India and capital account convertibility

Capital controls

- "Foreign institutional investors" and FDI have convertibility.
- Foreign investors can easily access foreign currency denominated debt but not INR denominated debt.
- Local households can't easily do global diversification.
- Currency derivatives exist - but mispriced and barriers to access.

Openness: Gross flows on current account and capital account add up to $\approx$ 90% of GDP.

Questions

Policy questions:

- Should portfolio flows be restricted?
- Should currency volatility be constricted?

Empirical questions:

- Portfolio flows are unusually important in India, and have grown dramatically.
  If India has just become ‘flavour of the month’, can portfolio flows suddenly reverse themselves?
  Do foreign investors engage in herding?
- Are local firms carrying currency exposure?
  Do local firms manage currency risk, or are they oblivious to it?

Does greater currency flexibility reduce firm exposure?

Ila Patnaik Ajay Shah

Neemrana, January 2007

Sources of currency exposure for firms

- Import of raw materials and export of finished goods
- Import parity pricing in domestic markets
- Foreign currency borrowing
  Borrowing in foreign currency denominated bonds is fairly easy; foreign capital coming into INR denominated bonds is restricted.

Why might firms carry exposure?

Incomplete markets Firms may desire lower risk but are unable to owing to capital controls or weak markets.

Moral hazard Implicit guarantee of a pegged exchange rate regime.

Some international evidence.
In Latin America, more currency flexibility yields reduced currency mismatch.
In Mexico, shift from fixed to floating gave more hedging.

Either hypothesis could be true for India

- In India currency spot and future markets are weak and capital controls exist.

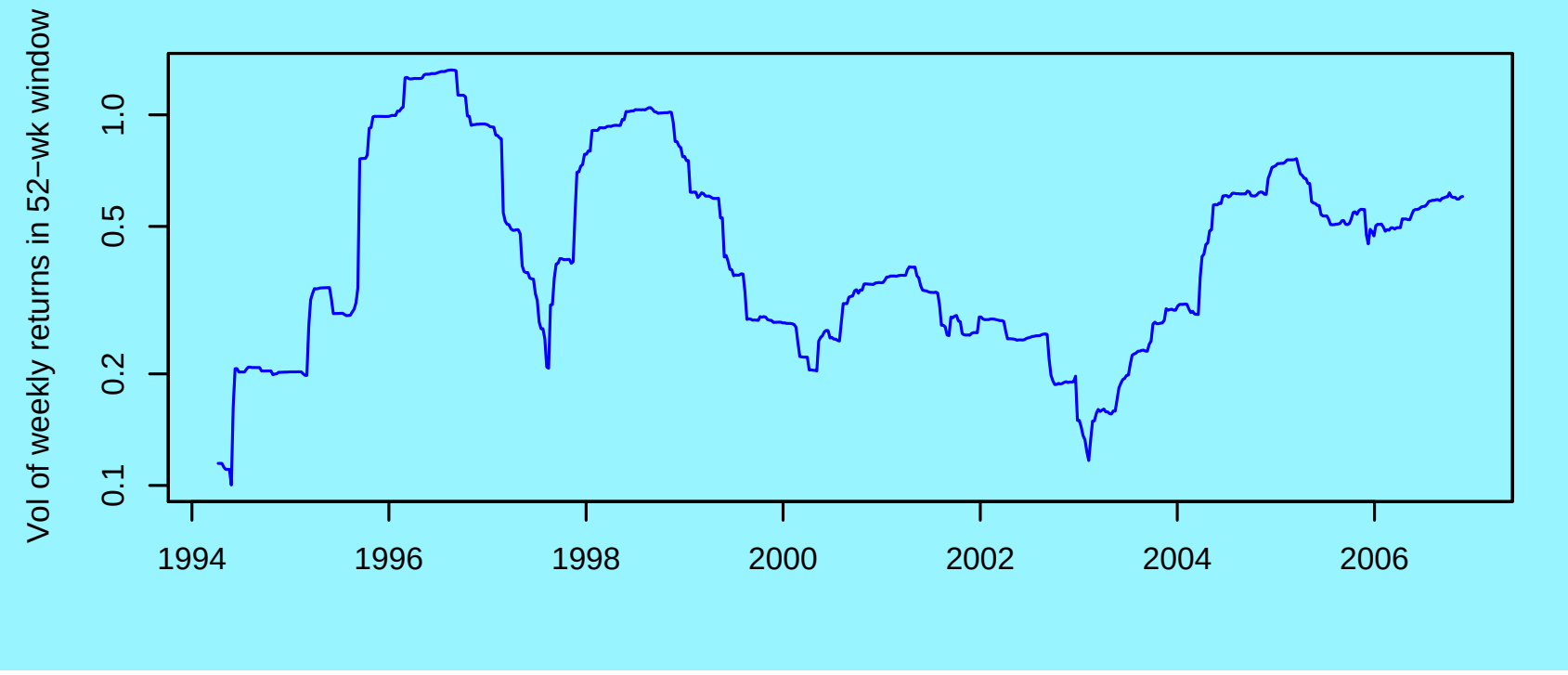
  If the *incomplete markets* hypothesis is true, firms should be exposed to currency risk, even when currency vol is high.
- The Indian rupee is pegged to the US dollar.

