

A Stable System of Exchange Rates

Atish Ghosh

Ran Bi
Christopher Crowe
Victoria Fazio
Sam Fraiberger
Julian di Giovanni
Jun Kim
Jay Shambaugh
Marco Terrones
Haris Tsangarides
Mary Yang



stability
integration
resilience
credibility
insulation

The views expressed in this presentation are those of the authors and do not necessarily represent those of the IMF or IMF policy.

Introduction

- Article IV requires the IMF and its members to “assure orderly exchange arrangements and promote a stable system of exchange rates”
 - Facilitate the exchange of goods, services and capital
 - Sustain sound economic growth with reasonable price stability
 - Avoid producing erratic disruptions
- Elements of a Stable System
 - Individual countries’ macro goals
 - Goods and capital market integration, smooth adjustment
 - Key currencies not erratic
- Today’s Presentation
 - Review theoretical literature
 - Ghosh, Gulde, Wolf (2003) *Exchange Rate Regimes—Choices and Consequences*
 - Wolf, Ghosh, Berger and Gulde (2008) *Currency Boards in Retrospect and Prospects*
 - Lay out empirical agenda
 - *Exchange Rate Regimes in an Increasingly Integrated World Economy* (1999)
 - *Evolution and Performance of Exchange Rate Regimes* (2003)

