BANK FOR INTERNATIONAL SETTLEMENTS

Currency networks in cross-border bank lending

Stefan Avdjiev - Előd Takáts

Bank for International Settlements

Third BIS Research Network meeting on Global Financial Interconnectedness

October 1-2, 2015

1. Motivation

- Cross-border bank lending: cca $30 trillion
- Extensive research with one gap: currency composition
- Research question: does currency denomination affect lending?
  - Current interest: divergence in monetary policies in major advanced economies (US vs euro area, Japan)
- New data: Stage 1 enhancements to map currency networks
- Analysis: focus on taper tantrum (shock to one currency network)

Results

- Two large currency networks
  - dollar one-half of total volumes
  - euro network one-third of total volumes

- Currency composition affects cross-border *interbank* lending
  - but not lending to non-banks
  - *in addition* to source and destination drivers

- During the taper tantrum, higher US dollar share associated with
  - Safe haven flows to the United States
  - Unchanged flow dynamics to other advanced economies
  - Strong slowdown in lending to emerging markets

Roadmap

1. (Motivation)
2. Related literature
3. Data: Stage 1 data
4. Currency networks
5. Analysis: the taper tantrum
6. Conclusion

2. Related literature

- Cross-border bank lending
  - De Haas and Van Lelyveld (2011), Rose and Wieladek (2011), Cetorelli and Goldberg (2012), Giannetti and Laeven (2012), De Haas and Van Horen (2012), Buch et al. (2014), Cerutti et al (2014), Cerutti et al (2015)
  - *To EMEs:* McGuire and Tarashev (2008), Takáts (2010), Cetorelli and Goldberg (2011), Schnabl (2012), Avdjiev et al (2012), Beck (2014), Avdjiev and Takáts (2014)

- Foreign currency lending
  - Nagy, Jeffrey and Zettelmeyer (2011), Krogstrup and Tille (2015)

- Triple coincidence
  - Shin (2012), Bruno and Shin (2015a and 2015b)

3. Stage 1 enhancements

- Stage 1 data provides the necessary three dimensions

	Currency composition (A)	Residence of borrower (B)	Nationality of lending bank (C)
Consolidated Data	No	Yes	No
Locational Data			
by Residence	Yes	Yes	No
by Nationality	Yes	No	Yes
Stage 1 data	**Yes**	**Yes**	**Yes**

