

The exchange rate regime

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What is the exchange rate regime?

The ERR is the text of a manual inside the central bank about what they do in the currency market.

It is a statement of the currency policy of the country.

What is a policy?

A policy is a mapping from states of nature to actions.

A written manual?

- In any slightly complex organisation, work is not left to chance or spontaneity
- Example: You are in an invasion of Bangladesh in 1971, and there are innumerable bridges to build
- Things can be left to chance or the vagaries of individuals who happen to be present. Discretion, incompetence, corruption.
- The army has *standard manuals* that govern various kinds of bridges.
- Good management in government: write manuals, debate these in public, everyone knows what the government will do when. Rules rather than discretion, and transparency, and improved thinking.
- Only terrible third world countries have government agencies where important things are done without written manuals.

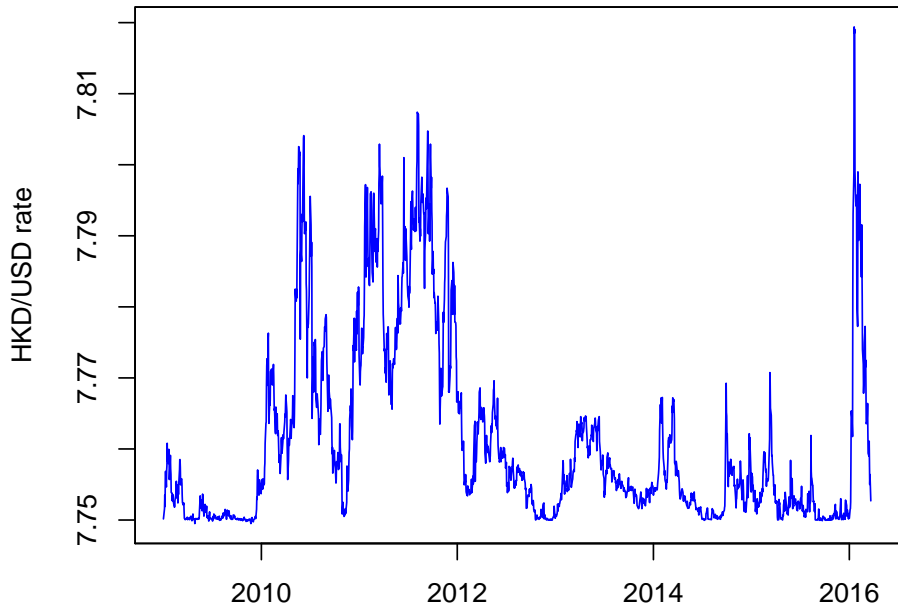
The information problem

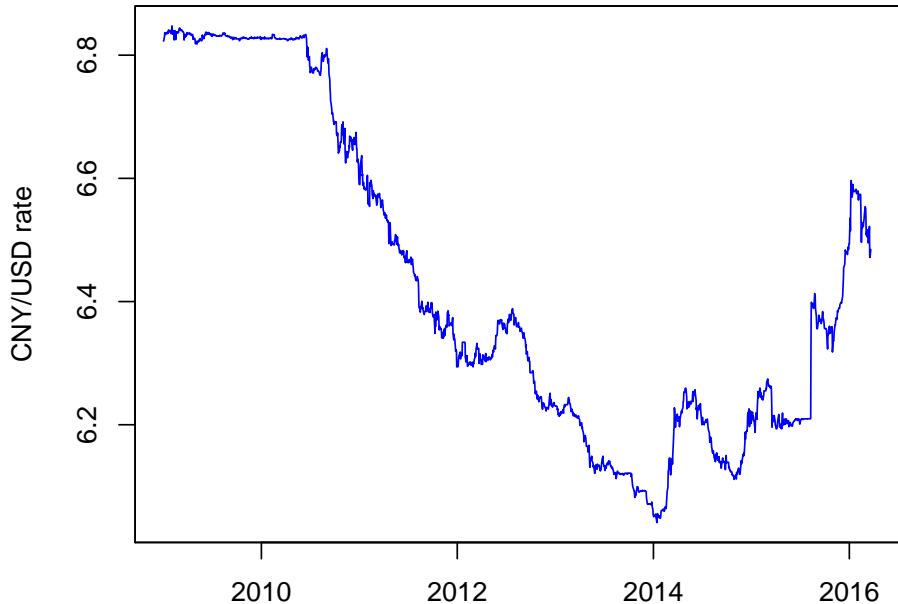
- 1 A country might have no written manual for the ERR.
- 2 A country might loudly claim to have one ERR but actually practice another. “De jure” vs. “De facto”.
- 3 In OECD countries other than Japan, this is not a question: countries are fully transparent and they do what they say. But in the study of other countries, just *knowing* what is the exchange rate regime is a big problem.

