One way bets on pegged exchange rates

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Evolution of the Indian exchange rate regime

Structural break dates identified using Zeileis, Patnaik, Shah:

		INR/USD	Reserves addition (Bln. USD)	
	Dates	Weekly vol.	Overall	Per year
1	1993-04 - 1995-02	0.16	13.03	6.93
2	1995-02 - 1998-08	0.93	4.86	1.39
3	1998-08 - 2004-03	**0.29**	82.64	14.81
4	2004-03 - 2008-02	0.63	178.23	**46.40**

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- A one way bet.
- Firms will modify their exchange rate exposure so as to profit from this exchange rate outlook.

Measurement of exchange rate exposure

- Accounting data is not useful.
- Stock returns r_j, broad market index r_{M1}, exchange rate r_{M2}, a model:

$$r_j = \alpha + \beta_1 r_{M1} + \beta_2 r_{M2} + \epsilon$$

- β_2: Rise in stock price for a 1% currency depreciation.
- Nominal INR/USD appropriate given dollar pegging, and the statistical efficiency gained by using high-frequency data.

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- Heteroscedasticity.

Our estimation strategy

1. Work within sub-periods of exchange rate regime
2. Switch from r_{M2} to ARMA innovations
3. Purge exchange rate exposure from the market index series.
4. SBC-minimising lag structure and HAC standard errors.
5. Use daily data in order to maximise statistical precision.
6. Obtain statistical precision by focusing on industry indexes and not individual stocks:
    1. Reduction of unsystematic risk and thus improvement in precision of estimating β_{M2}
    2. If and only if a one-way bet is present, exchange rate views of multiple firms in an industry will be homogeneous

Comparison against literature

By and large, in the literature, exchange rate exposure is generally not found either with stocks or with industry indexes. We conjecture it is because:

- With floating exchange rates, there is no one way bet
- Difficulties of measurement.

Difficulties of measurement: an example

- As an example, focus on just the 11 top level indexes
- Start from a naive measurement strategy
- One by one, introduce elements of sophisticated measurement
- Picture comes into focus.

I. Weekly data, no structural breaks

t statistic of β_2	Number of industry indexes P1	P2	P3	P4
$t \leq -1.96$			0	
$-1.96 < t \leq 1.96$			11	
$1.96 < t$			0	

II. Weekly data, **structural breaks**

t statistic of β_2	Number of industry indexes P1	P2	P3	P4
$t \leq -1.96$	0	0	0	0
$-1.96 < t \leq 1.96$	9	11	11	11
$1.96 < t$	2	0	0	0

III. Weekly data, structural breaks, **purge** r_{M1}

t statistic of β_2	Number of industry indexes			
	P1	P2	P3	P4
$t \leq -1.96$	0	1	7	4
$-1.96 < t \leq 1.96$	8	10	4	7
$1.96 < t$	3	0	0	0

V. **Daily data**, structural breaks, purge r_{M1}, currency innovations

t statistic of β_2	Number of industry indexes P1	P2	P3	P4
$t \leq -1.96$	0	6	10	10
$-1.96 < t \leq 1.96$	3	5	1	1
$1.96 < t$	8	0	0	0

Exchange rate exposure of Nifty

	P1	P2	P3	P4
Same day	0.538	**-0.283**	**-1.204**	**-1.249**
	(0.8)	**(-2.4)**	**(-4.0)**	**(-8.1)**
Lag 1	1.060	-0.055	**-0.603**	**-0.398**
	(1.6)	(-0.5)	**(-2.0)**	**(-2.6)**
Lag 2	0.877	0.092	0.002	-0.267
	(1.3)	(0.8)	(0.0)	(-1.7)
Lag 3	-0.287	0.180	-0.342	0.173
	(-0.4)	(1.5)	(-1.1)	(1.1)
Lag 4	0.656	0.124	0.431	-0.251
	(0.9)	(1.0)	(1.4)	(-1.6)
Lag 5	1.008	-0.029	0.455	-0.119
	(1.6)	(-0.2)	(1.5)	(-0.8)
$\bar{R}^2$	0.005	0.005	0.015	0.073

Data for industry indexes

- Family of industry indexes maintained by CMIE
- At the top level, broad industry groups
- A tree of indexes
- We focus on the leaf nodes
- Within each of these narrow industry indexes, natural economic exposure is homogeneous.
- 126 such industry indexes.

Main result

t statistic of β_2	Number of industry indexes P1	P2	P3	P4
$t \leq -1.96$	0	29	68	93
$-1.96 < t \leq 1.96$	91	94	57	33
$1.96 < t$	32	1	0	0

Many exporting industries - which should ordinarily gain from depreciation - moved around in this table through time and managed to obtain the opposite exposure.

Robustness checks

- Choice of market index
- Choice of return interval
- Alternative definition of break dates: Perron-Bai breaks in the time-series of months of import cover.
- The basic results stand.

Conclusion

- In Period 4, 93 of 126 industry indexes had a bet on appreciation.
- With low volatility, large reserves and sustained one-way purchases by RBI, economic agents appear to have been convinced that there was a one-way bet.
- Capital controls and financial markets were sufficiently conducive for achieving large changes in exchange rate exposure.

Thank you.