2)	(3)	(4)	(5)	(6)
1999-2015	-3.112**	-2.931**	-2.5883***	-2.1971**	-1.9101**	-1.5081**
	(0.0257)	(0.0418)	(0.0048)	(0.0140)	(0.0281)	(0.0458)
1999-2001	-1.316	-1.134	-0.6371	-1.3687**	-1.0902**	-1.7003**
	(0.6217)	(0.7013)	(0.2620)	(0.0455)	(0.0978)	(0.0445)
2002-2003	-0.765	-1.315	-1.0362	-2.2283**	-3.4935***	-3.5644***
	(0.8293)	(0.6222)	(0.1501)	(0.0129)	(0.0002)	(0.0002)
2004-2005	-1057	-2.329	-0.6397	-0.9147**	-1.0288**	-1.4160**
	(0.7320)	(0.1627)	(0.2612)	(0.0022)	(0.0418)	(0.0484)
2006-2007	-1.311	-0.944	1.2055	0.2498	-0.1965	0.1160
	(0.6240)	(0.7731)	(0.8860)	(0.5986)	(0.4221)	(0.5462)
2008-2009	-1.095	-1.706	0.5334	0.5304	-0.2051	-1.0323
	(0.7172)	(0.4281)	(0.7031)	(0.7021)	(0.4188)	(0.1510)
2010-2011	-1.471	-0.685	2.7163	3.3569	1.7749	1.4049
	(0.5479)	(0.8506)	(0.9967)	(0.9996)	(0.9620)	(0.9200)
2012-2013	0.624	-1.013	0.2539	-0.0736	0.3184	-0.1211
	(0.9882)	(0.7485)	(0.6002)	(0.4707)	(0.6249)	(0.4518)
2014-2015	-2.365	-2.311	-2.9384***	-3.3342***	-2.3514***	-2.7853***
	(0.0418)**	(0.0484)**	(0.0016)	(0.0004)	(0.0094)	(0.0027)

▸ Estimate

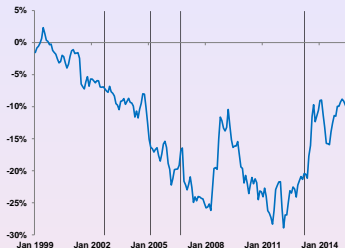# Structural Breaks for Nominal Deviation

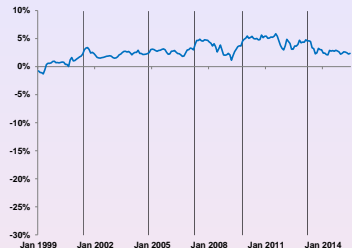(a) Bangladesh
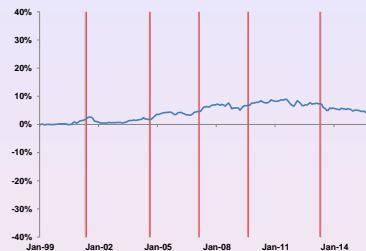
(b) India
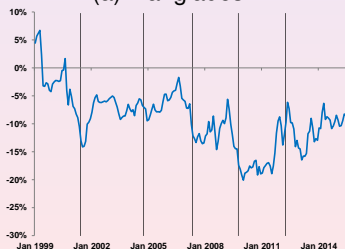
(c) Pakistan

