

The Non-Bank Credit Cycle

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(the usual disclaimer applies)

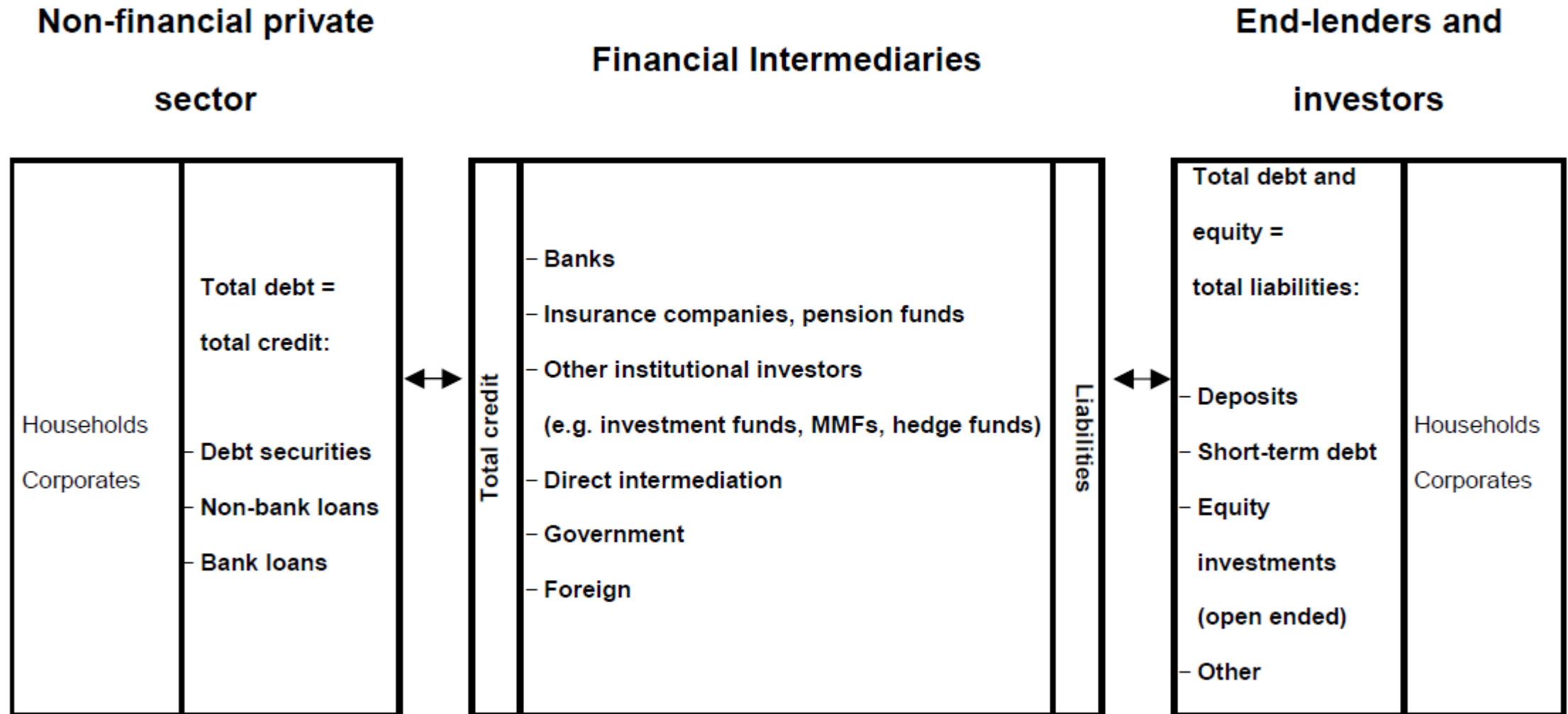
Outline

1. Motivation
2. Constructing the non-bank credit data
3. Non-bank credit cycles
 - Examples of bank & non-bank credit cycles
 - Characteristics
4. Non-bank credit & financial stability
 - Main result: non-bank credit growth/cycles as a leading indicator for currency crises

Motivation/ literature

- Large literature on financial/credit cycles, **bank and total credit**
 - *E.g. Schularick and Taylor (2012), Claessens et al. (2011), Drehmann et al. (2012),*
- What about **non-bank credit**? Increasing attention for risks in corporate debt markets & increasing balance sheets of investment funds. Risks?
- **Cyclical**ity of non-bank credit: spare tyre?
 - *Becker and Ivashina (2014) on bond credit, IMF (2015) on spare tyre*
 - *Herman et al. (2017) and Bora Durdu and Zhong (2019) on US*
- Value added in monitoring non-bank credit separately? Link to **financial crises**
 - *Bats and Houben (2017) market-based finance more conducive to financial stability*
 - *Laeven and Valencia (2012): banking crises, but also currency crises and sovereign crises*