  If the *moral hazard* hypothesis is true we should have less currency exposure when there is more currency vol.

Indian currency regime

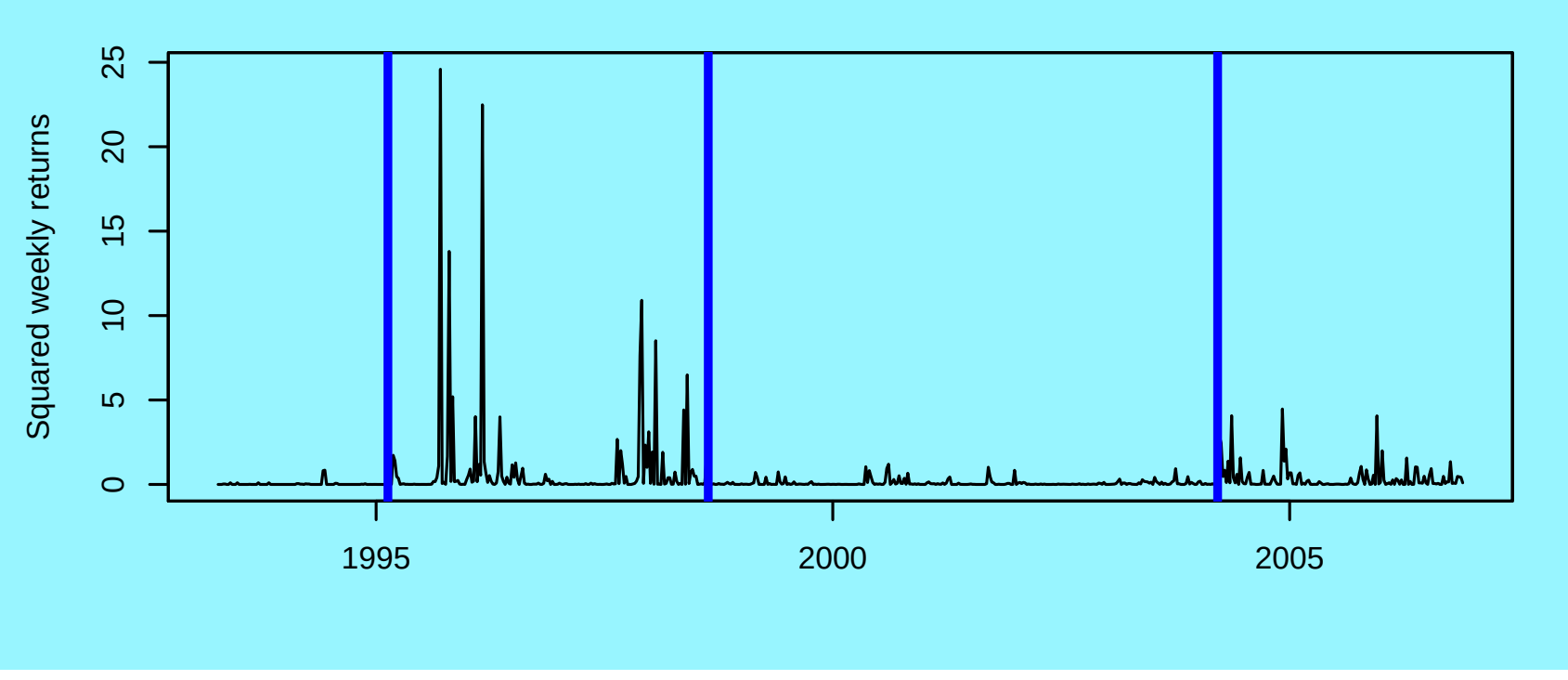
- RBI actively trades on the market, with the goal of "containing volatility"
- The Indian rupee is pegged to the US dollar (Calvo and Reinhart (2002), Reinhart and Rogoff (2003), Patnaik (2003)).
- However the volatility of the INR/USD has changed significantly over different periods

INR/USD volatility



Identifying dates of structural change

Bai and Perron (2003) methodology:



Significant changes in INR/USD vol

Period	Standard deviation of weekly returns
1	0.16
2	0.93
3	0.29
4	0.61

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Four distinct periods

Period 1: 2 April 1993 to 17 February 1995 Period where trading in the INR first began. For most of this period the exchange rate was Rs.31.37 per dollar.

Period 2: 18 February 1995 to 21 August 1998 The period of the Asian crisis, there was the highest-ever currency flexibility in India's experience.

Period 3: 22 August 1998 to 19 March 2004 Tight pegging, with low volatility and some appreciation.

Period 4: 20 March 2004 to 24 November 2006 Greater currency flexibility.