(d) Sri Lanka

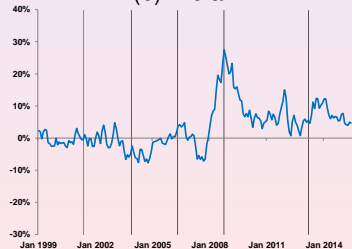▸ Structural Breaks

Structural Breaks for Real Deviation
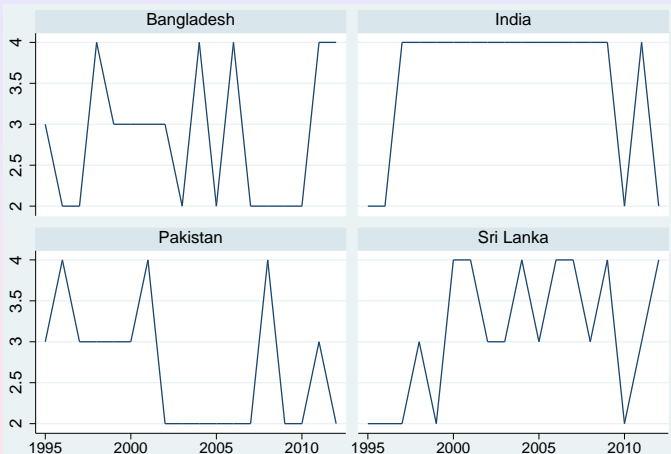

(a) Bangladesh

(b) India

(c) Pakistan
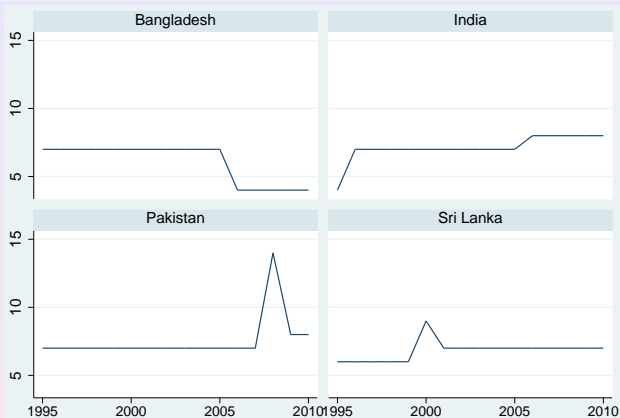
(d) Sri Lanka

▶ Structural Breaks

Bleaney and Tian Exchange Rate Regimes

Note: 1=No Legal Tender, 2=Peg, 3=Peg Parity Change, 4=Float
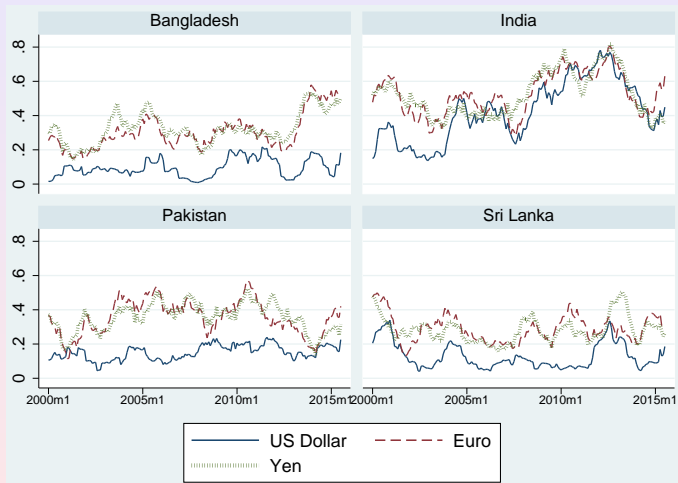
▸ Regimes

Ilzetzki *et al.* Exchange Rate Regimes

● Note: 1: No separate legal tender; 2: Pre-announced peg or currency board arrangement; 3: Pre announced horizontal band that is narrower than or equal to 2%; 4: De facto peg; 5: Pre announced crawling peg; 6: Pre announced crawling band that is narrower than or equal to 2%; 7: De facto crawling; 8: De facto crawling band that is narrower than or equal to 2%; 9: Pre announced crawling band that is wider than or equal to 2%; 10: De facto crawling band that is narrower than or equal to 5%; 11: Moving band that is narrower than or equal to 5%; 12: Managed floating; 13: Freely floating; 14: Freely falling; 15: Dual market in which parallel market data is missing.

▸ Regimes

EMPI Based Exchange Rate Flexibility

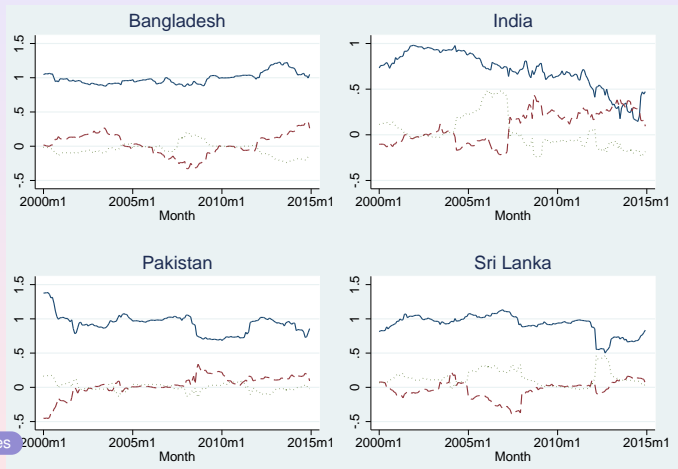|	US Dollar	Euro	Yen
Bangladesh	0.095	0.304	0.324
	(0.054)	(0.102)	(0.093)
India	0.425	0.527	0.523
	(0.176)	(0.123)	(0.129)
Pakistan	0.151	0.357	0.357
	(0.043)	(0.100)	(0.084)
Sri Lanka	0.128	0.289	0.283
	(0.075)	(0.079)	(0.074)

▸ EMPI

Recursive Estimates of EMPI

▶ EMPI

Recursive Estimates of FW Regression

▸ FW Estimates