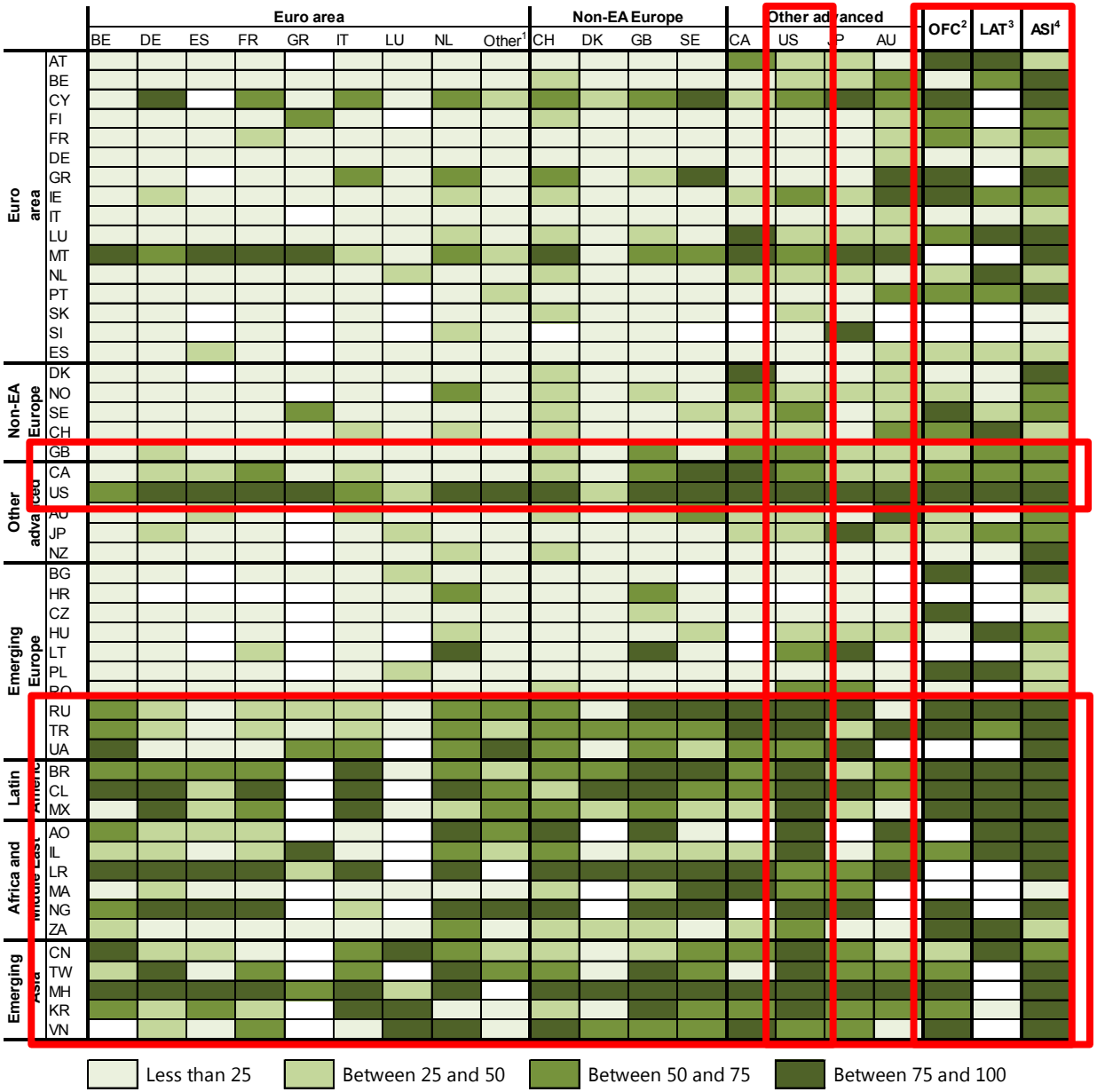
- Why nationality and not residence of the lender?
  - Example: German bank's UK subsidiary lending to the US
  - 'Same country' lending

