A new global database of *de facto* exchange rate regimes

Ila Patnaik Ajay Shah Anmol Sethy Achim Zeileis

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1 Motivation

2 Methodology

3 Applications
- Exchange rate flexibility
- Role of major currencies

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- *De jure* exchange rate regime different from *de facto* regime.
- *De facto* regime classifications:
  - Calvo and Reinhart (2002)
  - Ghosh, Gulde and Wolf (2003)
  - Levy-Yeyati and Sturzenegger (2003)
  - Reinhart and Rogoff (2004)
  - Frankel and Wei (2002, 2006,2008)
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  - IMF classification
  - Reinhart and Rogoff

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Frequency	Monthly
Span	1998-2009
Method	Change in 2009; Qualitative classification
Update	Quarterly
Classification	Based on algorithms, on *de jure* regime and on judgement.
Categories	Nine descriptive categories.

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Classification should be

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The new *de facto* exchange rate regime classification

METHODOLOGY

Zeileis, Shah and Patnaik (2010(forthcoming))

- The methodology adopts the linear regression model used in Haldane and Hall (1991) and Frankel and Wei (1994).
- A tool for understanding the de facto exchange rate regime in operation is a linear regression model based on cross-currency exchange rates (with respect to a suitable numeraire, e.g., CHF).
- If estimation involving the Indian Rupee (INR) is desired, the model estimated is:

$$d\log\left(\frac{\text{INR}}{\text{CHF}}\right) = \beta_1 + \beta_2 d\log\left(\frac{\text{USD}}{\text{CHF}}\right) + \beta_3 d\log\left(\frac{\text{JPY}}{\text{CHF}}\right) + \beta_4 d\log\left(\frac{\text{DEM}}{\text{CHF}}\right) + \beta_5 d\log\left(\frac{\text{GBP}}{\text{CHF}}\right) + \epsilon$$

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Methodology: Econometrics of structural change

- Perron and Bai (2003) provides a methodology for identification of structural change in an OLS regression.
- This has been used in Frankel and Xie (2010) to identify structural change in exchange rate regimes.
- Zeileis Shah and Patnaik (2010 (forthcoming))extend the Perron and Bai (2003) methodology for identification of structural change in an OLS regression to a general MLE setting, to identify the parameter vector that incorporates the error term as a full parameter, thus identifying $\theta = (\beta, \sigma_\epsilon)$.

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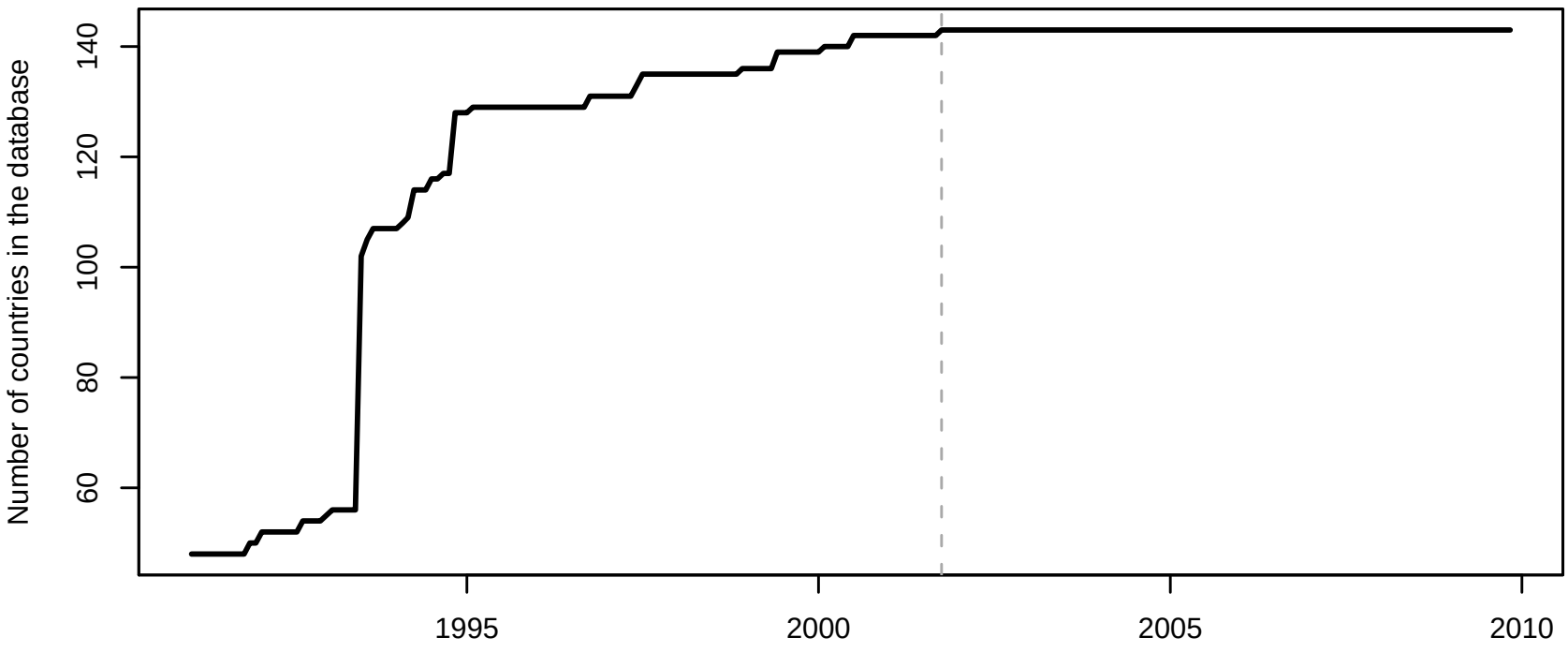
Our database

Database span: 1991-02-01 to 2009-11-24



Total number of currencies: 143

Currencies in the database

Regions	1991-02-01	1996-02-01	2002-02-01
Asia	19	41	44
Africa	8	33	38
N.America	3	3	3
S.America	8	25	26
Oceania	3	6	8
E.Europe	1	9	9
ROW	6	12	15
World	48	129	143

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Frequency	Weekly
Span	February 1991 - December 2009
Method	Zeileis, Shah and Patnaik (2010 (forthcoming))
Update	Codes available online; researcher may update as and when necessary.

