For large liquid DRs, the arbitrage works well
But this is easily disrupted either through illiquidity or capital controls.
Can be a canary in the coal mine that detects disruptions.
Part I

Difficulties of arbitrage
An example from purely domestic finance

- One day in the life of Infosys
- Equity spot and stock futures, both on NSE
- 3 May 2007
- The closest there is to a sound financial market in India.
Autocorrelation function of spot-futures basis, discretised to observations every 30 seconds

Ajay Shah
Comments on Yeyati, Schmukler, Horen
But the basic futures pricing is all wrong

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Comments on Yeyati, Schmukler, Horen
Substantial basis risk

Ajay Shah Comments on Yeyati, Schmukler, Horen
India and DRs

- Warning: DRs are non-voting shares (?) and thus not exactly comparable.
- First flush of DR issuance - early 1990s - a response to crisis of settlement of 1993
- Once NSDL and NSE fell into place, this motivation subsided
- Illiquidity led to conversion of DRs into underlying shares that led to more illiquidity
Arbitrage when ADR/GDR is too cheap

1. A foreign investor who has a license to operate in India
2. Buys the DR
3. Presents it to custodian bank
4. Gets the shares
5. Sells them in India.

- Mispricing compared against frictions of above steps and uncertainty caused by delays.
- This reduces the size of the DR!
ADR/GDR is too costly

- Example: Infosys ADR at NASDAQ had a premium of 200% in 2000.
- Now the arbitrage involves: Buying shares on the spot, converting them into DRs, and selling these on the offshore market.
- Capital controls a la India come in the way.
- Specific and limited CAL for two-way fungibility announced in February 2001, operationalised by RBI in February 2002.
- Only “reconversion” is permitted.
- Frictions work out to 100 to 150 bps.
- But from 2002 to 2004, ADR actually premia went up (http://tinyurl.com/2yoc9f)
"To the extent that these controls are effective in limiting the ability to transfer funds (not securities) across borders..."
ADR arbitrage against NSE is genuinely hard

- Zero overlap of time zones between New York and Bombay
- Other delays (e.g. custodian bank) caused by timezone problem
- The Indian currency market
Recent period

- For foreign investors, NSE vs. NYSE is a feasible choice
- NSE incurs ‘securities transaction tax’; difficulties on FII licensing; difficulties with taxation – NYSE is clean on all three counts.
- A few ADRs have gained remarkable traction.
- The DR story is becoming important again.
Part III

Example: The Infosys ADR
Premium

Comments on Yeyati, Schmukler, Horen
Vol of premium

S.D. of premium over last 3 months

2007 2008

Comments on Yeyati, Schmukler, Horen
ACF of premium

Ajay Shah

Comments on Yeyati, Schmukler, Horen
Null of $I(1)$: Augmented Dickey-Fuller test has a prob value of 0.06473
The Indian financial markets environment is hostile to arbitrage

- Extremely sophisticated players in a certain sense
- Tremendous constraints placed on them by the policy environment
- Barriers to algorithmic trading; ban on banks or bank credit; extremely weak debt and currency markets; silo system that prevents any one financial firm from straddling multiple markets, etc.
Part IV

Larger implications
Both domestic financial market imperfections, and capital controls, affect DR mispricing.

In particular, time zone and currency spot market are huge challenges.

Observed mispricing is owing to both financial market imperfections and capital controls.
Locating this question within the discussion on *de facto* convertibility in macro policy

- The US 90-day rate is 1.23%
- The Indian 90-day rate is 7%
- Rupee-dollar is a *de facto* pegged exchange rate
- The question for macro policy is: *Can enough capital move, so that pegging induces substantial monetary policy / fiscal policy distortions?*

- Can enough capital move, to make this 450 bps interest rate differential infeasible?
- This is *different* from the issue of no-arbitrage between (say) Infy vs. Infosystch.
- Capital controls can bind, can yield large microeconomic distortions, and foul up the arbitrage. But at the same time, enough money can move, to remove monetary policy autonomy when pegging.
- Example: Why does China have such low interest rates?

Ajay Shah

Comments on Yeyati, Schmukler, Horen
Thank you.