4. Currency networks

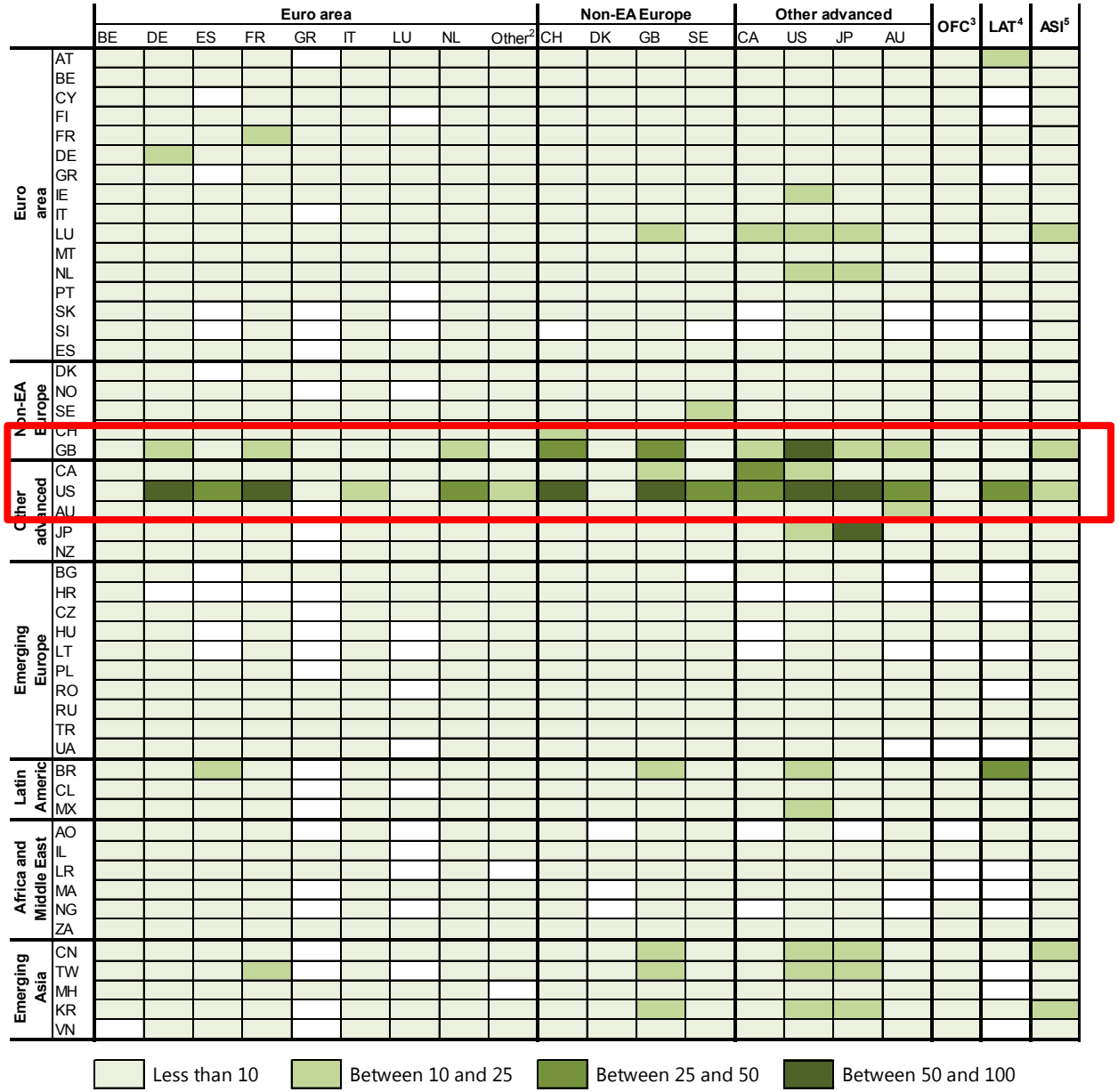
Currency composition of cross border bank lending at end-Q4 2014

	Amounts outstanding (in trillion USD)			
	All	US dollar	Euro	Japanese yen
Counterparty sector				
All sectors	**28.6**	**12.9**	**9.0**	**1.3**
Banks, total	**16.2**	7.4	5.1	0.6
Non-banks, total	**12.0**	5.4	3.7	0.8
Counterparty countries				
Advanced economies	**20.0**	**8.1**	**7.9**	0.8
Euro area	7.9	1.3	**5.7**	0.2
Of which: intra – EA	4.3	0.3	**3.9**	0.0
United States	4.6	**4.1**	0.3	0.1
Emerging markets	**3.4**	**1.6**	0.4	0.0
Emerging Europe	0.6	0.2	**0.2**	0.0
Emerging Asia	1.8	0.8	0.1	0.0