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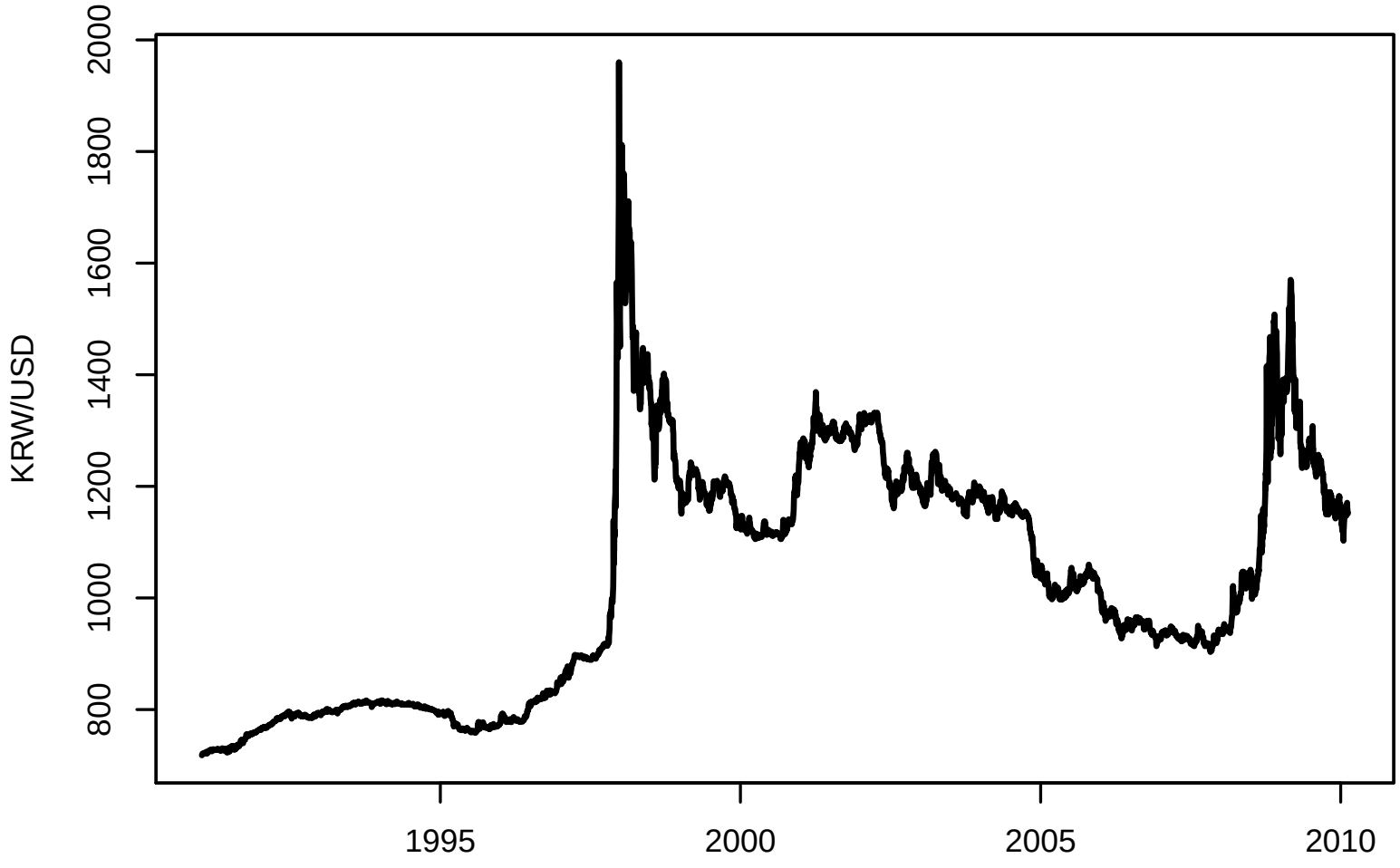
Examples