So the problem statement: Using the data, decipher what is the exchange rate regime.

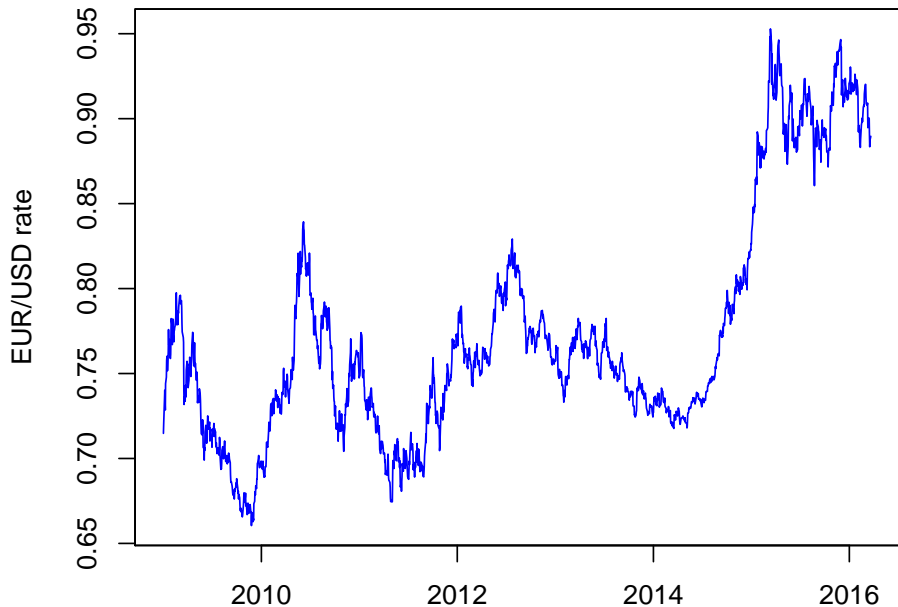
A few standard cases

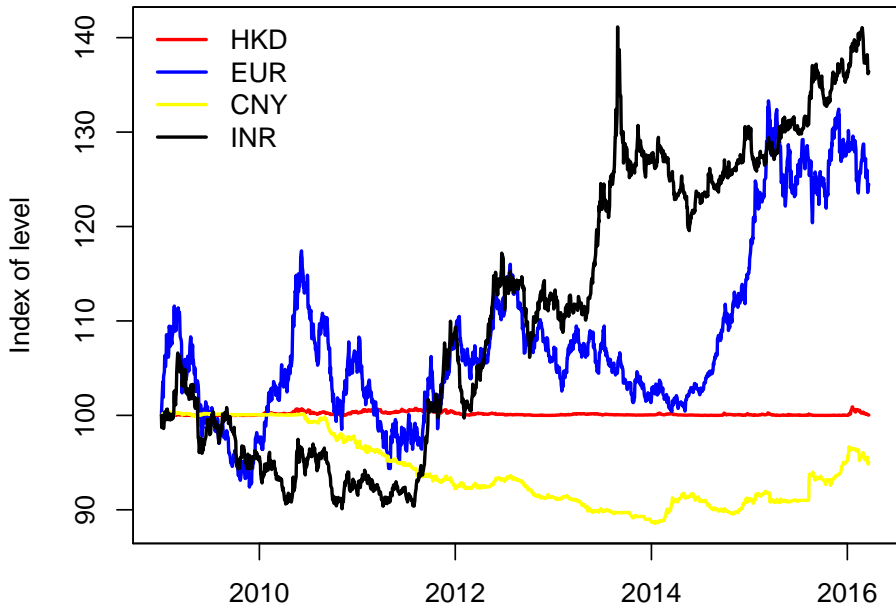
- 1 A fixed exchange rate: example: HKD/USD
- 2 A floating exchange rate: example: EUR/USD
- 3 In between cases: The CB is meddling with the exchange rate but we as outsiders don't quite know how.