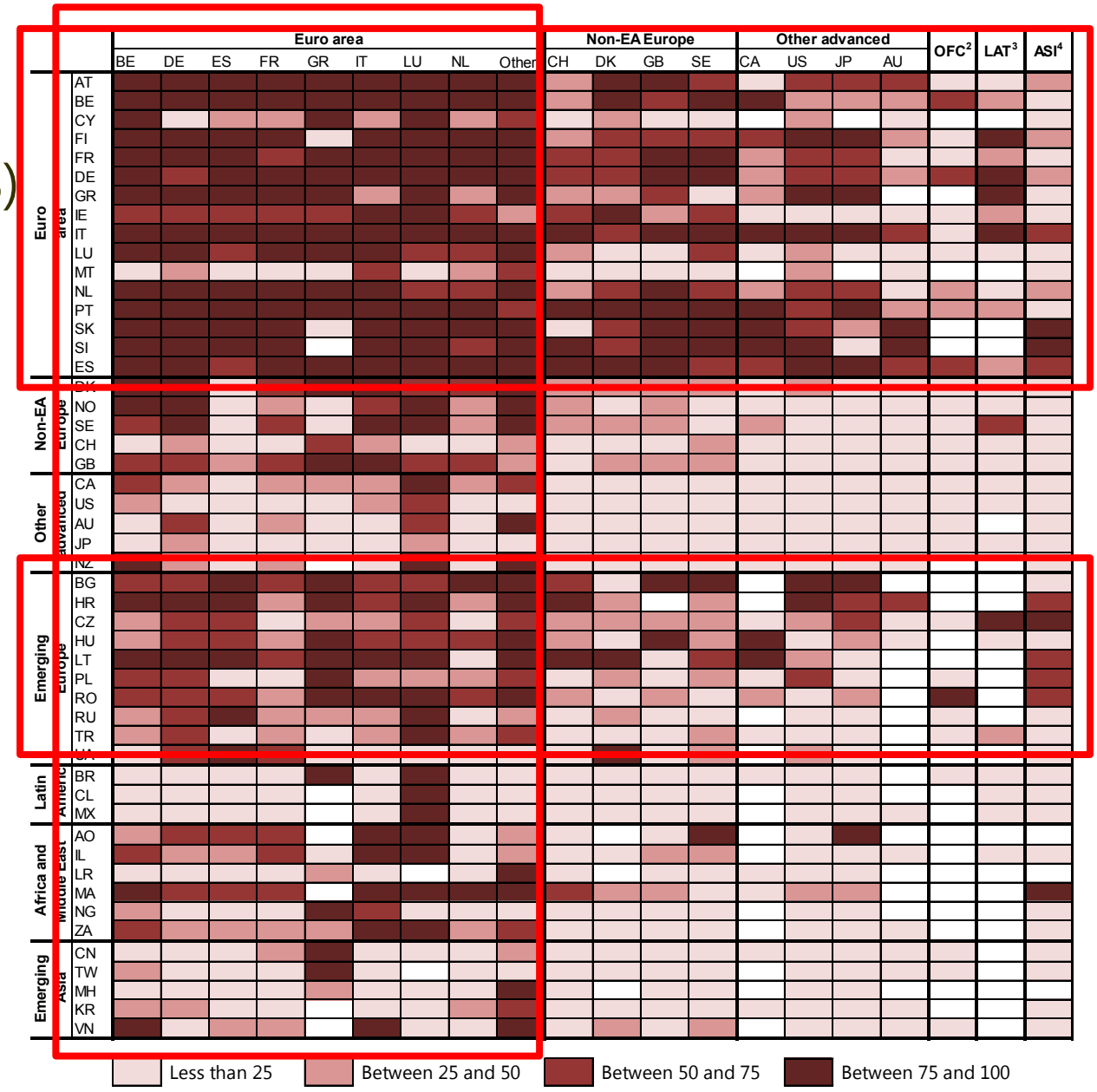
Dollar share (%)



