DEUTSCHE BUNDESBANK
EUROSYSTEM

Inst
Monetar
Finan
Stal

Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

Workshop on

"Money, Finance and Banking in East Asia"

Training Centre of the Deutsche Bundesbank, Eltville
5-6 December 2011

Christoph Fischer
Deutsche Bundesbank

Presentation to

"Currency blocs in the 21st century"

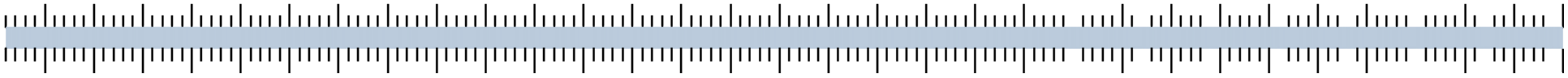
DEUTSCHE BUNDESBANK
EUROSYSTEM

Currency Blocs in the 21st Century

Christoph Fischer

3rd Workshop on Money, Finance, and Banking in East Asia

Eltville, 6 December 2011



Motivation

DEUTSCHE BUNDESBANK
EUROSYSTEM

(1) What are the **characteristics of the present currency blocs**?

(2) How do long-term structural variables affect an economy's **anchor currency choice**? Which distinctive features of the US dollar bloc and the euro bloc can be inferred from the analysis?

(3) What might a **currency bloc equilibrium** based on the above analysis be like? How would currently discussed currency regime-related policy decisions affect this equilibrium?

Overview

DEUTSCHE BUNDESBANK
EUROSYSTEM

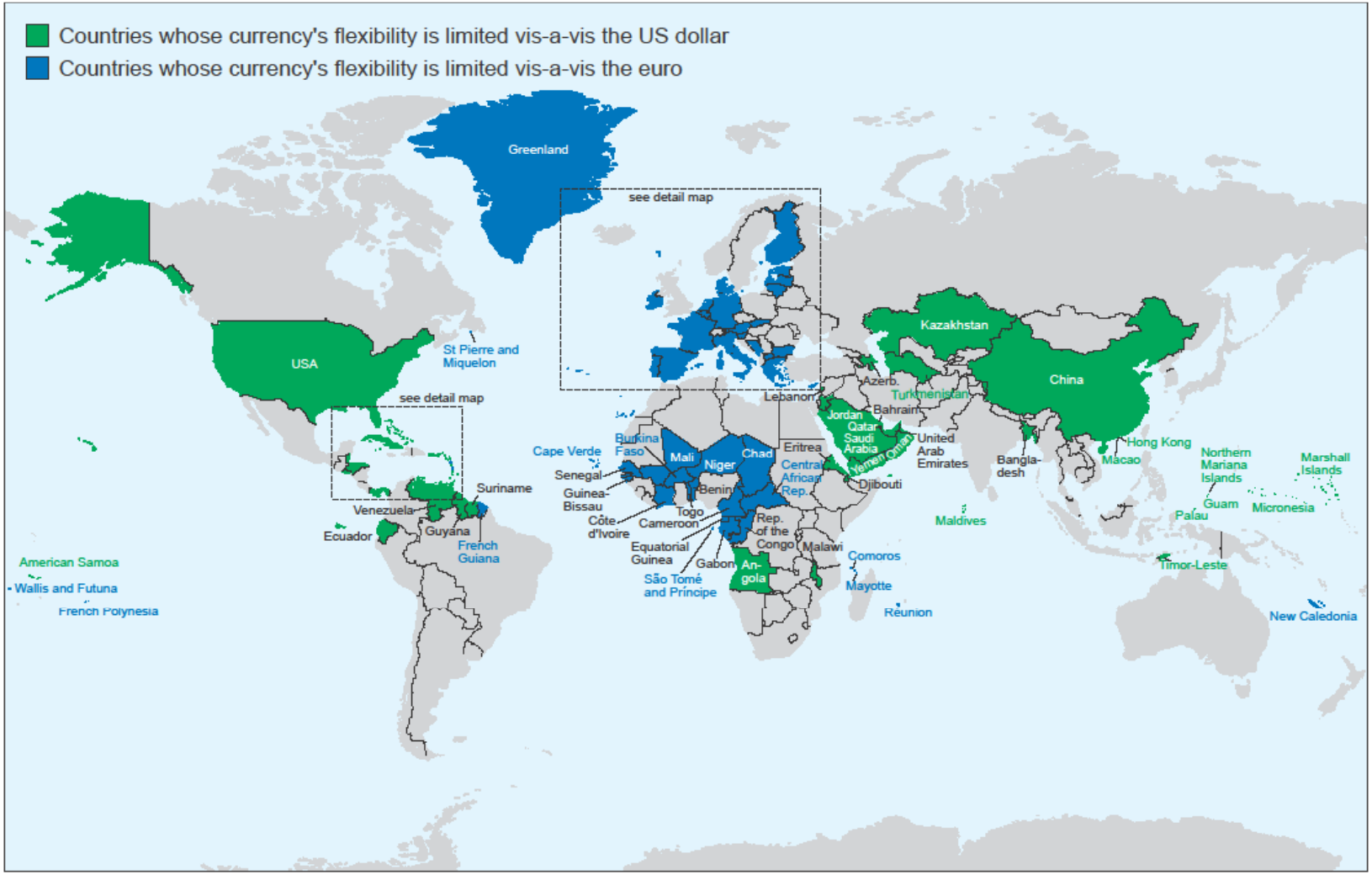
- A descriptive overview of present currency blocs
- Econometric approach and explanatory variables
- Results:
  - Estimation results
  - The distribution of regime and anchor currency choice
  - The US dollar as an “anchor of last resort”
  - Checks for endogeneity
- A currency bloc equilibrium
- Effects of economic policy decisions
- Conclusions

Present Currency Blocs (1)