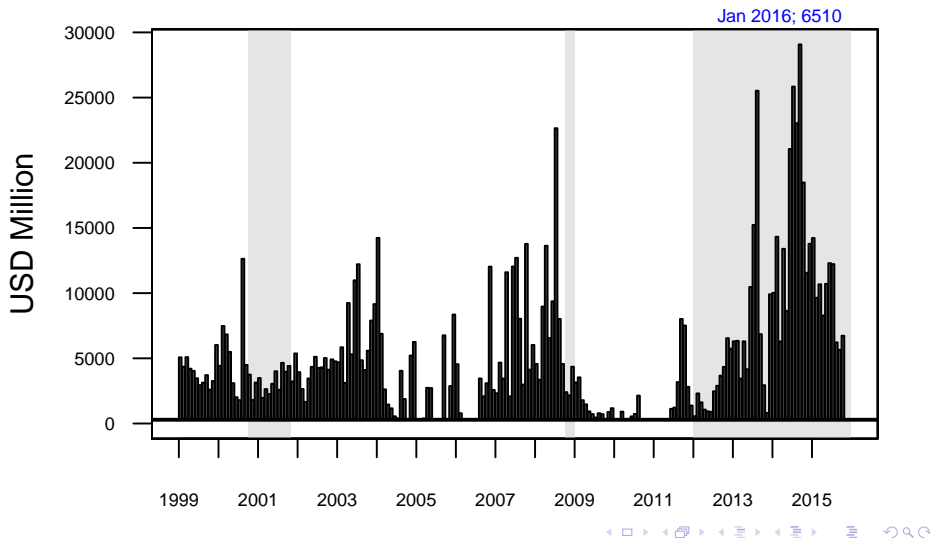


How to tell what's going on?

Some clues:

- Look at standard deviations
- When HKD/USD is fixed, HKD/EUR is a float
- Look for violations of the random walk
- Exchange rate stability goes with interest rate volatility.

Can we watch the trading of the CB?