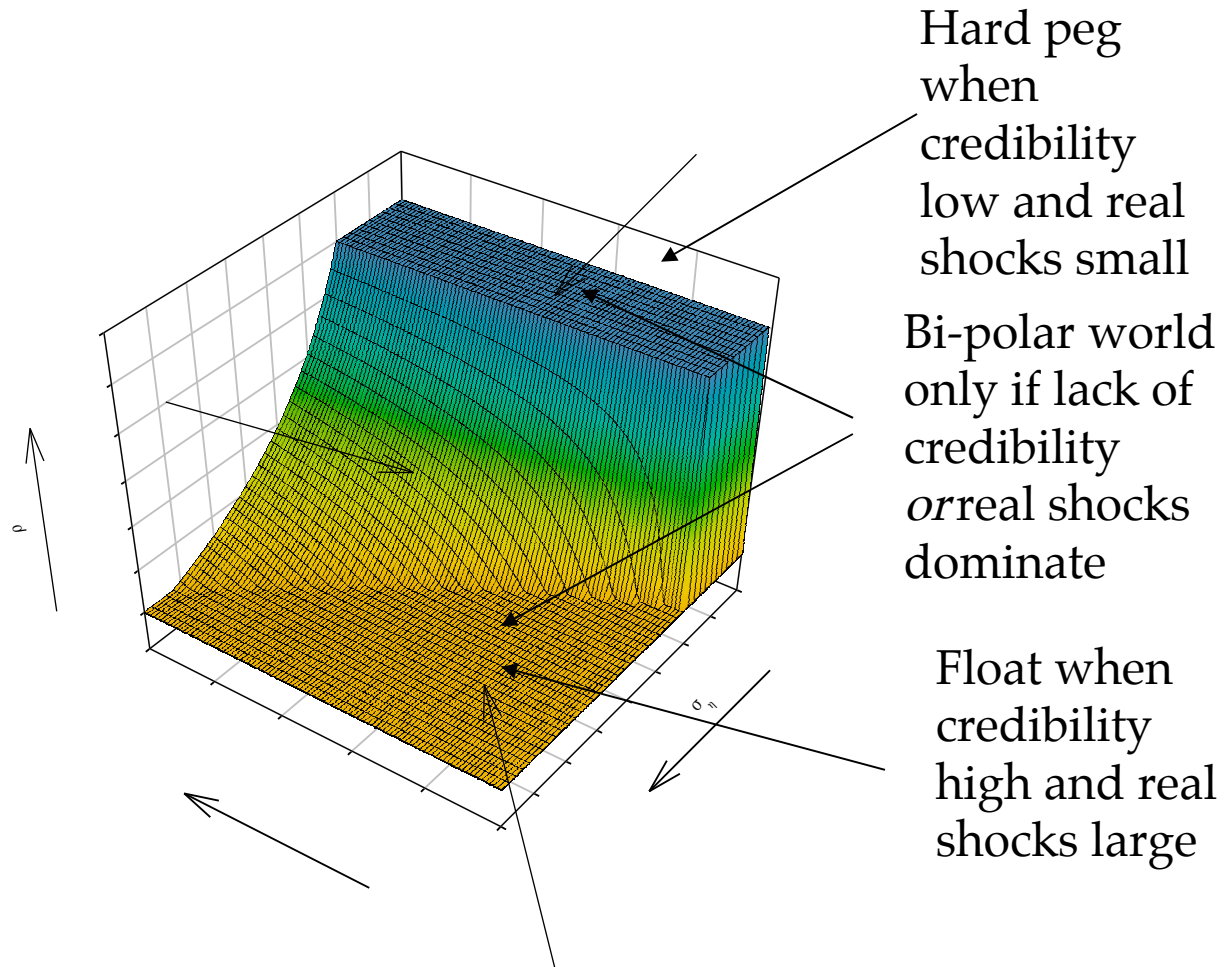
Theoretical Literature on Regime Choice

- Three main strands
 - Insulation against shocks, effectiveness of macro policies
 - Cross-border trade and investment; Optimum Currency Areas (OCA)
 - Disinflation, policy credibility
- Post-ERM, and capital account crises, susceptibility and resilience
 - First, second, and third-generation BOP crisis models
 - Currency crises, implicit and explicit one-way bets
 - Banking crises, lender of last resort
 - Sudden stops, debt crises
- External adjustment
 - Friedman debates in 1950-60s
 - Surprisingly little literature after 1970s

Theoretical Model

- Structure
 - Open-economy Barro-Gordon model of monetary policy time-inconsistency / lack of central bank credibility
- Two-step regime choices:
 - fixed versus floating;
 - hard vs. soft peg vs. float
- Key insights
 - Pegged exchange rate leads to lower inflation due to:
 - Monetary discipline (lower money growth)
 - Monetary credibility (lower inflation for given money growth)
 - Especially useful during “incredible” disinflations
 - Floating exchange rates preferable to fixed when
 - Real shocks dominate—unless wages flexible, or peg to perfectly correlated partner (OCA)
 - Small nominal shocks
 - Bi-polar world
 - Hard peg when credibility problems important
 - Pure float when real shocks predominate

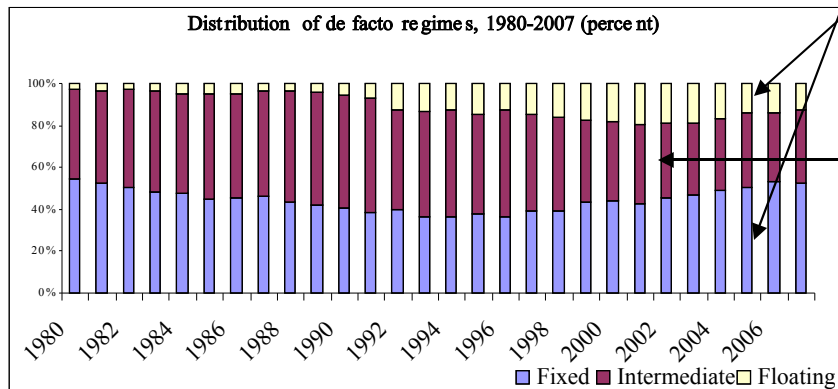
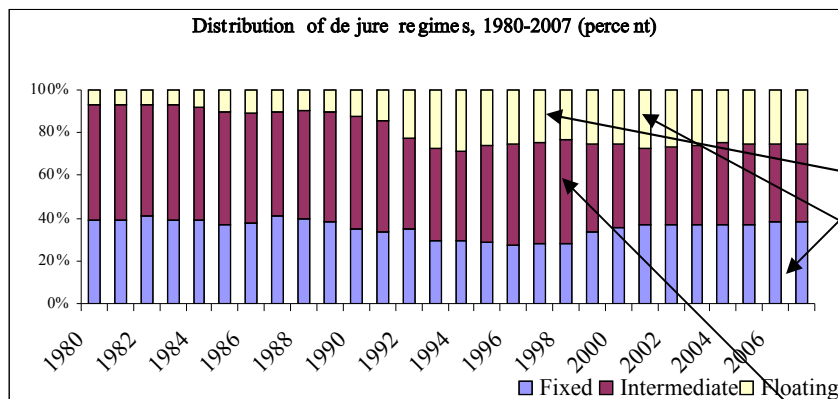
Theoretical Model