DEUTSCHE BUNDESBANK EUROSYSTEM

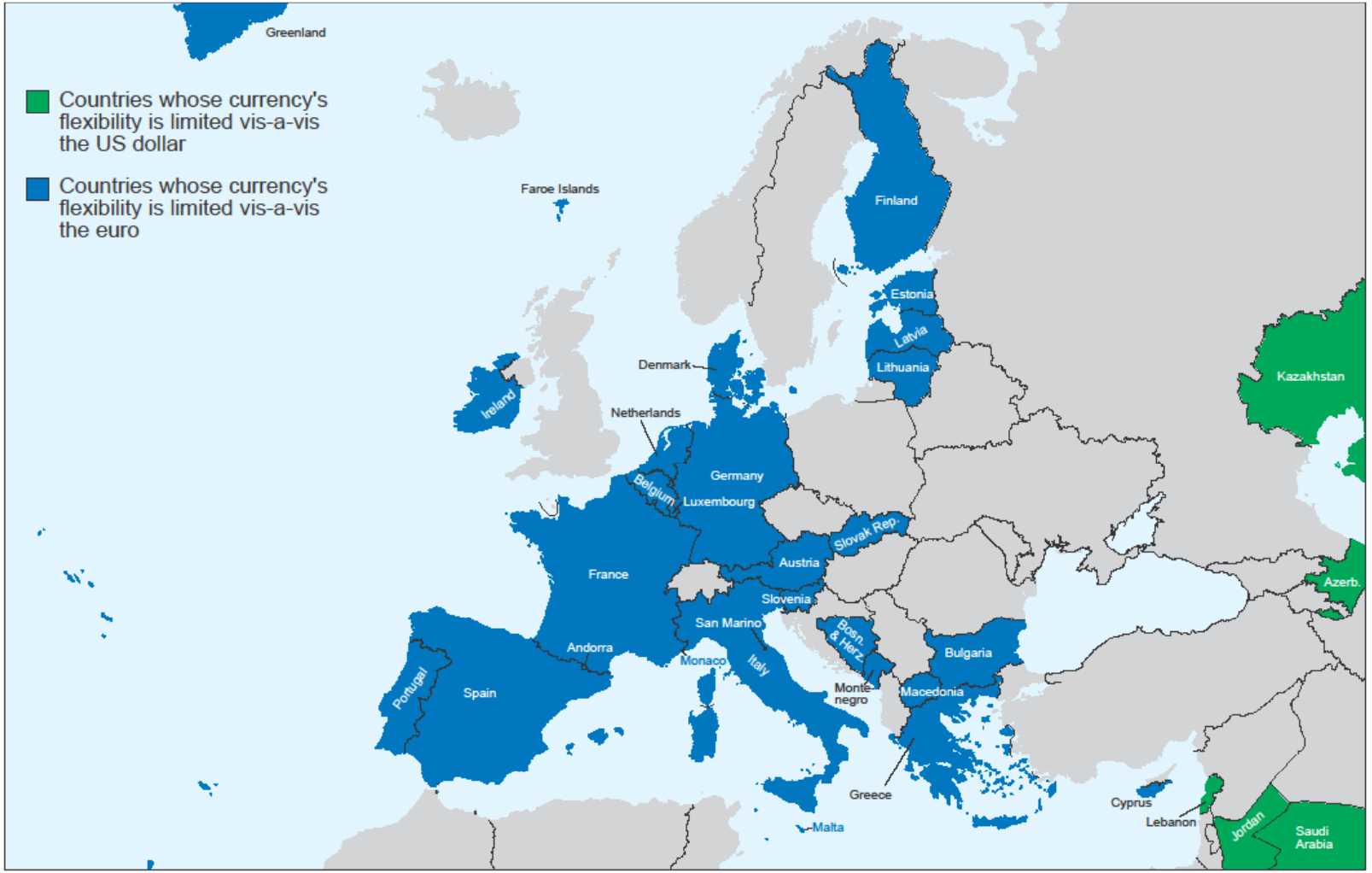
- **Currency regime classification:**
  - IMF's *de facto* classification of exchange rate arrangements supplemented by Bundesbank data.
- **Categories:**
  - Peg to the euro
  - Peg to the US dollar
  - Peg to another currency
  - Float
- Annual observations starting in 1999.

Currency Blocs in 2008 (2)



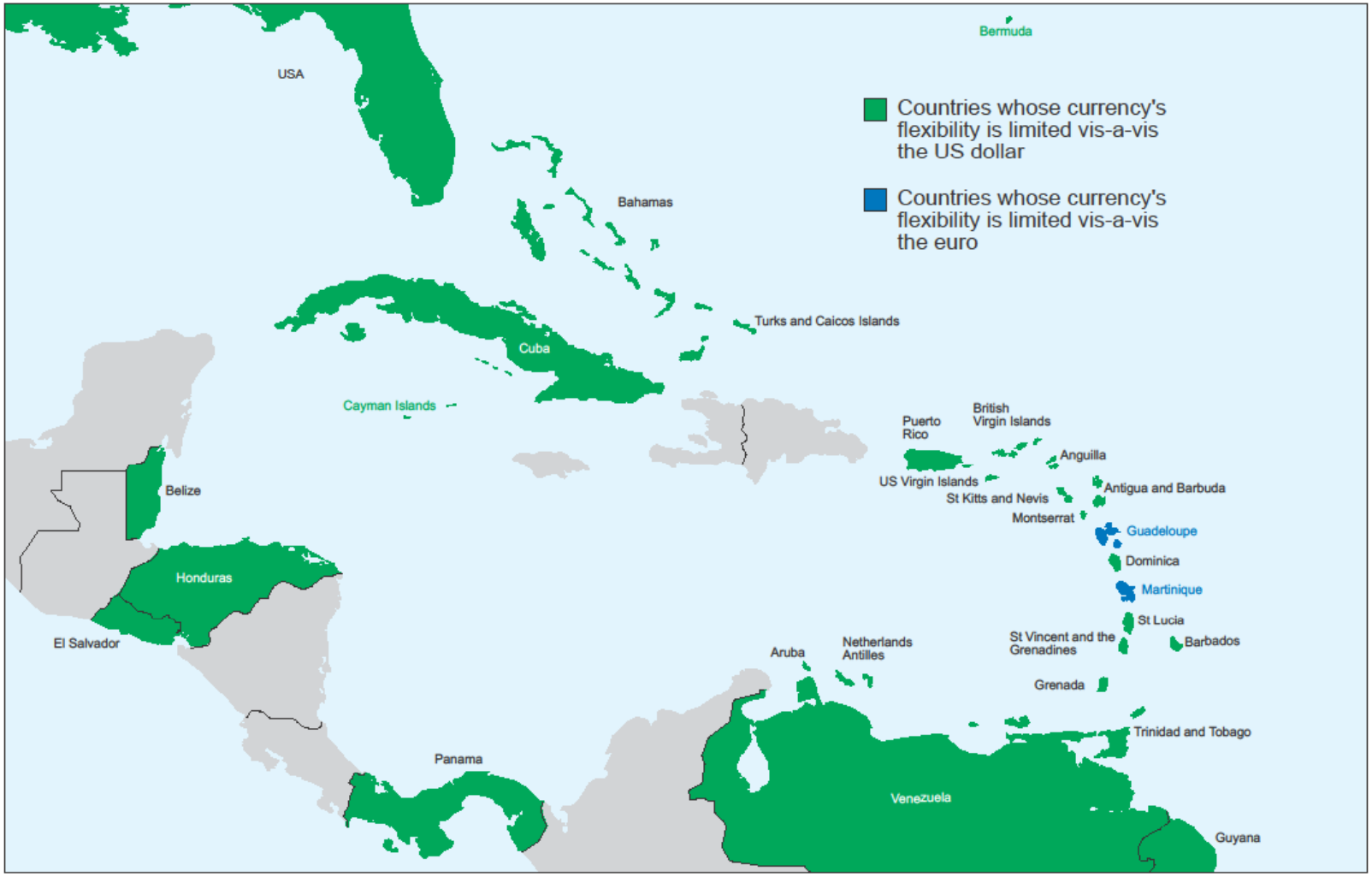
Currency Blocs in 2008 (3)