Example: South Korea



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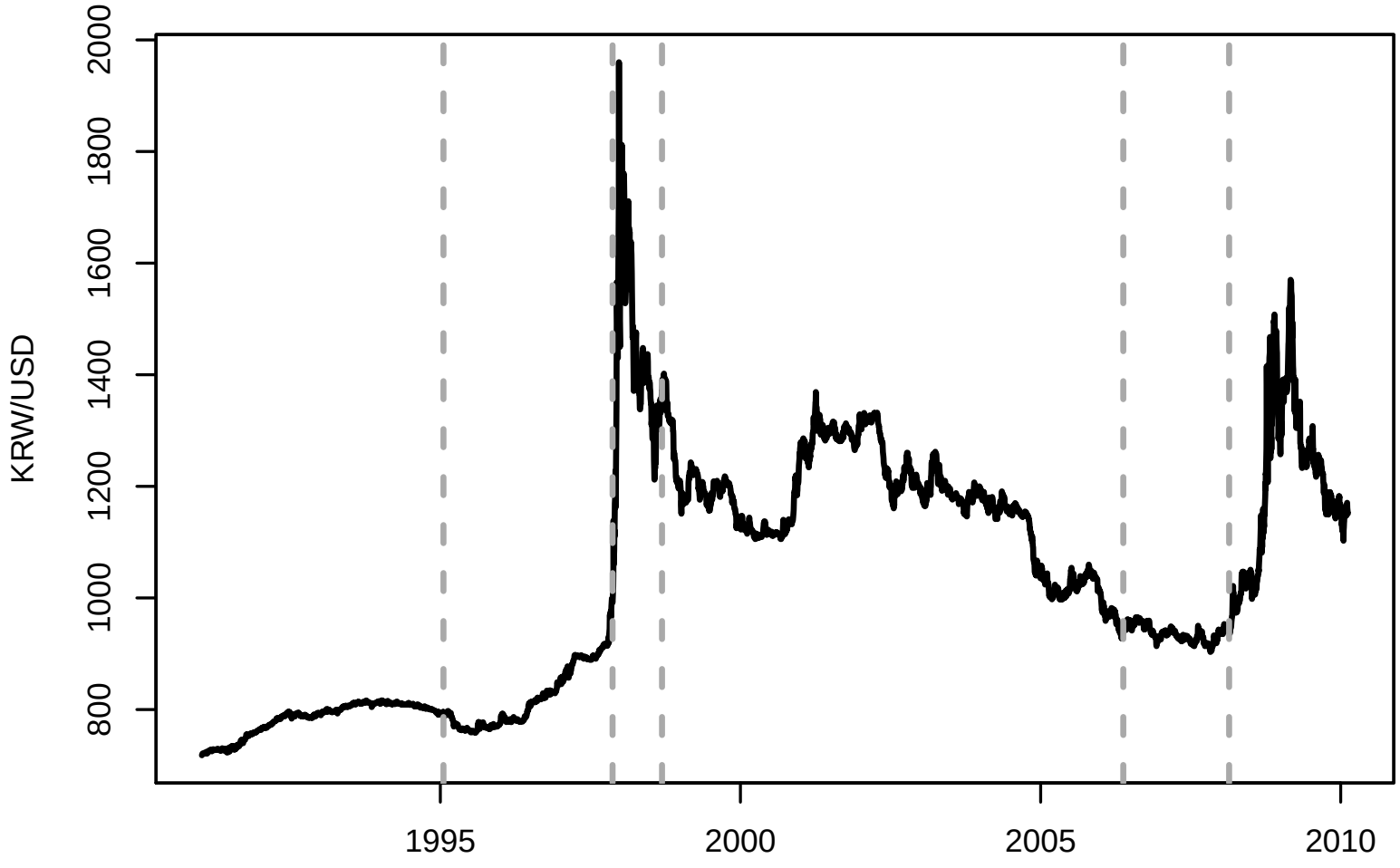


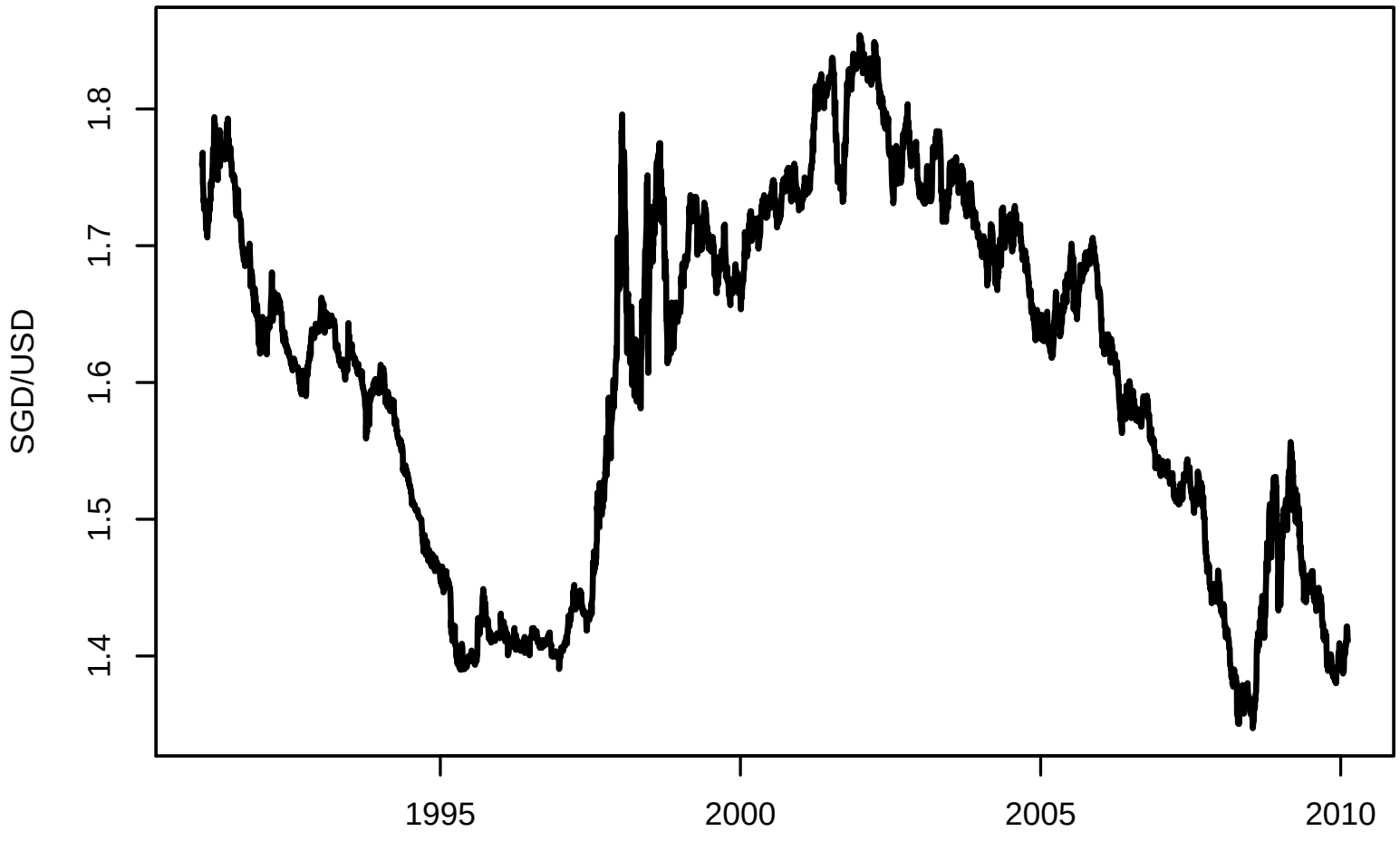
FW regression for Korea

Start	End	r^2	USD	DUR	GBP	JPY	σ^2
1991-01-11	2009-12-25	0.56	0.67	0.23	0.13	0.11	1.30