Empirical Agenda

- Trends in regimes
 - Bipolar world?
 - De jure vs. de facto
 - Determinants of regime choice
- Implications for macroeconomic policies
 - Monetary policy and the impossible trinity
 - Fiscal policy (Krugman, fiscal theory of prices); discipline or “cheat”?
- Macroeconomic performance
 - Inflation
 - Growth
 - Volatility
- Susceptibility to crises, cost of crises
- External adjustment
 - Build up of unsustainable imbalances
 - Persistence of current account balances
- Cross border goods and capital market integration
 - Real exch. vol. at different horizons; uncertainty vs. protectionism
 - Stabilizing (consumption smoothing) vs. de-stabilizing capital flows
- Behavior of key currencies

Trends in Regimes



- Increasing share of pegged exchange rate regimes in recent years—especially de facto
- Increase of de jure floats
- Big divergence between de jure float and de facto intermediate or pegs (why?)
- Some hollowing out (bipolar world)—but not supported by Markov chain evidence (hard pegs and free floats neither closed set nor absorbing states)

Implications for Macro Policies—Monetary

Table 1. Monetary Policy (ΔR) Regressions: Baseline for whole sample, peps and non-pegs

	(1)	(2)
	Pegged	Non-Pegged
Inflation _t	-0.006	0.213**
Output Gap _{t-1}	-0.04	0.385*
Δ Baser R _t	0.618**	0.043
Observations	710	1307
R ²	0.07	0.12

Notes: Dependent variable is annual change of domestic policy rate. Output gap defined as gap between real GDP and MA(4) predictions of GDP. Exchange Rate Dummy Based on MCM Classification. Robust standard errors, clustered at country level, in parentheses. + significant at 10%; * significant at 5%; ** significant at 1%.

- Monetary policy under a pegged exchange rate regime react less to inflation or the output gap
- Under peg, monetary policy follows the anchor country's interest rate
- Results similar across country income groups
- Results are even stronger when differentiating across openness of the capital account

Implications for Macro Policies—Fiscal

Fiscal Policy and the Exchange Rate Regime

	(1) All Countries	(2) Advanced Economies	(3) EMEs/ Developing Economies
Output Gap _{t-1}	4.60	9.23	5.52
Output Gap _{t-1} × Int Dummy	9.37**	39.4***	3.58
Output Gap _{t-1} × Flt Dummy	13.9***	32.4***	14.1***
Within R ²	0.46	0.64	0.44
Observations	794	334	458
Countries	74	26	47

Exchange Rate Regime Dummies based on MCM de facto classification. All specifications include country fixed effects, year dummies and a constant term. Specifications I-IV also include exchange rate regime dummies. Country Groupings based on SID definition. Specification IV: Output Gap lagged one year; other variables contemporaneous.