DEUTSCHE BUNDESBANK
EUROSYSTEM



Currency Blocs in 2008 (4)

DEUTSCHE BUNDESBANK
EUROSYSTEM



Currency Blocs in 2008 (5)

DEUTSCHE BUNDESBANK EUROSYSTEM

Extensiveness of currency blocs:

- Out of 229 countries and territories …
  - … 56 belong to the US dollar bloc, …
  - … 56 to the euro bloc and …
  - … 26 to the category “peg to another currency”.
- Combined GDP (2005 PPP units) of US dollar bloc falls between 150% and 209% of the corresponding euro bloc value.

Present Currency Blocs (6)

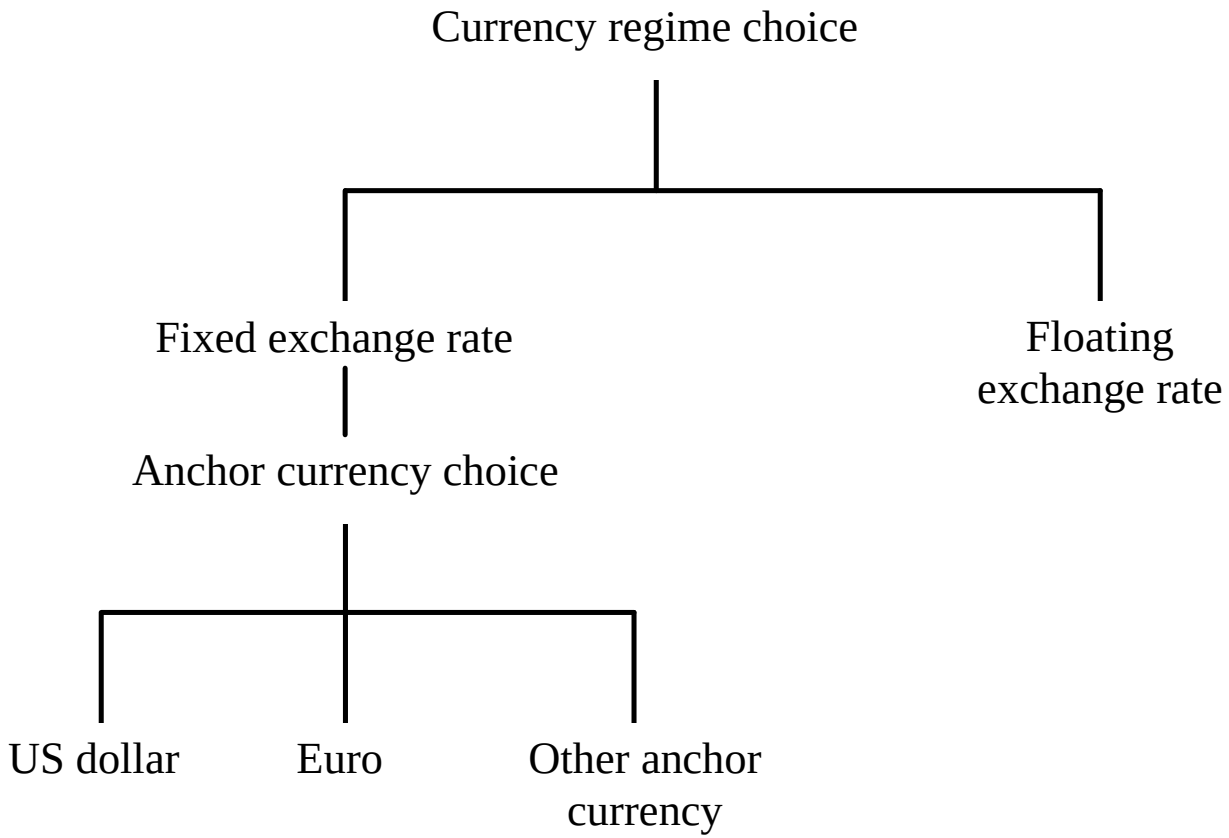
DEUTSCHE BUNDESBANK EUROSYSTEM

Stability of currency blocs:

- The euro bloc is extremely stable compared with the US dollar bloc: Between 1999 and 2008…
  - … only Hungary and Croatia left the euro bloc, …
  - … but 33 countries from all over the world left the US dollar bloc.
  - Nevertheless, the number of countries with pegs to the US dollar increased slightly during this period.

Econometric Approach (1)

Decision tree on currency regime and anchor currency choice



→ Proper estimation method: Nested Logit

Econometric Approach (2)