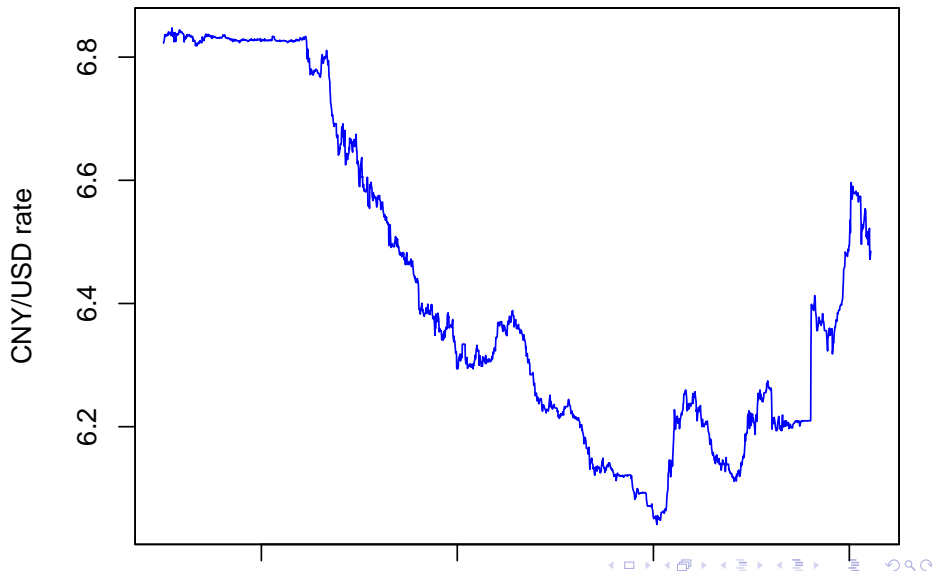
Frankel-Wei regression methodology

A useful linear regression (SGD for example) –

$$d \log \left(\frac{\text{SGD}}{\text{CHF}} \right) = \beta_1 + \beta_2 d \log \left(\frac{\text{USD}}{\text{CHF}} \right) + \beta_3 d \log \left(\frac{\text{JPY}}{\text{CHF}} \right) + \beta_4 d \log \left(\frac{\text{DEM}}{\text{CHF}} \right) + \epsilon$$

- Fixed rates: $R^2 = 1$
- A diverse array of pegging schemes: the various β coefficients
- Limitation: What happens with float?
We know R^2 will be low, but it is not clear what it should be.
- E.g. Canada is bound to have a high R^2 against the USD even though they don't trade the currency market.
- Limitation: Requires a numeraire CHF

The ERR is not fixed, e.g. China



How to express change in the FW regression?

- Two views of the world: time-varying parameters vs. structural breaks
- Process manuals change discontinuously
- Structural breaks concept is more applicable

Structural change in the ERR

- Perron/Bai strategy (Econometrica, 2002)
- A dynamic programming algorithm to identify a 'best' set of dates of structural change in OLS

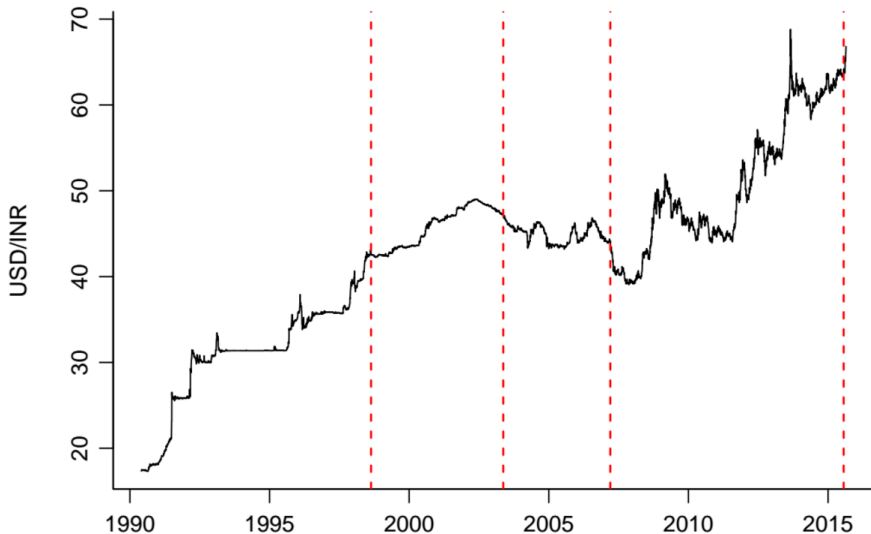
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- The problem: Perron/Bai is oriented towards structural breaks in β but forces a constant σ_ϵ^2 .
- Our solution: Extended Perron/Bai to the MLE case with normally distributed errors.
Achim Zeileis, Ajay Shah, Ila Patnaik. "Testing, Monitoring, and Dating Structural Changes in Exchange Rate Regimes".
Computational Statistics & Data Analysis, 2010.
- We are able to identify structural breaks in $\theta = (\beta, \sigma_\epsilon^2)$.
- Get break dates and confidence intervals for these.