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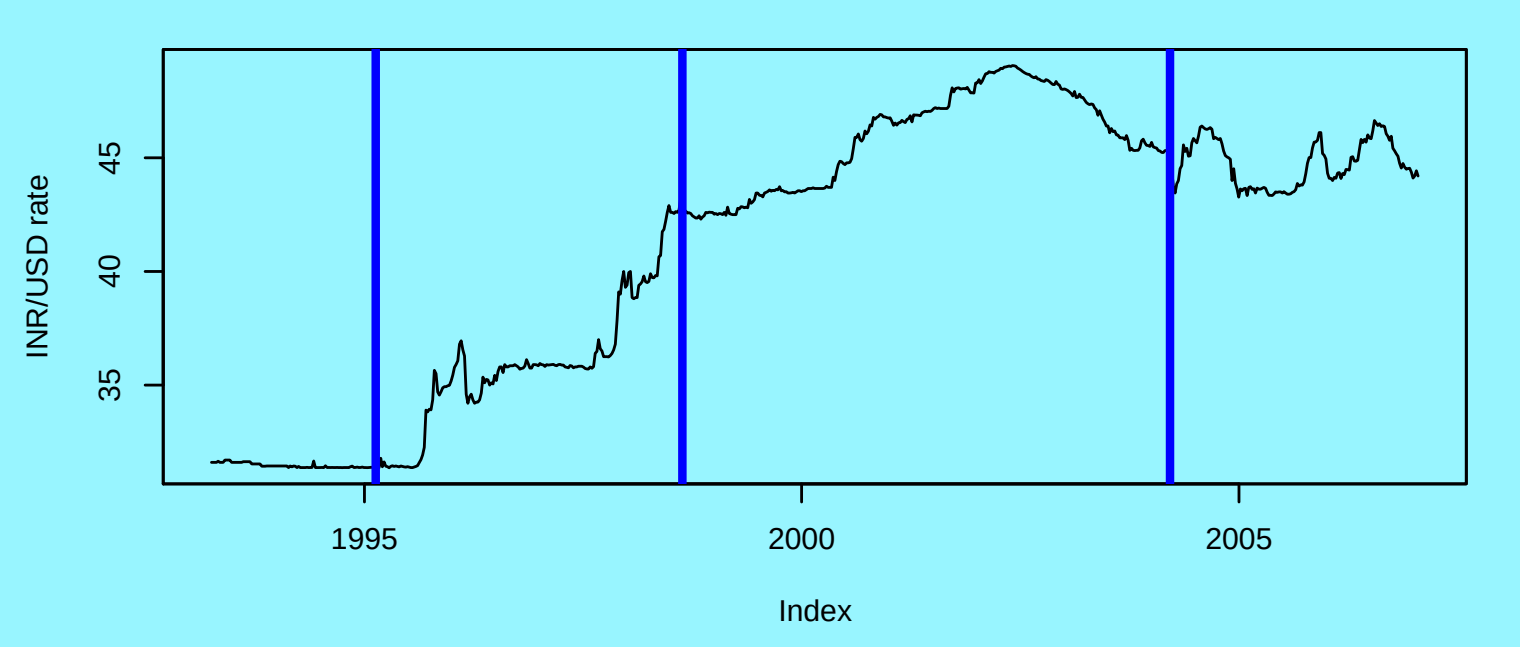

An identification opportunity

- INR/USD vol went through low-high-low-high.
- This is an identification opportunity - what did this do to the currency exposure of firms?
- While INR/USD was a pegged exchange rate throughout, volatility values range from ≈ 0.1 to ≈ 1.

Measuring currency exposure

Balance sheet data of Indian firms is inadequate for measuring firm exposure.

- A company's direct export and import data may be incomplete if companies operate through local third parties.
- Economic exposure owing to import parity pricing is not measured.
- Balance sheet data from annual accounts is often incomplete in terms of foreign liabilities.
- Disclosures about currency derivatives are inadequate.

Measuring currency exposure through stock returns

- We focus on the 100 most liquid firms of India.
- For these firms, there is an active speculative market where all kinds of information is impounded into the price.
- If a firm has currency exposure, the stock price will go up (or down) when the exchange rate changes.
- Example: In the last few weeks, all major IT firms have complained about INR appreciation affecting profit.

Estimation strategy

- Augmented market model:

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

  r_j measures firm returns
  r_{M1} measures market index movements
  r_{M2} measures currency fluctuations
  If an exporting firm is unhedged and gains when there is a currency depreciation, it would have $\beta_2 > 0$.
- Re-express r_{M2} as ARMA innovations i_{M2}, with separate models in each sub-period. The overall exposure is the $\bar{\beta}_2$, the sum of coefficients on $i_{M2,t}$, $i_{M2,t-1}$, $\ldots$ $i_{M2,t-4}$.
- Inference procedures based on a HAC covariance matrix.

Average across the 100 firms

Period	$E(\lvert\bar{\beta}_{2j}\rvert)$
1	9.31
2	0.79
3	2.32
4	1.36

Summary

Period	Currency Vol.	Exposure
1	Low	High
2	High	Low
3	Low	High
4	High	Low

- The currency exposure of Indian firms responds strongly to currency flexibility - less flexibility induces more risk-taking.
- In order to obtain less exposed firms, give them more currency vol.

Thank you.