Nested Logit: Overall probability of country i choosing currency regime / anchor currency j

$$p_{i,peg\_euro} = p_{i1} = p_{iP} \times p_{i1|P} = \frac{\exp(\mathbf{z}'\boldsymbol{\alpha} + \tau \cdot I)}{1 + \exp(\mathbf{z}'\boldsymbol{\alpha} + \tau \cdot I)} \cdot \frac{\exp\left(\mathbf{x}_1'\boldsymbol{\beta}_1 / \tau\right)}{\exp(I)}$$

$$p_{i,peg\_dollar} = p_{i2} = p_{iP} \times p_{i2|P} = \frac{\exp(\mathbf{z}'\boldsymbol{\alpha} + \tau \cdot I)}{1 + \exp(\mathbf{z}'\boldsymbol{\alpha} + \tau \cdot I)} \cdot \frac{\exp\left(\mathbf{x}_2'\boldsymbol{\beta}_2 / \tau\right)}{\exp(I)}$$

$$p_{i,peg\_other} = p_{i3} = p_{iP} \times p_{i3|P} = \frac{\exp(\mathbf{z}'\boldsymbol{\alpha} + \tau \cdot I)}{1 + \exp(\mathbf{z}'\boldsymbol{\alpha} + \tau \cdot I)} \cdot \frac{1}{\exp(I)}$$

$$p_{i,float} = p_{i4} = p_{iF} = \frac{1}{1 + \exp(\mathbf{z}'\boldsymbol{\alpha} + \tau \cdot I)}$$

where $\sum_{j=1}^{4} p_{ij} = 1$ and $I = \ln\left[1 + \exp\left(\mathbf{x}_1'\boldsymbol{\beta}_1 / \tau\right) + \exp\left(\mathbf{x}_2'\boldsymbol{\beta}_2 / \tau\right)\right]$

Econometric Approach (3)

A FIML estimator maximizes $\ln \mathrm{L} = \sum_{i=1}^{N} \sum_{j=1}^{4} y_{ij} \ln p_{ij}$

The nested logit model is consistent with an additive random utility model (ARUM) interpretation if $0 \leq \tau \leq 1$.

Then, country i's utility of choosing alternative j is given by

$U_{ij} = V_{ij} + \varepsilon_{ij}$ where

$V_{i1} = \mathbf{z}'\boldsymbol{\alpha} + \mathbf{x}_1'\boldsymbol{\beta}_1$ $\qquad$ $V_{i3} = \mathbf{z}'\boldsymbol{\alpha}$

$V_{i2} = \mathbf{z}'\boldsymbol{\alpha} + \mathbf{x}_2'\boldsymbol{\beta}_2$ $\qquad$ $V_{i4} = 0$

Explanatory variables (1)

DEUTSCHE BUNDESBANK
EUROSYSTEM

- Vector $\mathbf{z}$ (float vs. peg):
  - Log of real GDP (-)
  - Log of real *per capita* GDP (+)
- Vector $\mathbf{x}_2$ (US dollar peg vs. peg to a third currency):
  - Trade integration with the US dollar bloc (+)

$$S_{i,t}^{USD} = \frac{\sum_{k \in USD(t)} X_{i,k,t}}{\sum_{k} X_{i,k,t}} \cdot \frac{\sum_{k} X_{i,k,t}}{\sum_{k} X_{i,k,t} + \sum_{k} M_{i,k,t}} + \frac{\sum_{k \in USD(t)} M_{i,k,t}}{\sum_{k} M_{i,k,t}} \cdot \left(1 - \frac{\sum_{k} X_{i,k,t}}{\sum_{k} X_{i,k,t} + \sum_{k} M_{i,k,t}} \right)$$

  - Great circle distance to Washington, DC (-)
  - Percentage of net oil exports in total exports

Explanatory variables (2)

- Vector $\mathbf{x}_1$ (euro peg vs. peg to a third currency):
  - Trade integration with the euro bloc (+)

$$S_{i,t}^{EUR} = \frac{\sum_{k \in EUR(t)} X_{i,k,t}}{\sum_{k} X_{i,k,t}} \cdot \frac{\sum_{k} X_{i,k,t}}{\sum_{k} X_{i,k,t} + \sum_{k} M_{i,k,t}} + \frac{\sum_{k \in EUR(t)} M_{i,k,t}}{\sum_{k} M_{i,k,t}} \cdot \left(1 - \frac{\sum_{k} X_{i,k,t}}{\sum_{k} X_{i,k,t} + \sum_{k} M_{i,k,t}} \right)$$

  - Great circle distance to Frankfurt am Main (-)
  - Dummy for former or present European colonies (+)
  - Percentage of net oil exports in total exports
- Wald test on oil($\mathbf{x}_2$) = oil($\mathbf{x}_1$).

Estimation results (1)

DEUTSCHE BUNDESBANK EUROSYSTEM

		2008	1999	Pool
z	GDP	-0.334*** (-4.38)	-0.299*** (-4.50)	-0.319*** (-5.17)
	GDP per capita	0.771*** (3.88)	0.771*** (4.30)	0.798*** (4.92)
$\mathbf{x_1}$	Oil export share	0.038 (0.04)	-0.946* (-1.73)	-0.496 (-0.64)
	Distance(Frankfurt)	-0.216*** (-2.60)	-0.153** (-2.23)	-0.160*** (-2.60)
	Trade(EUR) share	5.15*** (3.52)	2.80** (2.44)	3.38*** (2.77)
	Colony (EUR)	2.94*** (3.96)	1.64*** (2.71)	1.78*** (2.62)
$\mathbf{x_2}$	Oil export share	1.50* (1.78)	0.110 (0.36)	0.199 (0.49)
	Distance(Washington)	-0.033 (-0.94)	-0.025 (-1.35)	-0.020 (-1.23)
	Trade(USD) share	2.49*** (2.59)	1.30** (2.20)	1.77*** (3.55)
τ		0.487	0.249	0.326
p($\tau = 1$)		0.029	0.0007	
p(oil($\mathbf{x_1}$) = oil($\mathbf{x_2}$))		0.056	0.069	0.293
N_1 (peg EUR)		39	33	369
N_2 (peg USD)		29	30	325
N_3 (peg other)		8	15	108
N_4 (float)		81	82	828

Estimation results (2)

Estimated average marginal effects on the probability of choosing a given exchange rate regime or anchor currency; percentage points

		2008	1999	Pool
GDP	peg EUR (p_{i1})	-2.41	-2.21	-2.40
(increase by 1%)	peg USD (p_{i2})	-2.94	-2.69	-3.01
	peg other (p_{i3})	-0.94	-1.28	-1.02
	float (p_{i4})	6.28	6.19	6.43
GDP per capita	peg EUR (p_{i1})	5.56	5.71	6.00
(increase by 1%)	peg USD (p_{i2})	6.79	6.94	7.52
	peg other (p_{i3})	2.17	3.31	2.56
	float (p_{i4})	-14.52	-15.96	-16.08
Oil export share	peg EUR (p_{i1})	-0.04	-0.17	-0.08
(increase by 1 PP)	peg USD (p_{i2})	0.23	0.08	0.07
	peg other (p_{i3})	-0.06	0.03	0
	float (p_{i4})	-0.13	0.06	0.02

Ctd.