- Pegged exchange rates much less counter-cyclical than floats
- Intermediate—in between, but closer to floats
- For all regimes, EMEs/developing countries less counter-cyclical—lower relative cost of pegging

Macroeconomic Performance—Inflation

Inflation and money growth (in percent per year)

	De jure classification			De facto classification		
	Peg	Int	Flt	Peg	Int	Flt
Scaled inflation	7.4	10.7	13.3	7.6	12.4	9.7
Scaled money growth	10.5	15.5	17.2	11.8	16.6	14.2
Scaled inflation (by country group)						
Upper-income	3.0	5.8	3.6	2.7	6.9	2.8
Upper-middle-income	5.5	11.7	20.1	5.8	13.9	9.6
Lower and lower-middle-in	9.8	12.7	16.6	10.2	14.1	15.7
Observations	1,446	2,172	887	1,919	2,112	492

■ Pegged regimes have lowest inflation

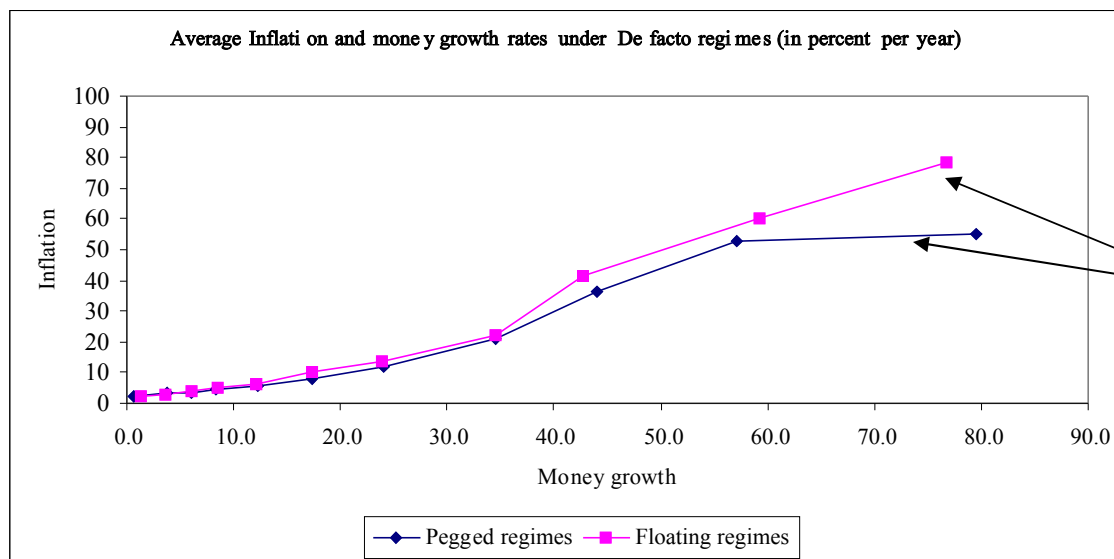
■ Intermediate regimes have lower inflation than floats (except for upper-income)

■ Money growth rates (“discipline”) follows same pattern

■ Better inflation performance of pegged regimes reflects both greater “discipline” and greater “confidence”

□ Endogeneity?

□ Cross-regime contamination?



Macroeconomic Performance—Growth

Growth, investment and openness
(in percent per year or percent of GDP)

	De jure classification			De facto classification		
	Peg	Int	Flt	Peg	Int	Flt
Real GDP growth per capita	1.5	2.1	1.5	1.7	1.9	1.5
Investment ratio (in pct of GDP)	22.3	21.6	20.1	22.3	21.3	19.1
Trade openness (in pct of GDP)	91.5	78.2	64.2	91.3	73.8	60.5
Export growth	6.2	7.6	6.8	6.5	7.6	6.9
Real GDP growth per capita (by country group)						
Upper and upper-middle-income	2.6	2.0	2.2	2.1	2.4	2.0
Lower and lower-middle-income	0.5	2.1	1.1	1.3	1.6	1.0
Observations	1,446	2,172	887	1,919	2,112	492

- GDP growth
 - Intermediate regimes have highest growth
 - Rankings not very robust to other controls—perhaps if differentiate samples
- Pegged regimes
 - highest investment ratios (lower productivity growth?)
 - most open
 - lower export growth

Macroeconomic Performance—Volatility

Volatility (in percent per year)