Non-bank and bank credit intermediation



Macro dataset – 36 countries

Non-bank credit to Private Non-Financial sector (PNF) $\approx$

(1) All sector credit to PNF

– (2) (Domestic) Bank credit to PNF

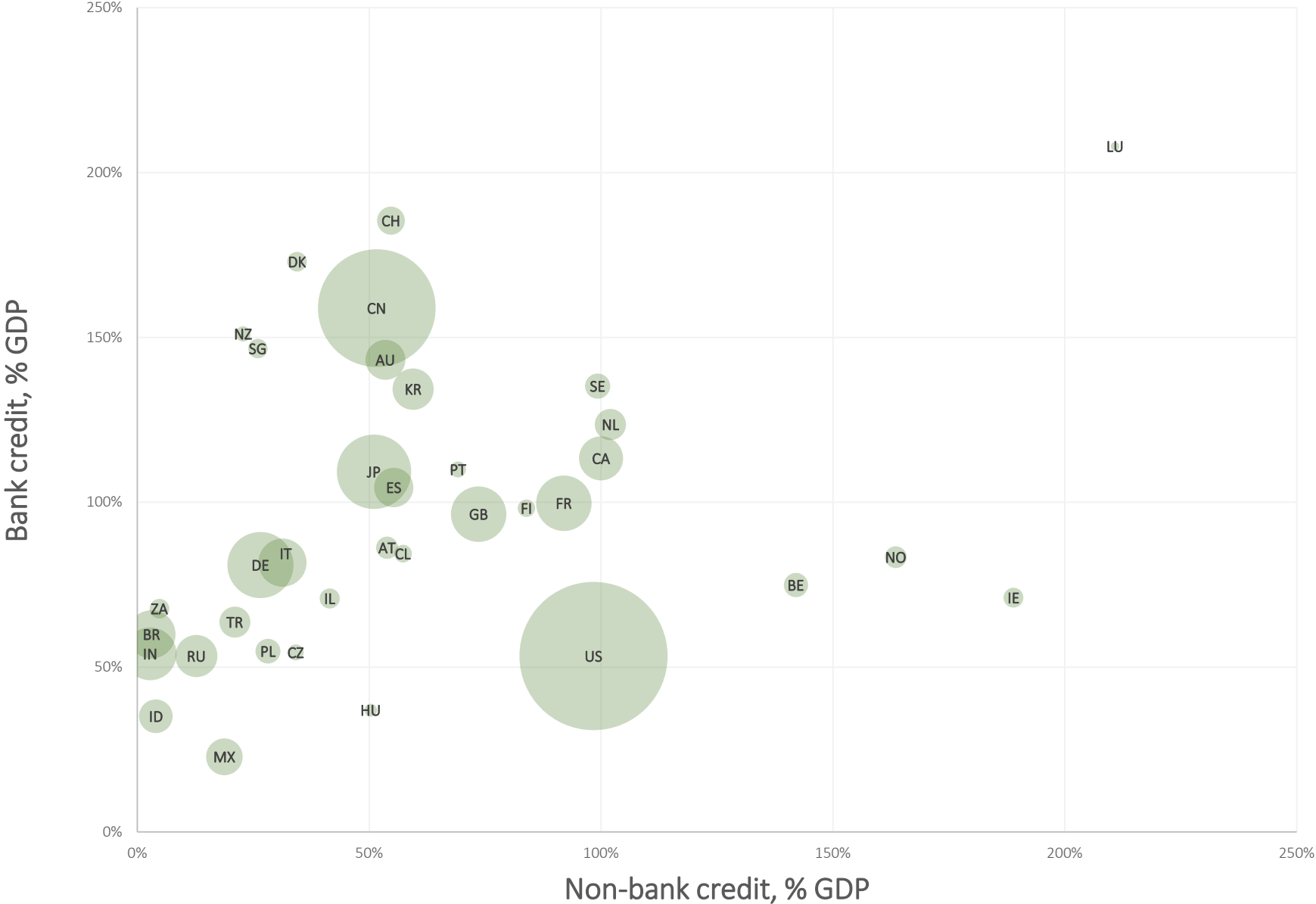
– (3) Non-resident bank loans to PNF

- (1) and (2): BIS long series database on private non-financial sector credit
- (3): BIS locational banking statistics, available as of end-2013
 - Correction & no correction for earlier years; difference is small, especially for growth rates

Non-bank credit from domestic or foreign sources?