Estimation results (3)

DEUTSCHE BUNDESBANK EUROSYSTEM

		2008	1999	Pool
Distance(Frankfurt)	peg EUR (p_{i1})	-2.51	-2.63	-2.42
(increase by 1%)	peg USD (p_{i2})	0.62	0.74	0.73
	peg other (p_{i3})	0.34	0.76	0.49
	float (p_{i4})	1.56	1.13	1.20
Distance(Washington)	peg EUR (p_{i1})	0.10	0.12	0.09
(increase by 1%)	peg USD (p_{i2})	-0.52	-0.72	-0.45
	peg other (p_{i3})	0.13	0.38	0.18
	float (p_{i4})	0.29	0.22	0.18
Trade(EUR) share	peg EUR (p_{i1})	0.60	0.48	0.51
(increase by 1 PP)	peg USD (p_{i2})	-0.15	-0.14	-0.16
	peg other (p_{i3})	-0.08	-0.14	-0.10
	float (p_{i4})	-0.37	-0.21	-0.25
Trade(USD) share	peg EUR (p_{i1})	-0.07	-0.06	-0.08
(increase by 1 PP)	peg USD (p_{i2})	0.39	0.38	0.41
	peg other (p_{i3})	-0.10	-0.20	-0.16
	float (p_{i4})	-0.22	-0.12	-0.17
Colony (EUR)	peg EUR (p_{i1})	44.57	35.96	33.68
("colony" instead of	peg USD (p_{i2})	-13.42	-12.49	-12.13
"no colony")	peg other (p_{i3})	-4.52	-7.52	-5.19
	float (p_{i4})	-26.62	-15.96	-16.35

Estimation results (4)

DEUTSCHE BUNDESBANK EUROSYSTEM

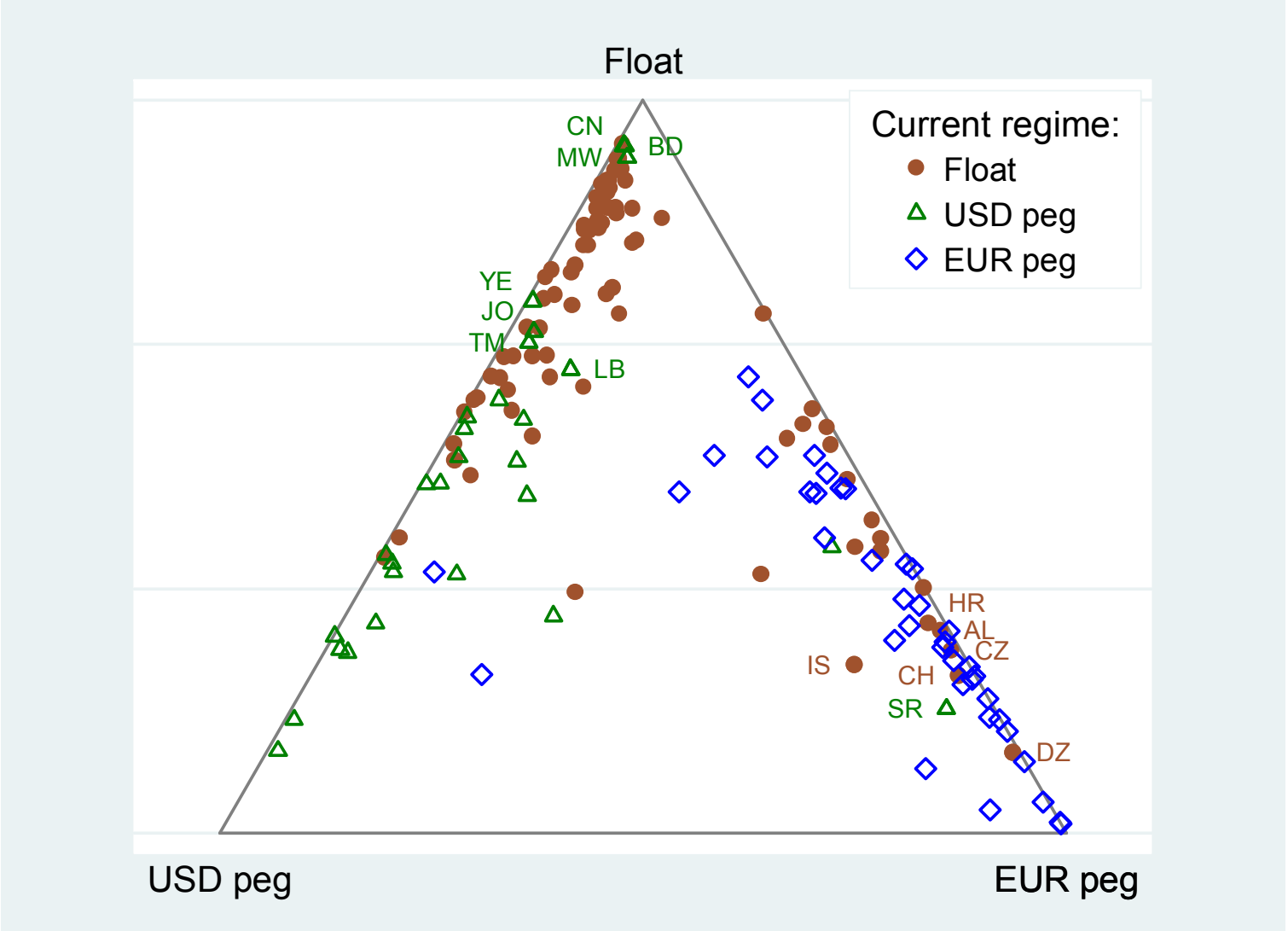
- **OCA criteria** contribute significantly not only to exchange rate regime but also to anchor currency choice.
- **Distance** is a significant determinant of a peg to the euro but it is insignificant for pegs to the US dollar.
- This suggests a **global role of the US dollar** as an anchor currency and a more **regional role of the euro**; this result, however, **will be qualified**.
- Being a **net oil exporter** is only a weakly significant determinant of anchor currency choice.