	De jure classification			De facto classification		
	Pegged	Intermediate	Floating	Pegged	Intermediate	Floating
<i>Full sample</i>						
Real GDP growth volatility	3.1	2.9	2.8	3.1	2.9	2.4
Real GDP volatility	2.5	2.3	2.4	2.5	2.3	1.9
Consumption growth volatility	7.5	5.8	4.6	7.3	5.7	3.5
<i>Upper and upper-middle-income</i>						
Real GDP growth volatility	2.6	2.9	2.6	2.8	3.0	1.6
Real GDP volatility	2.2	2.2	2.2	2.3	2.4	1.2
Consumption growth volatility	7.1	4.4	2.6	6.8	4.4	1.6
<i>Lower and lower-middle-income</i>						
Real GDP growth volatility	3.5	2.9	2.9	3.3	2.9	3.4
Real GDP volatility	2.6	2.3	2.4	2.6	2.3	2.8
Consumption growth volatility	7.7	7.0	6.1	7.7	6.8	6.0
Number of observations	1,446	2,172	887	1,919	2,112	492

- Output or growth volatility greater under pegged exchange rates
- Differences more marked in upper and upper-middle income countries (nominal rigidities)?
- Consumption growth volatility greater under pegged exchange rate—differences less marked for lower income countries

Susceptibility to Crises

Conditional Probability of a Crisis by Exchange Rate Regime 1/						
	Currency Crisis 2/			Financial Crisis 2/		
	All	Emerging	Developing	All	Emerging	Developing
I. 1980-2007						
Fix	0.035	0.036	0.039	0.176 **	0.252 **	0.166
Int	0.050 **	0.063 *	0.053	0.175 **	0.179 *	0.167
Flt	0.037	0.019	0.074	0.128	0.070	0.119
II. 1991-2007						
Fix	0.031	0.015	0.039	0.137	0.183	0.136
Int	0.045 *	0.067 **	0.045	0.171 **	0.182	0.156
Flt	0.039	0.020	0.075	0.115	0.081	0.118

1/ Bold figure refers to the case where the probability is significantly higher than in at least one of the other two regimes. Shaded cell refers to the case where the probability is significantly higher than in all other regimes.

2/ Currency crisis is defined as depreciation of at least 25%, and acceleration of at least 10%

3/ Exchange rate regimes are based on MCM de facto classification; lagged

- Currency crises
 - More frequent in intermediate (EM) regimes
 - Output cost of (4 pct of GDP for two-year period) does not differ significantly across regimes
- Financial (banking, debt, sudden stop) crises
 - More frequent in pegged (EM) and intermediate regimes
 - But more costly (3 times as large) under floating regimes

External Adjustment

Current Account Reversals
(Sample Statistics by Country Groups)

	De Jure		De Facto	
	Mean	Percent of exchange rate regime	Mean	Percent of exchange rate regime
Surplus reversals				
All Countries				
Fixed Exchange Rate	11.3	1.4	10.3	1.7
Intermediate Exchange Rate	9.1	1.9	9.6	1.9
Floating Exchange Rate	4.8	1.5	4.7	1.1
Emerging & Other Developing Economies				
Fixed Exchange Rate	11.5	1.5	10.3	1.6
Intermediate Exchange Rate	9.8	1.9	10.4	2.0
Floating Exchange Rate	5.3	1.8	5.4	1.1
Deficit reversals				
All Countries				
Fixed Exchange Rate	-21.8	3.0	-20.1	3.7
Intermediate Exchange Rate	-13.9	3.9	-14.3	4.0
Floating Exchange Rate	-11.2	3.7	-7.4	1.1
Emerging & Other Developing Economies				
Fixed Exchange Rate	-22.1	3.4	-20.7	4.1
Intermediate Exchange Rate	-15.8	3.9	-16.4	3.9
Floating Exchange Rate	-13.0	4.7	-9.3	1.1

Reversals are defined as in Caroline Freud (2004). A minimum threshold of 2 (-2) was used to identify surplus (deficit) reversals for Advanced Countries. A minimum threshold of 4 (-4) was used to identify surplus (deficit) reversals for Emerging Markets and Developing Countries.