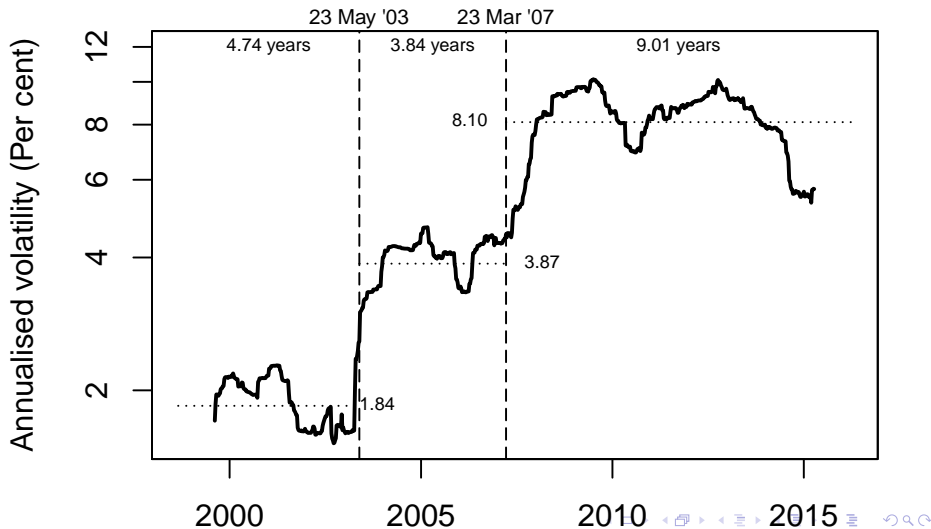
The INR story

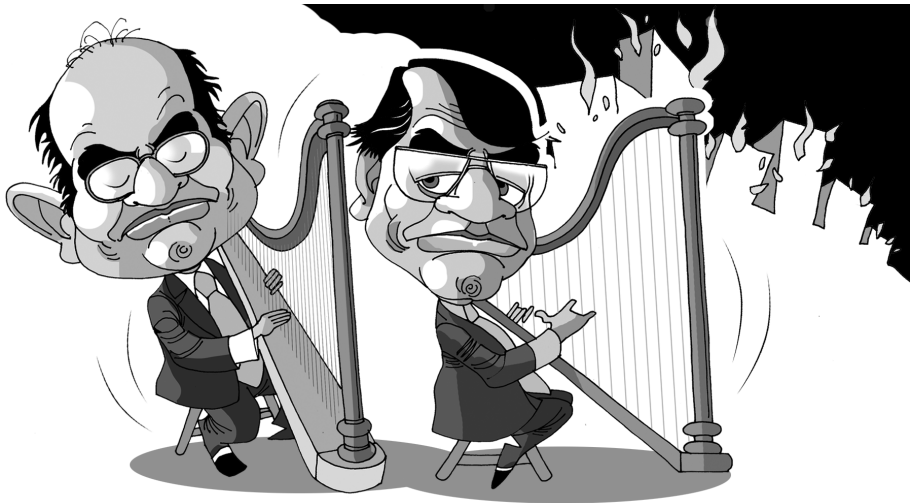


The INR story

From	To	R^2	USD	EUR	Variance
1990-06-08	1998-08-21	0.83	0.90	0.05	0.39
1998-08-28	2003-05-16	0.97	0.99	0.04	0.06
2003-05-23	2007-03-16	0.88	0.78	0.21	0.22
2007-03-23	2015-07-24	0.56	0.71	0.10	1.02

USD/INR volatility and structural breaks in the Indian ERR





Downstream work and possibilities

- Rich with interpretation: loss of MP autonomy, vulnerability to crisis, extent to which the CB is lying, etc.
- We have also built a 'monitoring' technology.
- Example of an application: Patnaik and Shah, JIMF, September 2010: Use these structural breaks as exogenous shocks and find out how the firms behave.
- Forecastability of the exchange rate will vary with ERR. inflexibility

Thank you.