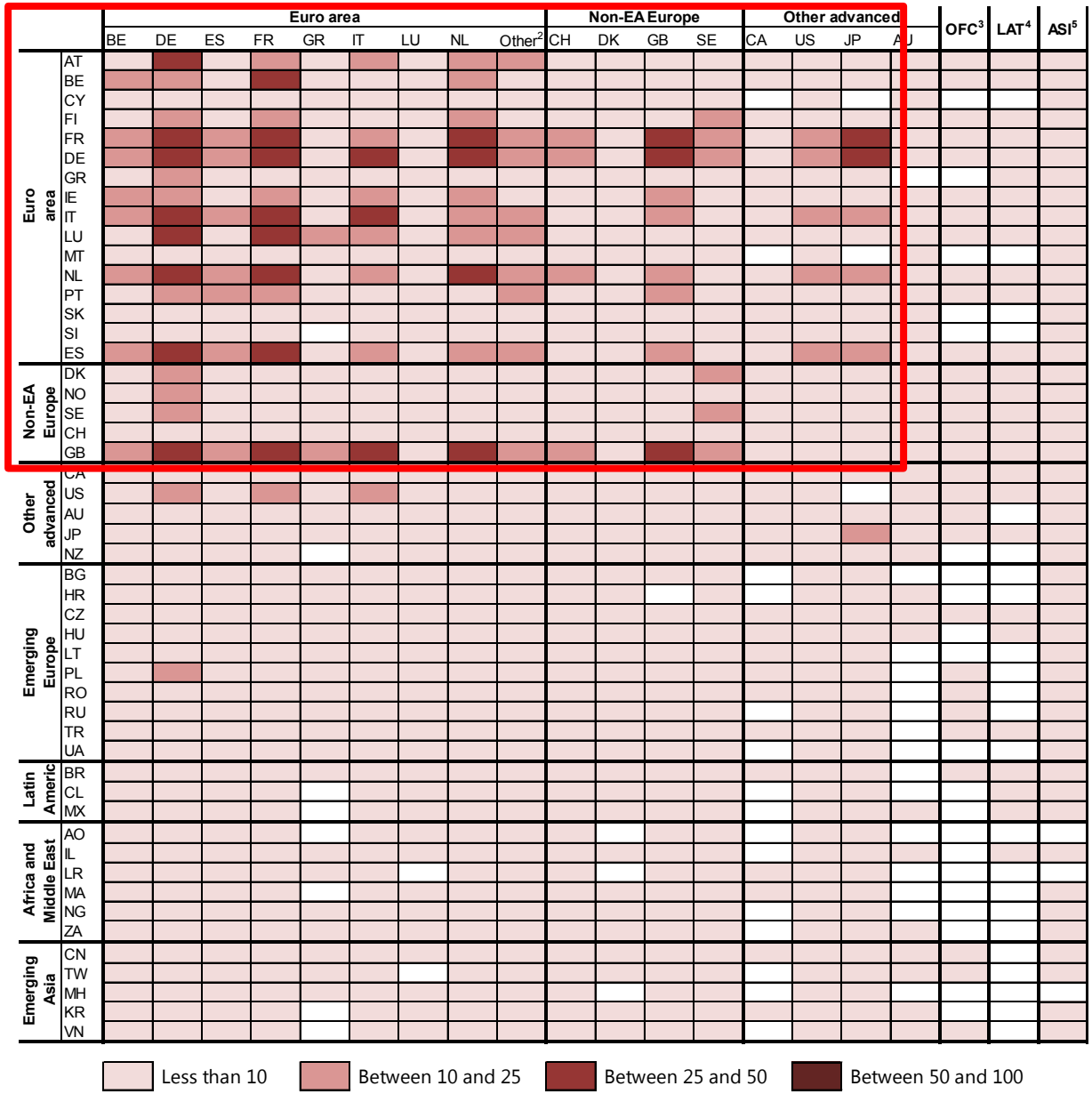
Dollar intensity



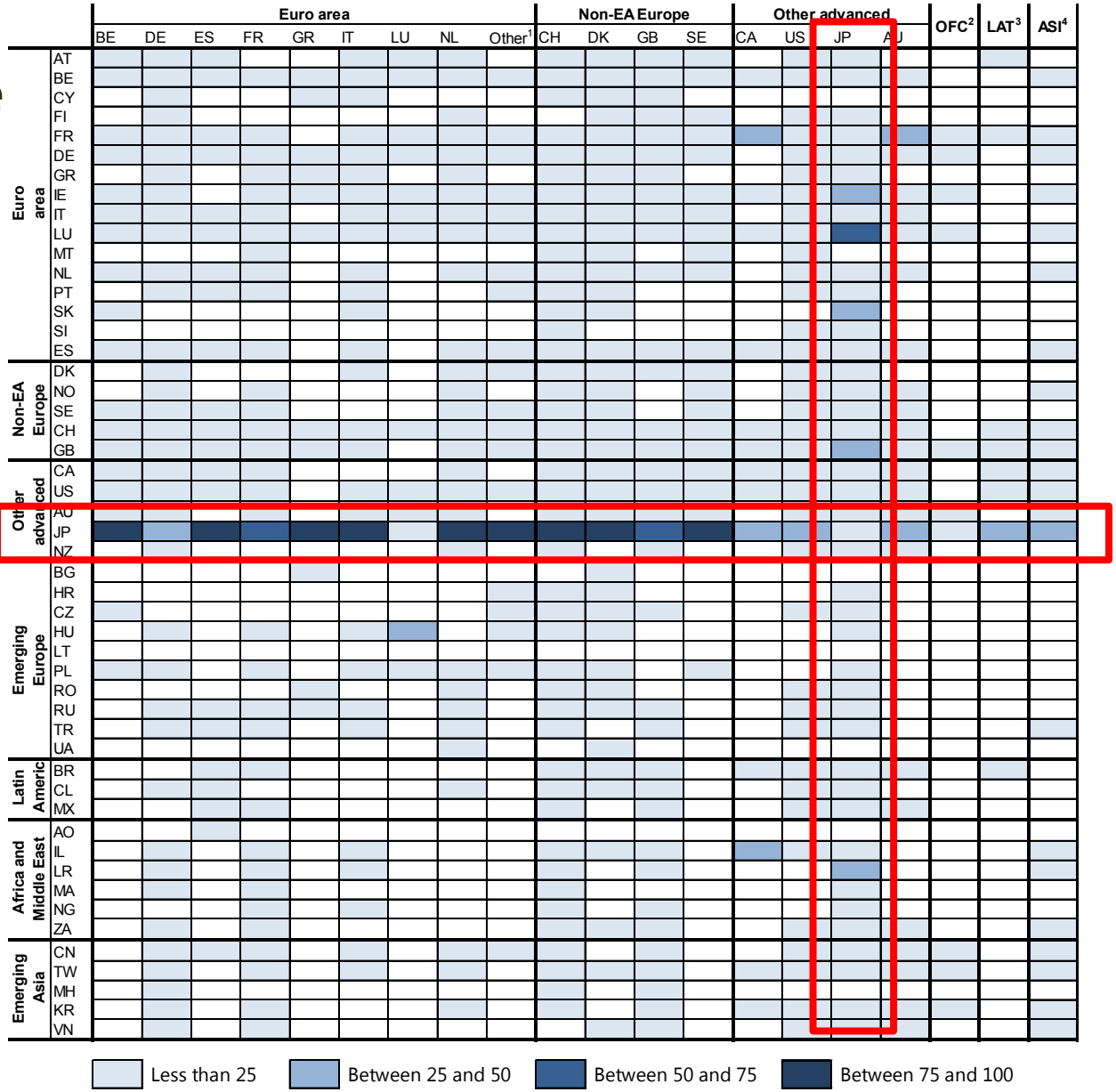
Euro share (%)


Euro area
BE DE ES FR GR IT LU NL Other
Non-EA Europe
CH DK GB SE
Other advanced
CA US JP AU
OFC2 LAT3 ASI4
Euro area
AT BE CY FI FR DE GR IE IT LU MT NL PT SK SI ES
Non-EA Europe
NO SE CH GB
Other advanced
CA US AU JP
Emerging Europe
BG HR CZ HU LT PL RO RU TR
Latin America
BR CL MX
Africa and Middle East
AO IL LR MA NG ZA
Emerging Asia
CN TW MH KR VN
Less than 25
Between 25 and 50
Between 50 and 75
Between 75 and 100

Euro intensity



Yen share


Euro area
BE DE ES FR GR IT LU NL Other[1]
Non-EA Europe
CH DK GB SE
Other advanced
CA US JP AU
OFC[2]
LAT[3]
ASI[4]
Euro area
AT BE CY FI FR DE GR IE IT LU MT NL PT SK SI ES
Non-EA Europe
DK NO SE CH GB
Other advanced
CA US AU JP NZ
Emerging Europe
BG HR CZ HU LT PL RO RU TR UA
Latin Americ
BR CL MX
Africa and Middle East
AO IL LR MA NG ZA
Emerging Asia
CN TW MH KR VN
Less than 25
Between 25 and 50
Between 50 and 75
Between 75 and 100

4. Analysis: the taper tantrum

Cross-border bank lending during taper tantrum

	Flows during taper tantrum episode (%)	Flows before taper tantrum episode (%)	Deceleration through taper tantrum (%)
All borrower countries			
All currencies	**–4.1**	**–2.7**	**–1.4**
US dollar	–1.9	–0.9	**–1.0**
Other currencies	–5.5	–3.9	–1.6
United States			
All currencies	–0.8	–4.2	**3.3**
US dollar	0.0	–2.7	**2.8**
Other currencies	–5.5	–12.1	6.6
Other AEs			
All currencies	–5.6	–3.6	**–2.1**
US dollar	–5.0	–2.1	**–2.9**
Other currencies	–5.8	–4.0	–1.8
Emerging markets			
All currencies	1.4	10.3	**–8.9**
US dollar	3.5	15.4	**–11.9**
Other currencies	–0.5	5.7	–6.3