Estimation results (5)

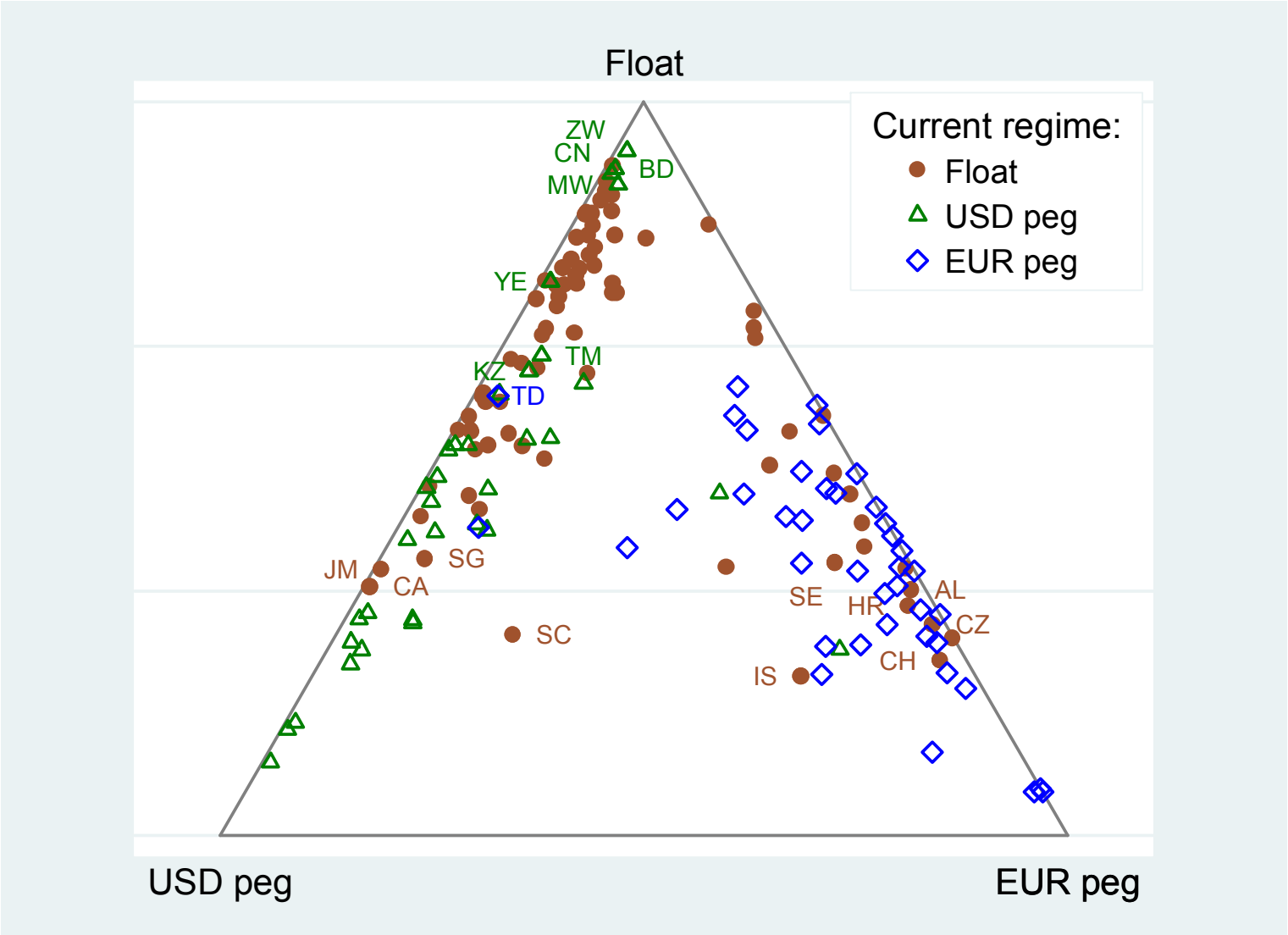
DEUTSCHE BUNDESBANK EUROSYSTEM

- The **dissimilarity parameter** …
  - … is significantly different from 1. A **multinomial logit** approach would therefore be **inappropriate**!
  - … lies always in the interval [0; 1]. Therefore, the currently observed pattern of exchange rate regime and anchor currency choice can be interpreted as an **outcome of an additive random utility maximization** by the countries in the sample!

The distribution of regime and anchor currency choice (1): 2008



The distribution of regime and anchor currency choice (2): pool



The distribution of regime and anchor currency choice (3)

DEUTSCHE BUNDESBANK EUROSYSTEM

- Coordinates of the points:

$$\left[\left(\hat{p}_{i1} - \hat{p}_{i2}\right)\cdot\cos(\pi/6);\quad \hat{p}_{i4} - \left(\hat{p}_{i1} + \hat{p}_{i2}\right)\cdot\sin(\pi/6)\right]$$

- Model determines anchor currency decision with very high precision.

- Does a change in the regime increase the (deterministic) utility V_{ij} of country i significantly?

The distribution of regime and anchor currency choice (4)

DEUTSCHE BUNDESBANK EUROSYSTEM

A Wald test:

- Additive random utility model: $U_{ij} = V_{ij} + \varepsilon_{ij}$
- Null hypothesis: $\hat{V}_{ik} - \hat{V}_{ij} = 0$
- Test statistic: $W = \dfrac{\left(\hat{V}_{ik} - \hat{V}_{ij}\right)^2}{\hat{Var}\left(\hat{V}_{ik} - \hat{V}_{ij}\right)} \sim \chi^2_{df=1}$

where $\hat{Var}\left(\hat{V}_{ik} - \hat{V}_{ij}\right) = \hat{\boldsymbol{\Gamma}}'\hat{\boldsymbol{\Sigma}}\hat{\boldsymbol{\Gamma}}$ $\qquad \hat{\boldsymbol{\Gamma}} = \left[\dfrac{\partial\left(V_{ik} - V_{ij}\right)}{\partial \boldsymbol{\theta}}\bigg|_{\boldsymbol{\theta}=\hat{\boldsymbol{\theta}}}\right]$

$\boldsymbol{\theta} = \left(\boldsymbol{\alpha}' \quad \boldsymbol{\beta}_1' \quad \boldsymbol{\beta}_2' \quad \tau\right)'$

The distribution of regime and anchor currency choice (5)

DEUTSCHE BUNDESBANK EUROSYSTEM

- Countries with floating exchange rates, for which a **peg to the euro** would significantly increase V_{ij}: Switzerland, Iceland, Czech Republic, Croatia, Albania, Sweden (pool) [2008: Algeria, Suriname].

- No **EMU countries** which could raise V_{ij} significantly through the adoption of a flexible exchange rate.

- Flexible exchange rates would raise V_{ij} of Chad (pool).