■ Surplus reversals

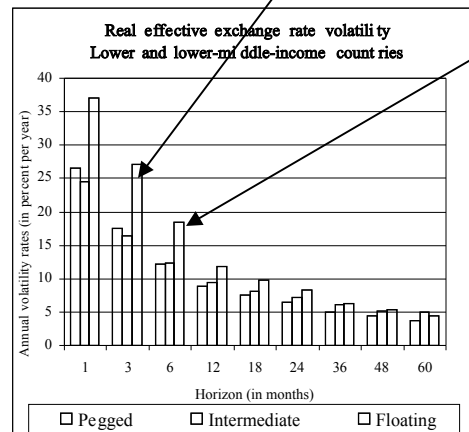
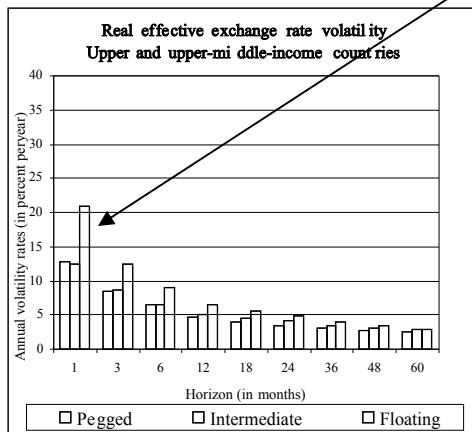
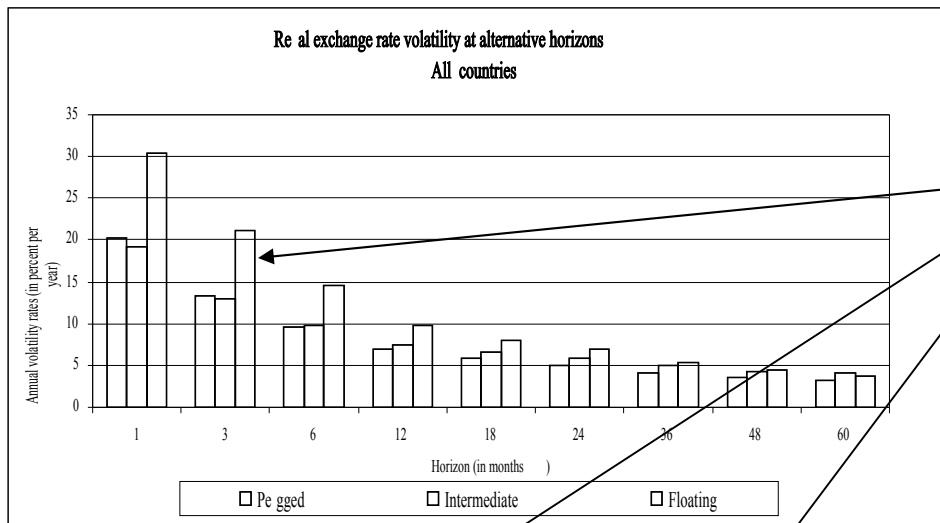
- No clear pattern under de jure classification
- Somewhat more frequent under pegged or intermediate regimes compared to floats in de facto classification

■ Deficit reversals

- Do not differ under de jure classification
- More frequent under pegged or intermediate regime compared to floats in de facto classification

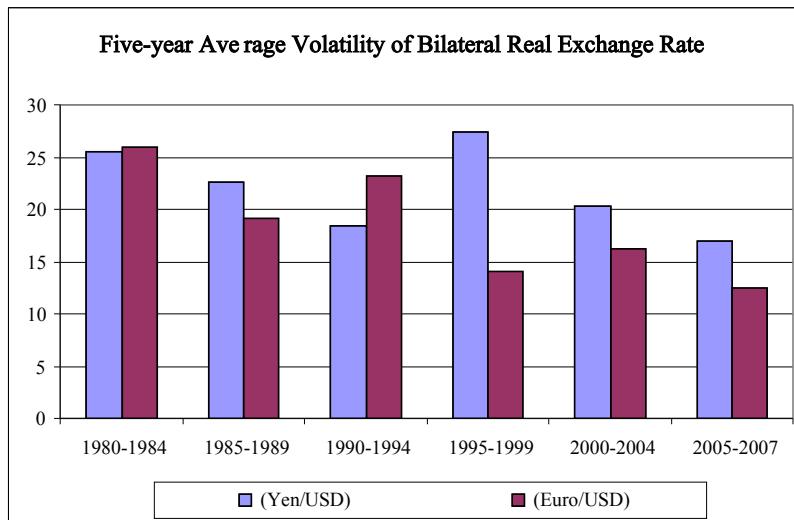
■ No significant differences in persistence of current account balances