Potential drivers

- *Drivers in the literature:* McGuire and Tarashev (2008), Takáts (2010), De Haas and Van Horen (2012), Van Rijckeghem and di Mauro (2013), Cerutti et al (2015), Cetorelli and Goldberg (2011), Avdjiev and Takáts (2014)

- Lending banking system
  - Bank CDS spread change during the taper tantrum
  - Credit growth in 2012 (real)
  - Deposit growth in 2012 (real)

- Borrowing country variables
  - Current account balance in 2012
  - Government budget balance in 2012
  - Credit growth to the private sector in 2012 (real)

Panel regression

- Weight observations with size of bilateral relationship

- Dependent variable: change-in-change in cross-border lending in percent of Q3 2012 stocks (acceleration/deceleration)
  - Clean: winsorise at 1% and 99%
  - Clean: exclude observation over 5 standard deviations

- Explanatory variables: elimination process
  - Start with all potential drivers
    - Borrowing country variables interacted with EME dummy
  - USD share of lending at Q3 2012
    - USD share interacted with US and EME dummy
  - Eliminate insignificant variables (at 5% level)

Benchmark regression

$$\Delta XBC_{b,l} = c + \alpha CreditGrowth_{l} + \beta DepositGrowth_{l} + \gamma BudgetBalance_{b}$$
$$+\delta US_{b} USDshare_{b,l} + \phi EME_{b} USDshare_{b,l} + \varepsilon_{b,l}$$

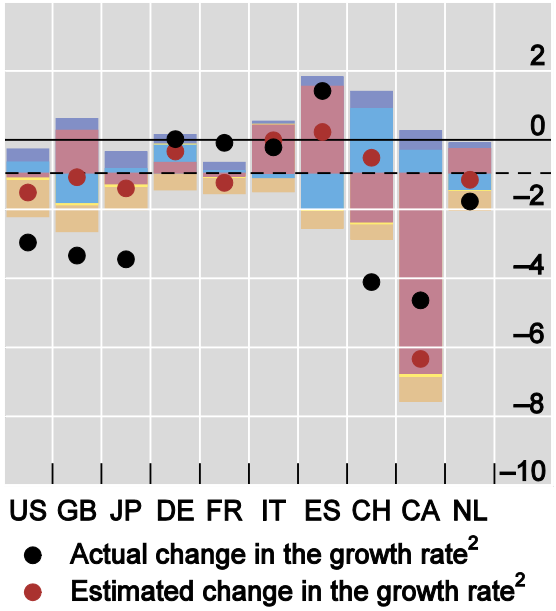
$$\Delta XBC_{b,l} = \frac{1}{2}\left(\frac{flow2Q13_{b,l}}{stock3Q12_{b,l}} + \frac{flow3Q13_{b,l}}{stock3Q12_{b,l}}\right) - \frac{1}{2}\left(\frac{flow4Q12_{b,l}}{stock3Q12_{b,l}} + \frac{flow1Q13_{b,l}}{stock3Q12_{b,l}}\right)$$