South Korea with structural breaks

	Start Date	End Date	R^2	USD	DUR	GBP	JPY	Variance
1	1991-01-11	1995-01-20	0.98	1.01	-0.00	-0.01	-0.02	0.07
2	1995-01-27	1997-11-14	0.83	0.87	-0.06	0.07	0.16	0.42
3	1997-11-21	1998-09-11	0.15	-1.03	1.27	1.17	-0.09	7.58
4	1998-09-18	2006-05-19	0.70	0.63	0.18	0.06	0.31	0.81
5	2006-05-26	2008-02-22	0.79	0.84	0.33	0.01	-0.15	0.27
6	2008-02-29	2009-12-25	0.28	0.44	0.52	0.12	-0.27	3.10

Example: Singapore



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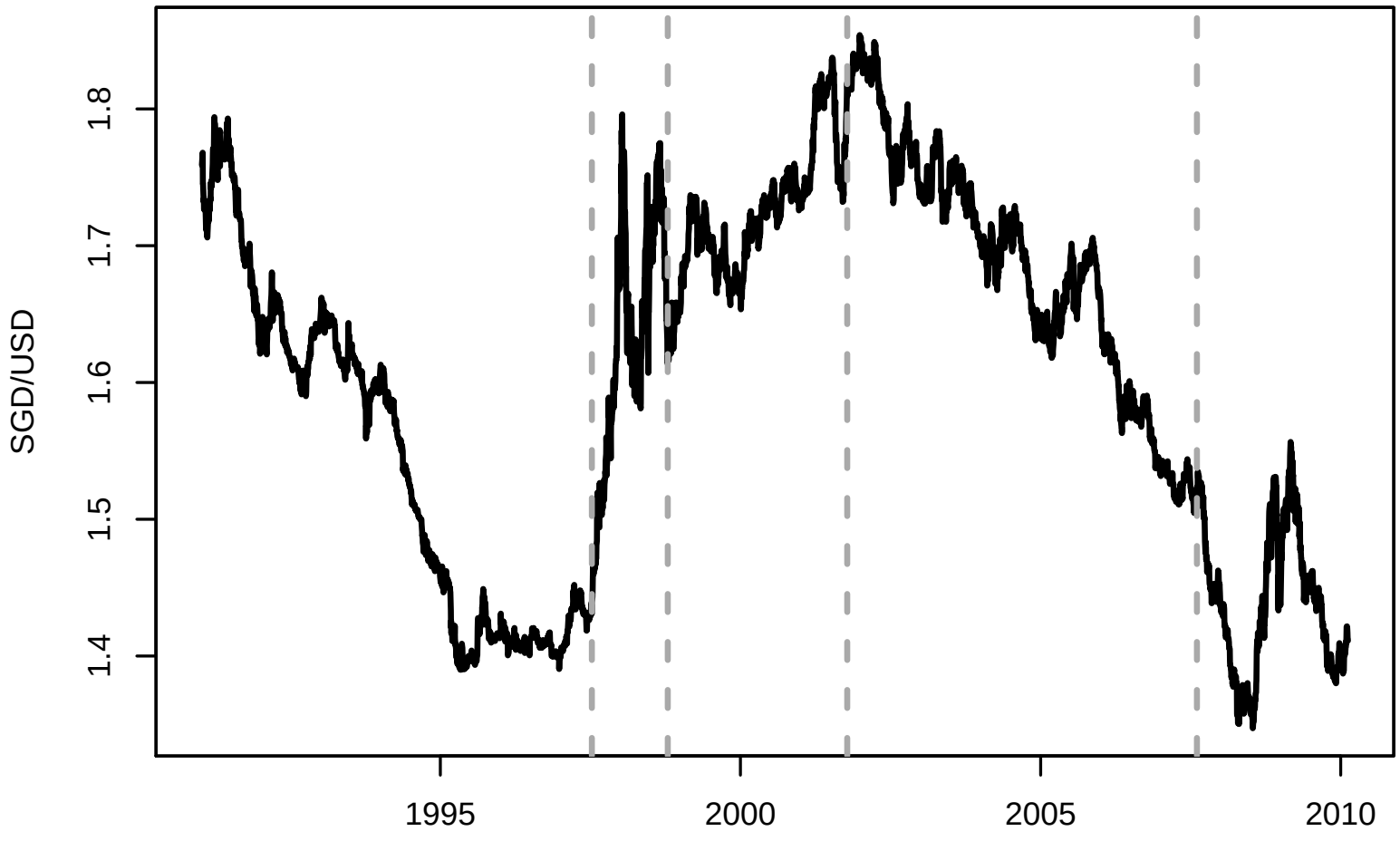

FW regression: Singapore

Start	End	r^2	USD	DUR	GBP	JPY	σ^2
1991-01-11	2009-12-25	0.81	0.64	0.22	0.06	0.12	0.32

Singapore with structural breaks

	Start	End	R^2	USD	DUR	GBP	JPY	Variance
1	1991-01-11	1997-07-11	0.92	0.78	0.16	0.01	0.10	0.15
2	1997-07-18	1998-10-16	0.22	-0.02	0.32	0.31	0.24	1.28
3	1998-10-23	2001-10-12	0.85	0.77	0.12	0.03	0.09	0.32
4	2001-10-19	2007-08-10	0.89	0.60	0.22	0.04	0.23	0.12
5	2007-08-17	2009-12-25	0.82	0.59	0.29	0.07	-0.02	0.26

Well known results and our database

How do we fare?