The distribution of regime and anchor currency choice (6)

DEUTSCHE BUNDESBANK EUROSYSTEM

- Pooled regression: Seychelles, Jamaica, Canada, Singapore would profit from **joining the US dollar bloc**; this result, however, **will be qualified**.

- Countries which could improve V_{ij} significantly by **de-pegging** their currencies **from the US dollar**: Zimbabwe (pool), Malawi, China, Bangladesh, Yemen, Turkmenistan, Jordan (2008), Kazakhstan (pool), Lebanon (2008).

The US dollar as an "anchor of last resort" (1)

DEUTSCHE BUNDESBANK
EUROSYSTEM

- The **term "anchor of last resort"** may be applied when countries adopt a peg although their economic structures do not suggest a close tie to the chosen anchor currency.
- A typical motive could be the attempt to impart credibility to their monetary policies.
- US dollar bloc split into two subgroups: **permanent peggers** and **temporary peggers**.

The US dollar as an "anchor of last resort" (2)

DEUTSCHE BUNDESBANK EUROSYSTEM

		(1)	(2)
z	GDP	-0.495*** (-4.19)	-0.276*** (-4.42)
	GDP per capita	1.23*** (4.02)	0.657*** (3.76)
$\mathbf{x}_1$	Oil export share	-1.17 (-1.21)	-0.914 (-1.25)
	Distance(Frankfurt)	-0.157* (-1.94)	-0.159** (-2.39)
	Trade(EUR) share	3.60** (1.98)	3.52** (2.53)
	Colony (EUR)	3.23*** (3.72)	1.98*** (3.45)
$\mathbf{x}_2$	Oil export share	0.638 (0.92)	0.164 (0.37)
	Distance(Washington)	-0.079*** (-2.87)	-0.020 (-1.17)
	Trade(USD) share	2.89*** (3.23)	1.04** (2.46)
τ		0.405	0.360
p(oil($\mathbf{x}_1$) = oil($\mathbf{x}_2$))		0.023	0.065
N_1 (peg EUR)		361	369
N_2 (peg USD)		176	149
N_3 (peg other)		90	108
N_4 (float)		609	828

The US dollar as an "anchor of last resort" (3)

DEUTSCHE BUNDESBANK
EUROSYSTEM

- US dollar bloc coefficients of pool that includes permanent peggers statistically and economically much more significant than those of pool with temporary peggers.
- The existence of such a group of countries distinguishes US dollar bloc from euro bloc.
- The **global role of the US dollar** depends entirely of the subgroup of temporary peggers and **may** thus **derive from the US dollar's "anchor of last resort" function**.

Checks for endogeneity (1)

DEUTSCHE BUNDESBANK EUROSYSTEM

- Frankel and Rose (1997, 2002) and Rose (2000) set off a debate on the **endogeneity of trade** relations **to exchange rate arrangements**.

- **More recent literature** (Alesina and Wagner, 2006, Bun and Klaassen, 2007, Levy-Yeyati et al, 2010, Wolf and Ritschel, 2011) **rather sceptical** about endogeneity of trade, at least if pegs instead of currency unions are concerned.

Checks for endogeneity (2)

DEUTSCHE BUNDESBANK EUROSYSTEM

- First control for endogeneity: lag trade shares by one year.
- Second control for endogeneity: consider pegs only in those periods in which the corresponding countries have adopted the peg.
- Results provide evidence for the hypothesis that **intensive trade with a given currency bloc is a prerequisite for the decision to join the bloc**.

Checks for endogeneity (3)

DEUTSCHE BUNDESBANK EUROSYSTEM

		(1)	(2)	(3)
z	GDP	-0.319*** (-5.15)	-0.072 (-0.67)	-0.214 (-1.29)
	GDP per capita	0.797*** (4.91)	-0.271 (-1.13)	-0.101 (-0.35)
$\mathbf{x}_1$	Oil export share	-0.518 (-0.67)		
	Distance(Frankfurt)	-0.161*** (-2.60)	-0.887 (-1.58)	-1.06 (-1.48)
	Trade(EUR) share	3.39*** (2.76)	15.1** (2.18)	18.6** (2.18)
	Colony (EUR)	1.74*** (2.58)		
$\mathbf{x}_2$	Oil export share	0.203 (0.50)	3.43** (2.35)	4.59*** (2.71)
	Distance(Washington)	-0.024 (-1.48)	0.338* (1.93)	0.484* (1.74)
	Trade(USD) share	1.90*** (3.65)	0.147 (0.11)	0.178 (0.10)
τ		0.326	1.45	2.36
p(oil($\mathbf{x}_1$) = oil($\mathbf{x}_2$))		0.281		
N_1 (peg EUR)		368	5	5
N_2 (peg USD)		325	33	22
N_3 (peg other)		108	3	3
N_4 (float)		828	55	55

A currency bloc equilibrium (1)

DEUTSCHE BUNDESBANK EUROSYSTEM

- Define a **currency bloc** to be in **equilibrium** if …
  - … none of the countries currently in the bloc is able to raise its estimated (deterministic) utility significantly by leaving the bloc and …
  - … none of the countries currently outside of the bloc is able to raise its estimated (deterministic) utility significantly by joining the bloc.
- Definition is in line with Alesina and Barro (2002).

A currency bloc equilibrium (2)

DEUTSCHE BUNDESBANK EUROSYSTEM

- A change in the currency regime or anchor currency of country i exerts a **network externality** on all the other countries.
- Any currency bloc equilibrium is **path-dependent**. As a consequence, …
  - … large currency blocs are **stabilized**, …
  - … a regime switch of large countries or country groups may initiate **cascades of** further **regime switches** of the same type, …
  - … which in turn might end up in a **corner solution**.

A currency bloc equilibrium (3)

DEUTSCHE BUNDESBANK EUROSYSTEM

- The **algorithm** used to compute the currency bloc equilibrium …
  - … basically assumes that that country adopts a new regime, …
    - … for which the probability of the regime shift increasing the estimated utility is highest among all countries, …
    - … given that this probability is larger than 95%;
  - … recalculates the trade shares for each country with each of the blocs anew as soon as a country has switched its regime.