Regression results

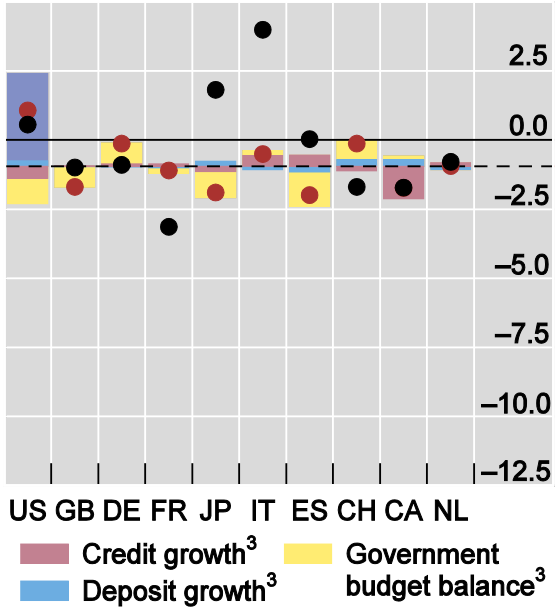
	Coefficient	t-statistic	Probability
Lending banking system credit growth ($CreditGrowth_l$)	–2.99	–4.77	0.0000
Lending banking system deposit growth ($DepositGrowth_l$)	2.31	2.53	0.0116
Borrowing country budget balance ($BudgetBalance_b$)	1.93	2.88	0.0041
US borrower - USD share interaction (US_b*$USDShare_b$)	0.38	5.11	0.0000
EME borrower – USD share interaction (EME_b*$USDShare_b$)	–0.66	–4.22	0.0000
R-squared (in %)	5.05		
Number of observations	1217		

Economic significance

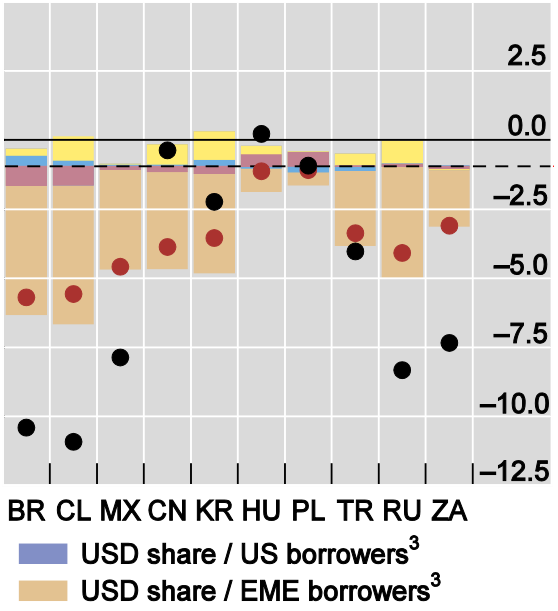
Selected lender banking systems



Selected borrower AEs



Selected borrower EMEs



Sensitivity analysis – results remain robust

- Adding additional potential drivers
- Exclusion of individual lending banking systems
  - 2 out of 135 coefficients loose significance at 5% (not USD share)
- Exclusion of individual borrowing countries
  - 1 out of 250 coefficients looses significance at 5% (not USD share)
  - Note: US*USD share interaction is not simply US dummy
- In addition, using Stage 1 data is critical
  - eg US*USD share would have been insignificant

Lending to banks vs non-banks

	Banks			Non-banks		
	Coefficient	t-statistic	Probability	Coefficient	t-statistic	Probability
Lending banking system credit growth ($CreditGrowth_l$)	**–3.45**	–3.90	0.0001	**–3.43**	–3.38	0.0008
Lending banking system deposit growth ($DepositGrowth_l$)	**4.01**	2.97	0.0030	0.10	0.07	0.9413
Borrowing country budget balance ($BudgetBalance_b$)	**4.14**	4.36	0.0000	–0.12	–0.11	0.9150
United States - USD share interaction (US_b*$USDShare_b$)	**0.98**	8.16	0.0000	0.04	0.43	0.6681
EME – USD share interaction (EME_b*$USDShare_b$)	**–1.01**	–4.4	0.0000	–0.25	–1.15	0.2493
R-squared (in %)	8.62			3.13		
Number of observations	1067			1164		

Conclusion

- Mapped two large currency networks
  - dollar network one-half of total volumes
  - euro network one-third of total volumes

- During the taper tantrum, higher US dollar share associated with
  - Safe haven flows to the United States
  - Unchanged flow dynamics to other advanced economies
  - Strong slowdown in lending to emerging markets

- The pattern arises due to interbank lending

- Policy: EMEs might want to monitor currency composition
  - Especially, in times of monetary policy divergence

Thank you!

Stefan Avdjiev (stefan.avdjiev@bis.org)

Előd Takáts (elod.takats@bis.org)