- Our macro measure covers non-bank credit from domestic and foreign sources
- Which part of **non-bank credit** is **foreign**? Difficult to get data...
 - Aggregate data from Euro Area (EA) Securities Holding Statistics (2017Q3): **debt securities issued by non-financial EA corporations**
 - **35% held by non-banks domestically, 65% by foreign non-banks from other EA countries**
 - This **underestimates** the foreign component for the EA, as 20% is held by investors from outside the EA. **Correction gives 28% domestic and 72% foreign**
- **A large part of non-bank credit** to the private non-financial sector **may be foreign**

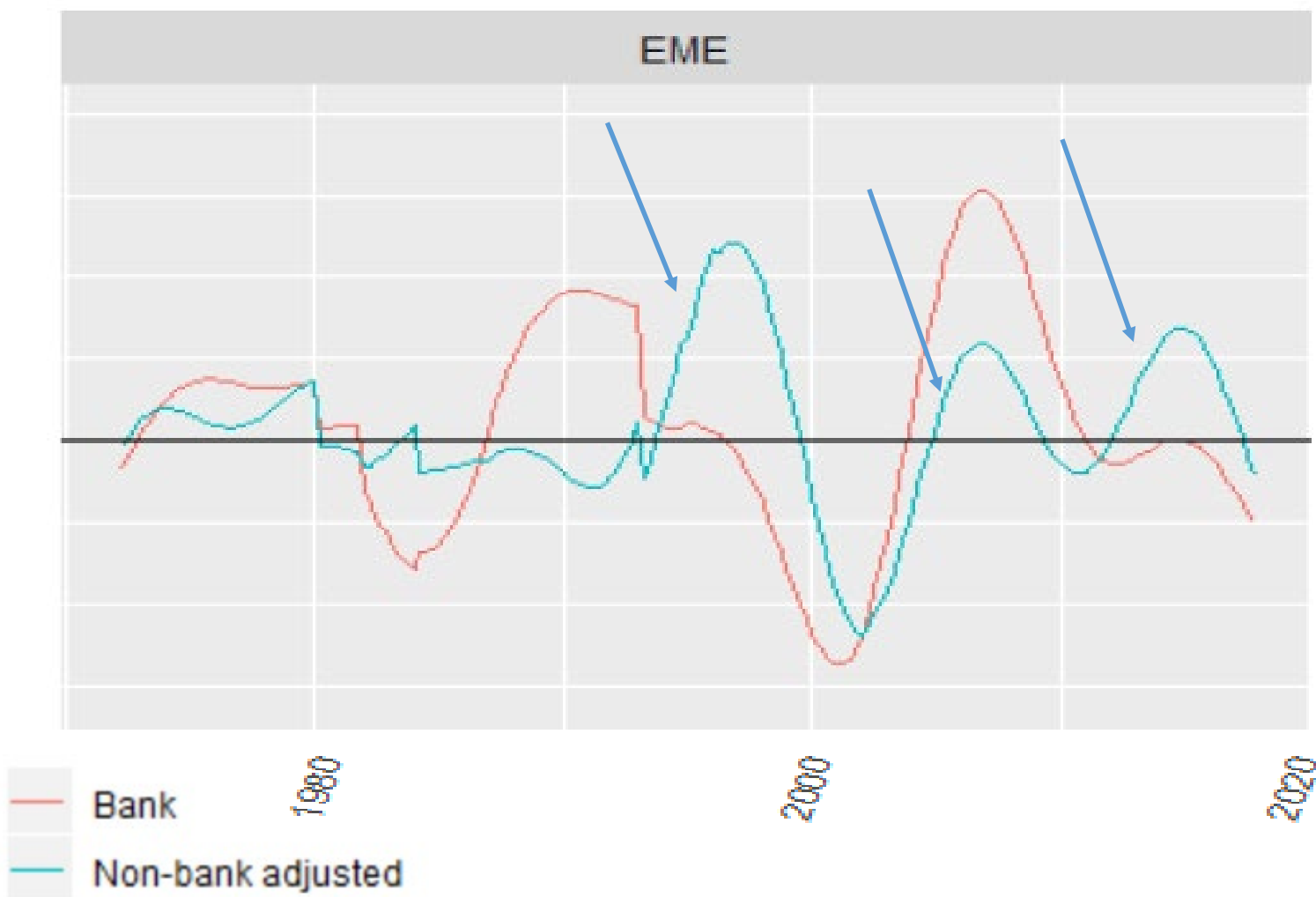
Size of bank and non-bank credit (% GDP, 2017 q3)



Calculating the cycle

- We follow the approach by Drehmann *et al.* (2012), Aikman *et al.* (2015) and others
- Apply Christiano-Fitzgerald (2003) filter...
 - Isolate the **cyclical component** in the frequency range between 32 and 120 quarters (i.e. real credit cycles with a **duration of between 8 and 30 years**)
- ...to **real growth rates**
 - Outstanding credit in domestic currency data, deflated by the Consumer Price Index (CPI) for each respective jurisdiction, expressed in logs, with the filter applied to the 4-quarter log changes.