Trade Integration—Real Exchange Rate

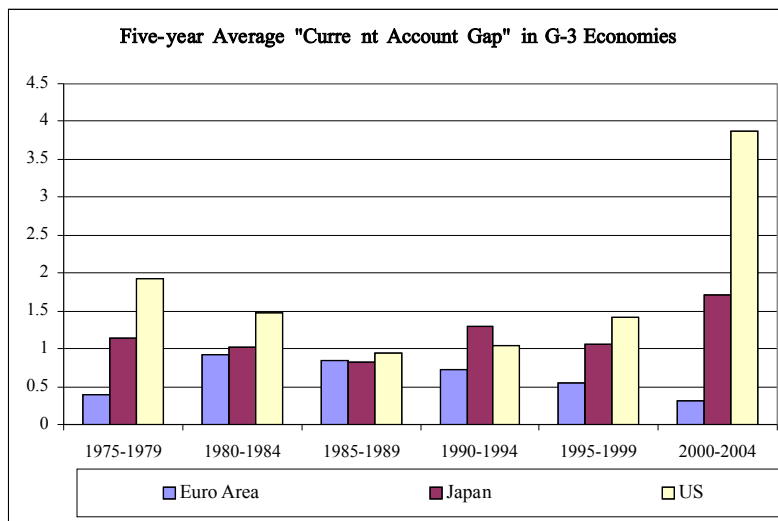


- Across country groups and horizons, volatility higher under floating regimes
- Across country groups and regimes, volatility declines with length of horizon
- More pronounced decline for lower-income countries (nominal depreciation offsets inflation)