Country	Date	Event	Our date	R^2; Wt.
Brazil	1999-01-16	Break peg	1999-01-15	0.424; USD
Turkey	2001-02-15	New Turkish lira	2001-02-16	0.241
Sweden	1992-09-01	Float	1992-07-31	0.330; ECU
China	2005-05-22	Basket crawl	2005-05-22	0.970; USD
Malaysia	2005-05-22	Managed Float	2004-05-22	0.744; USD

The global database

Some applications

- Has exchange rate flexibility risen over the years across the world?
- What is the role of major currencies in exchange rate management?

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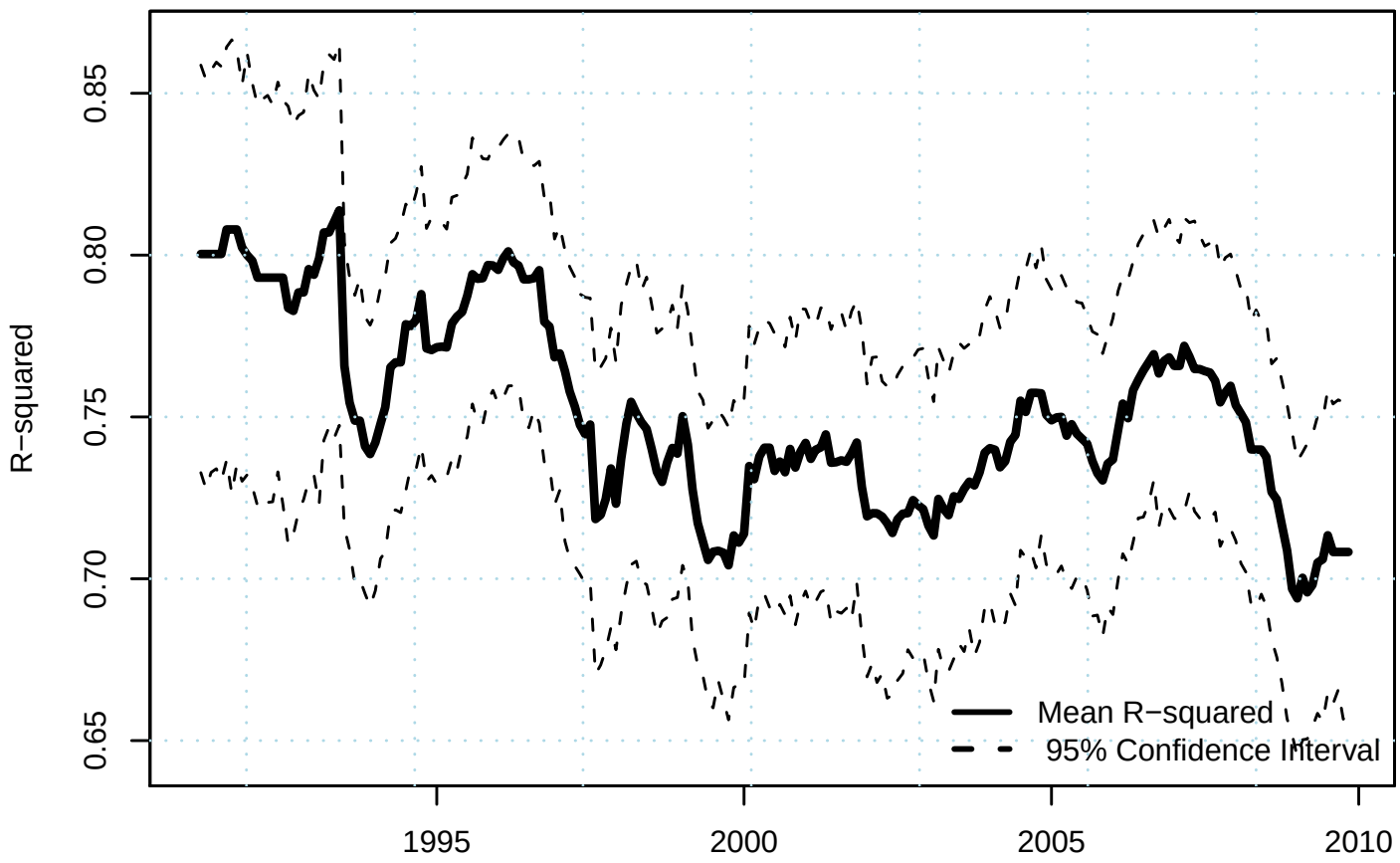
Exchange rate flexibility

Average global R^2



Average R^2 across different regions

	1991-11-01	1999-11-01	2009-11-01
Asia	0.8785	0.8309	0.8338
East Asia	0.9866	0.8262	0.7240
Latin America	0.7726	0.8038	0.8110
Africa	0.7100	0.6124	0.6159
Oceania	0.6005	0.5514	0.4606
E.Europe	NA	0.4228	0.4758