A currency bloc equilibrium (4): 2008

DEUTSCHE BUNDESBANK
EUROSYSTEM

Round	Country	Current regime	New regime	*p*-value in %
1	Malawi	peg(USD)	float	0.0002
2	China	peg(USD)	float	0.0002
3	Bangladesh	peg(USD)	float	0.0002
4	Yemen	peg(USD)	float	0.03
5	Jordan	peg(USD)	float	0.09
6	Switzerland	float	peg(EUR)	0.16
7	Iceland	float	peg(EUR)	0.36
8	Suriname	peg(USD)	peg(EUR)	0.35
9	Czech Republic	float	peg(EUR)	0.52
10	Croatia	float	peg(EUR)	0.45
11	Albania	float	peg(EUR)	1.05
12	Lebanon	peg(USD)	float	1.71
13	Algeria	float	peg(EUR)	1.97
14	Turkmenistan	peg(USD)	float	2.15
15	Djibouti	peg(USD)	peg(EUR)	2.82
16	Hungary	float	peg(EUR)	2.86
17	Serbia	float	peg(EUR)	1.26

A currency bloc equilibrium (5): pool

DEUTSCHE BUNDESBANK EUROSYSTEM

Round	Country	Current regime	New regime	*p*-value in %
1	Zimbabwe	peg(USD)	float	0.00003
2	Malawi	peg(USD)	float	0.00009
3	Bangladesh	peg(USD)	float	0.0001
4	China	peg(USD)	float	0.0003
5	Yemen	peg(USD)	float	0.0002
6	Switzerland	float	peg(EUR)	0.04
7	Iceland	float	peg(EUR)	0.03
8	Seychelles	float	peg(USD)	0.18
9	Kazakhstan	peg(USD)	float	0.19
10	Croatia	float	peg(EUR)	0.31

Ctd.

A currency bloc equilibrium (6): pool

DEUTSCHE BUNDESBANK EUROSYSTEM

Round	Country	Current regime	New regime	*p*-value in %
11	Czech Republic	float	peg(EUR)	0.30
12	Turkmenistan	peg(USD)	float	0.31
13	Chad	peg(EUR)	float	1.46
14	Albania	float	peg(EUR)	1.63
15	Hungary	float	peg(EUR)	1.76
16	Sweden	float	peg(EUR)	1.82
17	Norway	float	peg(EUR)	0.96
18	Angola	peg(USD)	float	1.90
19	Serbia	float	peg(EUR)	2.14
20	Jordan	peg(USD)	float	2.90
21	Jamaica	float	peg(USD)	3.90

A currency bloc equilibrium (7)

DEUTSCHE BUNDESBANK EUROSYSTEM

Results:

- Path-dependency's importance should not be overstated nor can it be ignored (*cf* the repercussions of China leaving the US dollar bloc).
- The currency equilibrium is not a corner solution.
- In the equilibrium, the US dollar bloc is smaller and the euro bloc is larger than at present.
- However, countries do not switch directly from the US dollar bloc to the euro bloc in the course of adjustment.

Effects of economic policy decisions (1)

DEUTSCHE BUNDESBANK EUROSYSTEM

- The analysis considers the effect of perturbations on the adjustment path to the currency bloc equilibrium.
- If **Sweden** pegs its currency to the euro, the estimation results suggest that it would be optimal for **Norway** to do so as well.
- If **Poland** or the **UK** joined the euro bloc, both **Sweden** and **Norway** should adopt a peg to the euro as well.
- If oil-exporting countries stop using the **US dollar as invoice currency**, some of them might be better off introducing flexible exchange rates (*eg* Azerbaijan).
- If **colonial ties no longer bind**, the model indicates that nearly all the African countries that presently peg their currencies to the euro will leave the euro bloc.

Effects of economic policy decisions (2)

The potential of the Chinese **renminbi as anchor currency**:

- Adjustment of the model:

$$p_{i,peg\_rmb} = p_{i5} = p_{iP} \times p_{i5|P} = \frac{\exp(\mathbf{z}'\boldsymbol{\alpha} + \tau \cdot I)}{1 + \exp(\mathbf{z}'\boldsymbol{\alpha} + \tau \cdot I)} \cdot \frac{\exp\left(\mathbf{x}_5'\boldsymbol{\beta}_5 / \tau\right)}{\exp(I)}$$

$$I = \ln\left[1 + \exp\left(\mathbf{x}_1'\boldsymbol{\beta}_1 / \tau\right) + \exp\left(\mathbf{x}_2'\boldsymbol{\beta}_2 / \tau\right) + \exp\left(\mathbf{x}_5'\boldsymbol{\beta}_5 / \tau\right)\right]$$

- Explanatory variables for vector $\mathbf{x}_5$: Great circle distance to Beijing, trade integration with China, a colony dummy for Hong Kong.

Effects of economic policy decisions (3)

DEUTSCHE BUNDESBANK EUROSYSTEM

The potential of the Chinese **renminbi as anchor currency** (ctd.):

- Impose parameters estimated for the euro bloc on China ($\beta_5 = \hat{\beta}_1$) or else use dollar bloc coefficients for the trade share and distance.
- Adjustment of the algorithm: Wald tests cannot be applied. Therefore, a simple comparison of a country i's probabilities of choosing a given regime is used to determine a regime switch.
- Result: The Hong Kong dollar is pegged to the renminbi.

Conclusions (1)

DEUTSCHE BUNDESBANK EUROSYSTEM

- At present, **two major currency blocs**, the US dollar bloc and the euro bloc, coexist with numerous floating currencies.
- The **number of countries** and territories in each bloc was the same in 2008 (56), but in terms of combined GDP measured in PPPs, the US dollar bloc is around double the size of the euro bloc.
- A **nested logit regression** suggests that long-term structural economic variables (*eg* distance, trade share) significantly explain **anchor currency choice**.

Conclusions (2)

DEUTSCHE BUNDESBANK EUROSYSTEM

- The US dollar bloc differs from the euro bloc in that it contains a group of countries which peg their currencies temporarily to the US dollar without having strong structural ties with the bloc (the **US dollar as "anchor of last resort"**).
- This aspect makes the US dollar globally more important as an anchor currency than the euro.
- In a **currency bloc equilibrium** in the spirit of Alesina and Barro (2002), the US dollar bloc is smaller and the euro bloc is larger than at present.

Conclusions (3)

DEUTSCHE BUNDESBANK EUROSYSTEM

- No **euro area** country stands to gain significantly from leaving the bloc.
- Some European countries (*eg* Switzerland, Iceland, the Czech Republic), however, could raise their estimated utility by **pegging** their currencies **to the euro**.
- There is strong evidence that **China** may introduce flexible exchange rates. The estimated structural relations for the euro and the US dollar bloc suggest, however, that the current potential for the formation of a renminbi bloc is low.