Behavior of Key Currencies

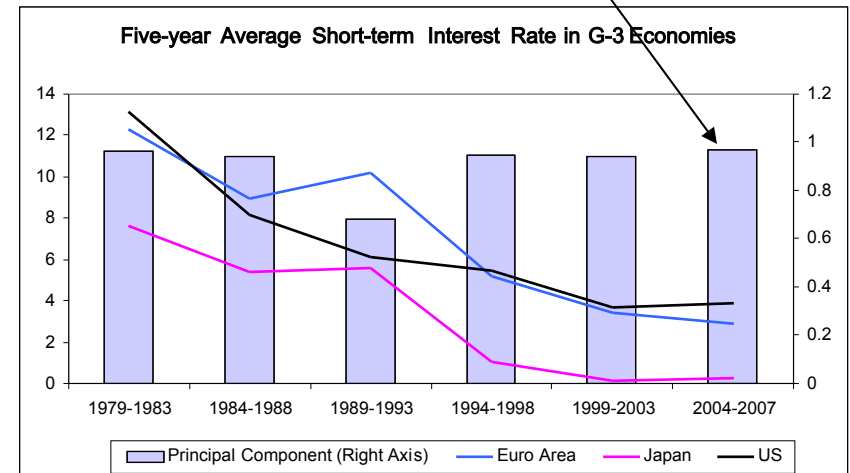
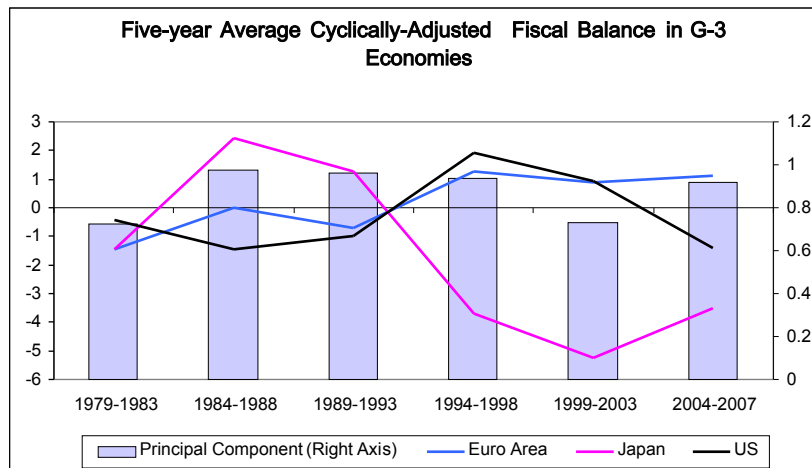
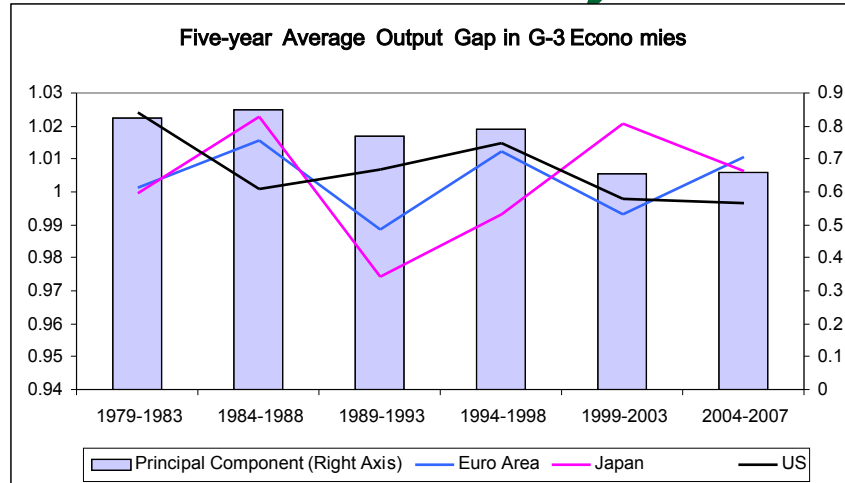


- Volatilities (rolling, monthly standard deviations) of key bilateral currencies have been declining
- But current account gaps—deviation of actual from estimated “norms”—have been increasing in absolute value



Behavior of Key Currencies

- Reduced volatility of key currencies reflects mainly greater coherence of monetary policy, rather than of output or fiscal policy



Tentative Conclusions

- Theory—
 - Insights on trade-offs:
 - Hard(er) pegs when credibility low, real shocks small, can peg to correlated partner; floats when real shocks important; intermediate otherwise
 - But too many other predictions!
- Empirical
 - Trends in regimes—no evidence of bi-polarity; continued divergence between de jure and de facto—why? Choice of regime?
 - Macro policy constraints—but pegs have lower inflation (suitable when lack of credibility would imply abuse?)
 - Macro performance—
 - Pegs have lower inflation (due to discipline and confidence), but less important once inflation is low. Endogeneity? Reactions to capital inflows?
 - Intermediates have strongest growth—robust? Sub-samples?
 - Pegs have greater volatility—nominal rigidities?
 - Currency crises more frequent under intermediate; Financial crises more frequent under pegged (especially for EMEs), but more costly under floats

Tentative Conclusions

- External Interactions
 - Adjustment
 - Some evidence of more frequent large imbalances (surplus or deficit) under de facto pegs / intermediates
 - But no evidence of more sluggish current account adjustment
 - Lower real exchange rate volatility under pegs
 - More trade? Why? (volatility, uncertainty, transactions costs)?
 - How perceived by private sector?
 - Capital market integration
 - More stabilizing capital flows under which regime? FDI flows?
- Behavior of Key Currencies
 - Lower volatility of major bilateral exchange rates—but does it differ by horizon? What is impact on other countries?
 - Mainly due to convergence of monetary policies—will that survive?
 - Evidence of larger imbalances