Summary: Exchange rate flexibility

- There is no clear trend in the mean flexibility across the globe.
- East Asia is the most inflexible.
- Africa is more flexible.
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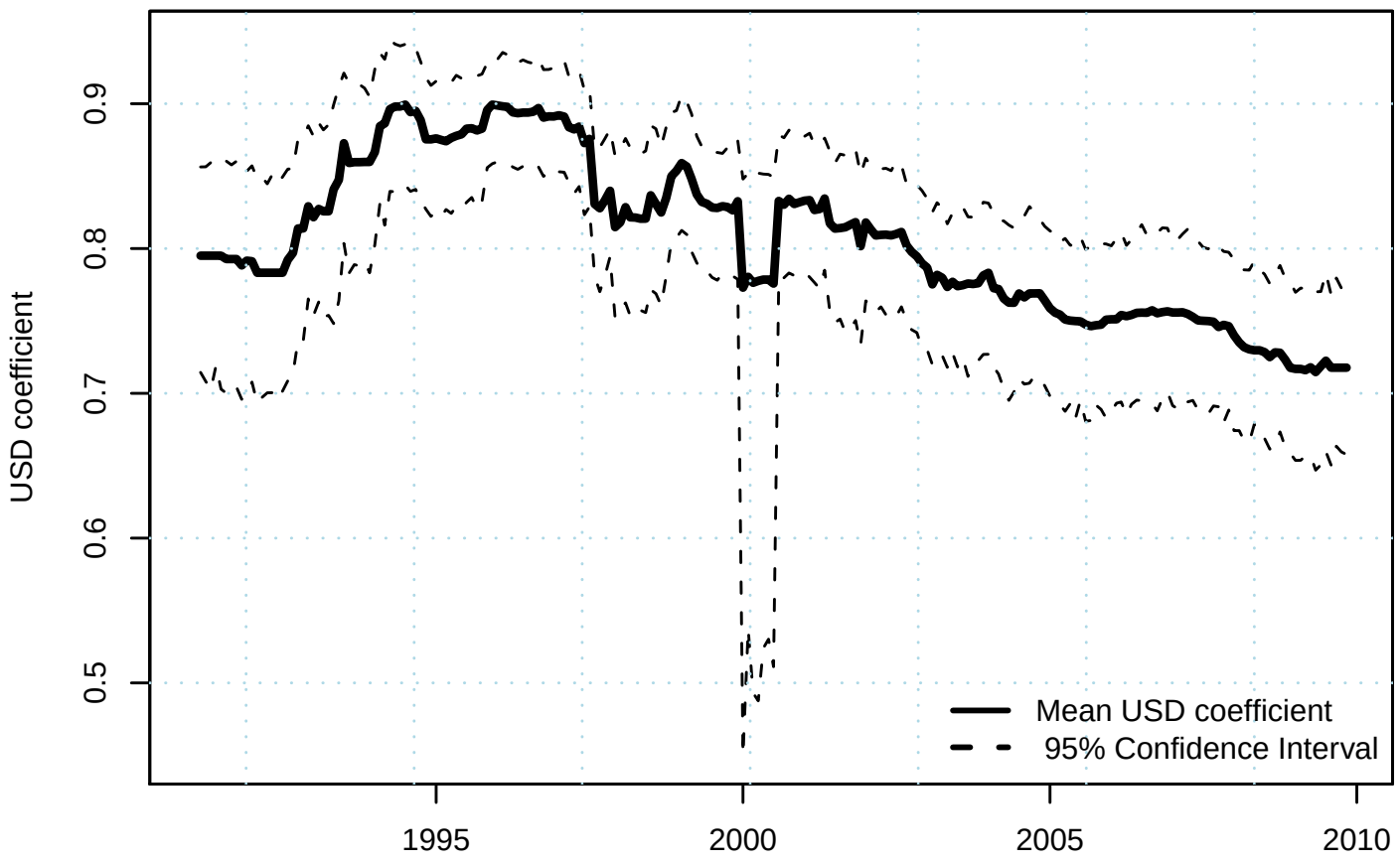
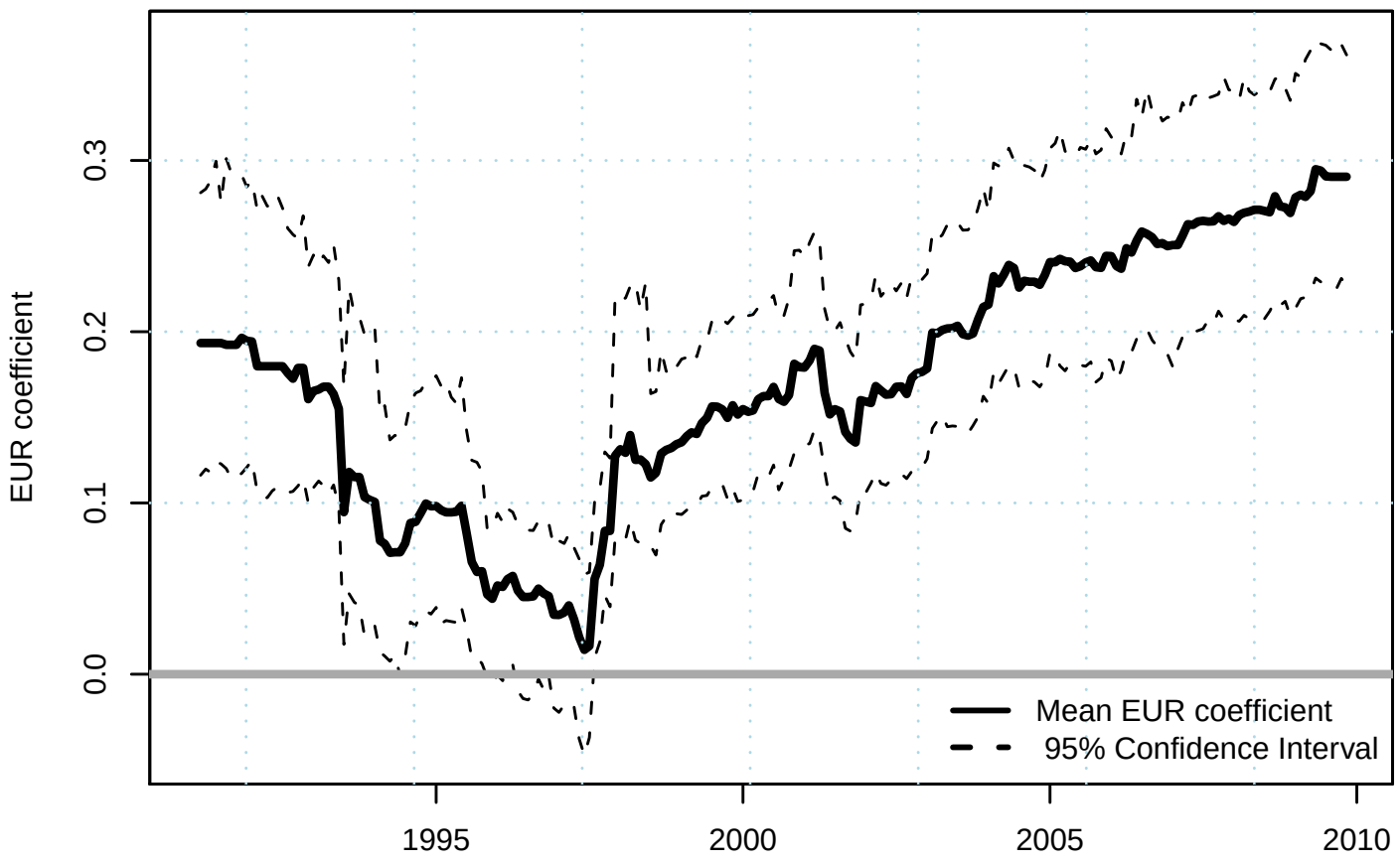
Role of major currencies

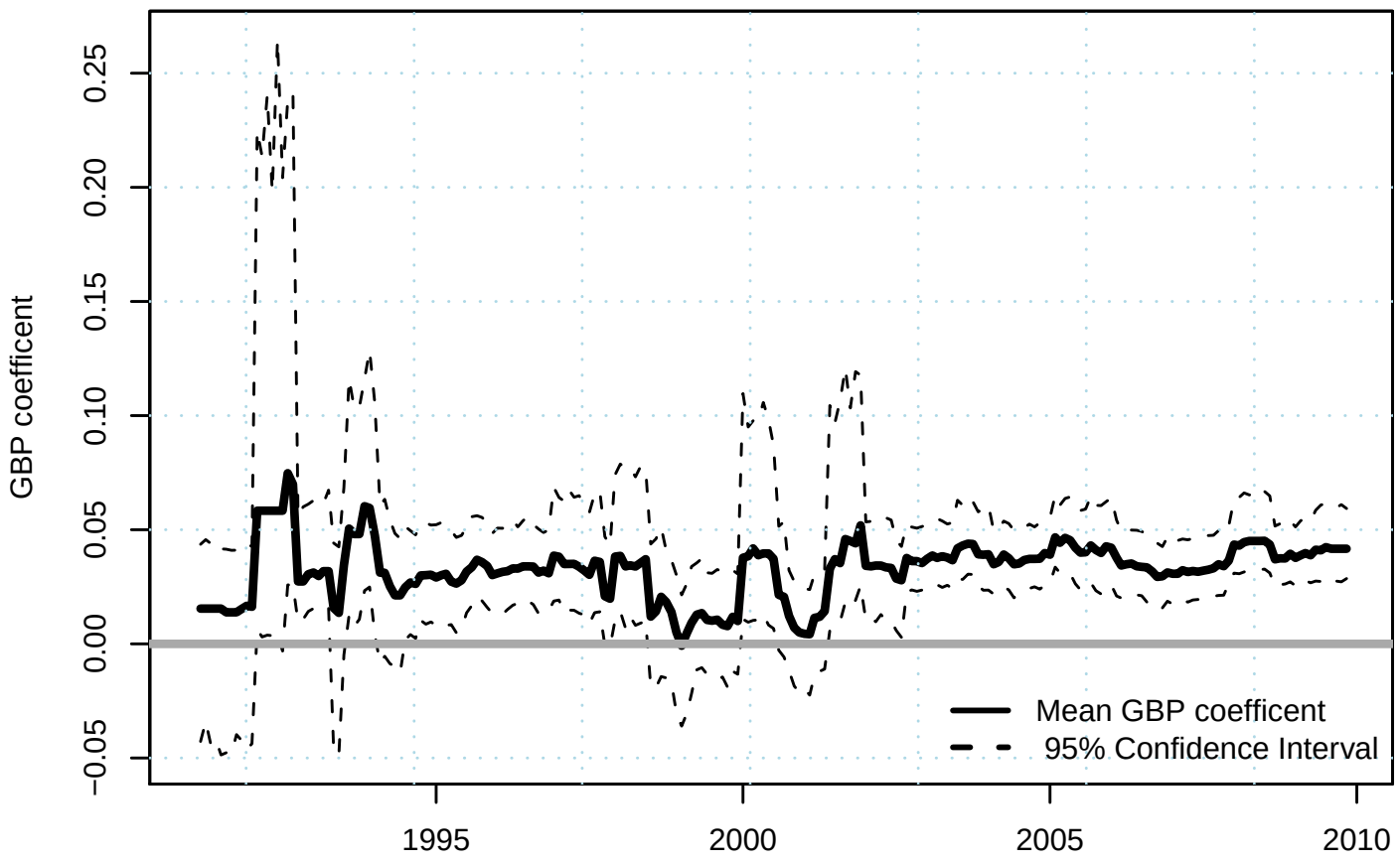
Secular decline in the Dollar across the world



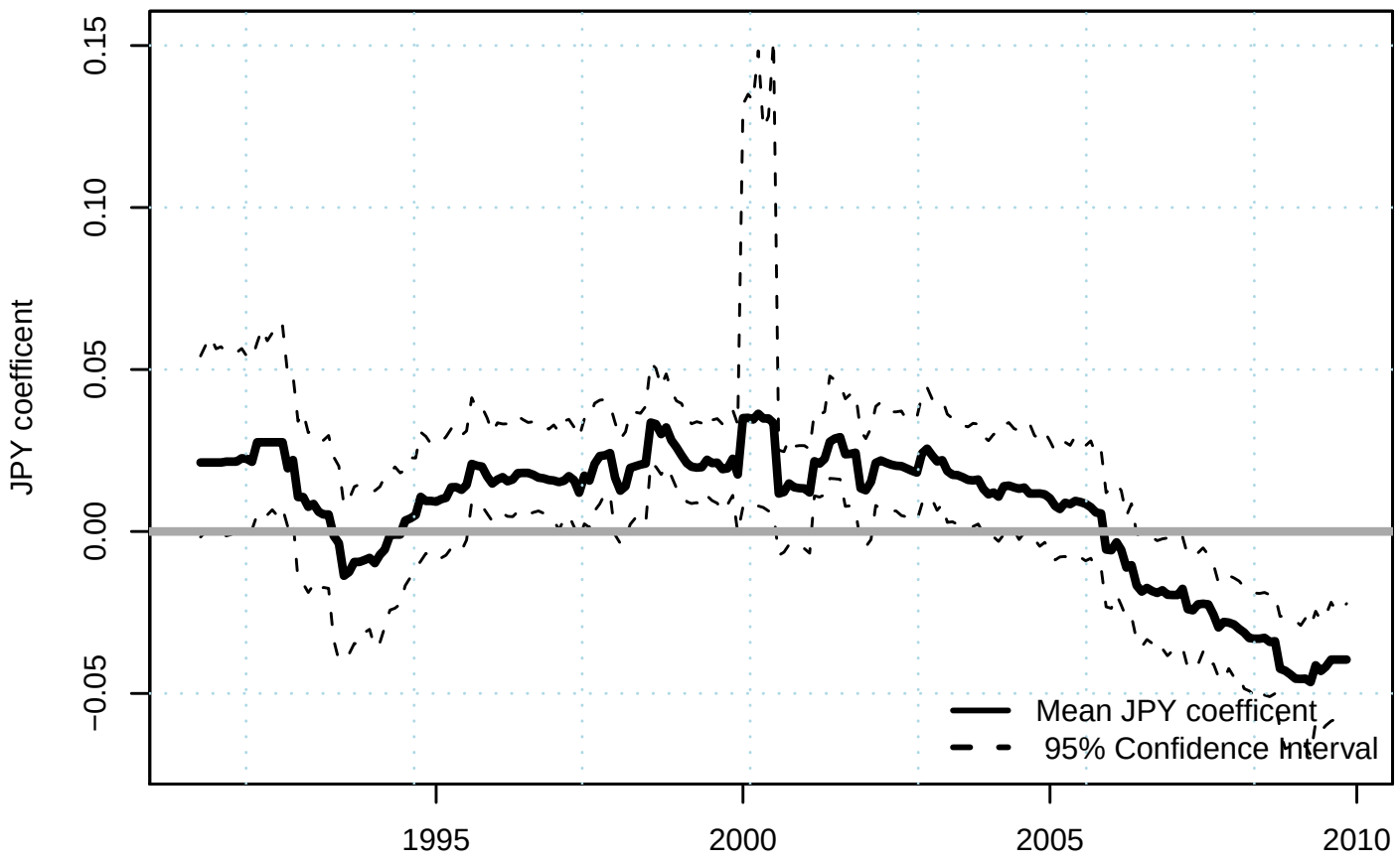
The secular rise of the Euro across the world



British Pound as an international currency



Yen no longer an international currency



Average coefficients across different regions

Region	1991-11-01		1999-11-01		2009-11-01	
	USD	DEM	USD	EUR	USD	EUR
Asia	0.91	0.06	0.95	0.05	0.87	0.10
East Asia	0.99	0.02	0.91	0.03	0.80	0.03
Latin America	0.89	0.07	0.94	0.00	0.89	0.15
Africa	0.59	0.40	0.81	0.17	0.72	0.28
Oceania	0.79	0.16	0.64	0.32	0.55	0.47
E.Europe	NA	NA	0.53	0.35	0.34	0.75

Summary: Role of major currencies

- There is a rise in Euro as an international currency.
- The decline of the dollar is significant.
- The British Pound has had a significant but a small role since 1997.
- Latin America and East Asia remain focused on the dollar.
- Africa, Asia and Eastern Europe have increased their weight to the EUR in the currency basket.
- The role for the JPY is negligible today.
- Results vary across different regions of the world, with Africa and Asia re-weighting the basket to give Euro a greater role.

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- Africa, Asia and Eastern Europe have increased their weight to the EUR in the currency basket.
- The role for the JPY is negligible today.
- Results vary across different regions of the world, with Africa and Asia re-weighting the basket to give Euro a greater role.

Research utilising the database

Example

- Ila Patnaik, Ajay Shah (2010 (forthcoming)). Does the currency regime shape unhedged currency exposure? *Journal of International Money and Finance*.
- Ila Patnaik, Ajay Shah (2010). Asia confronts the Impossible Trinity. *ADBI Working Paper*.
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Features of database

1. Shift from a qualitative to a quantitative approach in estimating *de facto* exchange rate regime.
2. Consistency across countries and across time.
3. Inferential strategy for dates of structural change.
4. Quantification of exchange rate flexibility (rather than discrete unordered classification.)
5. Weights of various currencies in the basket.
6. Code available in open source: `http://cran.r-project.org/package=fxregime`

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Thank You