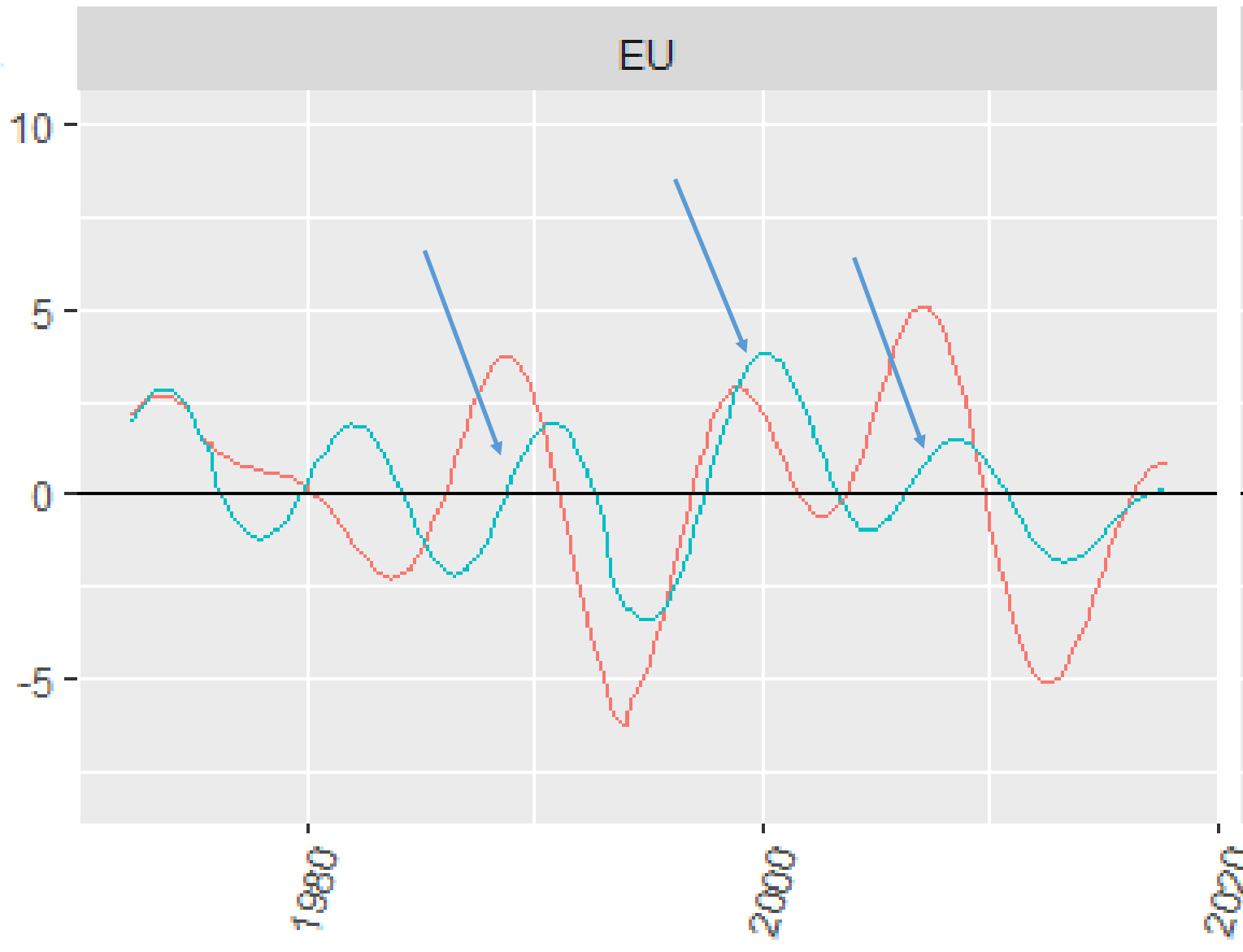
Non-bank and bank credit cycles: EMEs



Non-bank credit booms:

1. Before 1997 **Asian financial crisis**
2. Before **GFC**, but less than bank credit
3. After 2010. Shin (2013); Chui, Kuruc and Turner (2016): **2nd phase of global liquidity**; increased foreign currency borrowing by non-financial corporations after 2010. Reinforced by easing of monetary conditions in AEs

Non-bank and bank credit cycles: EU

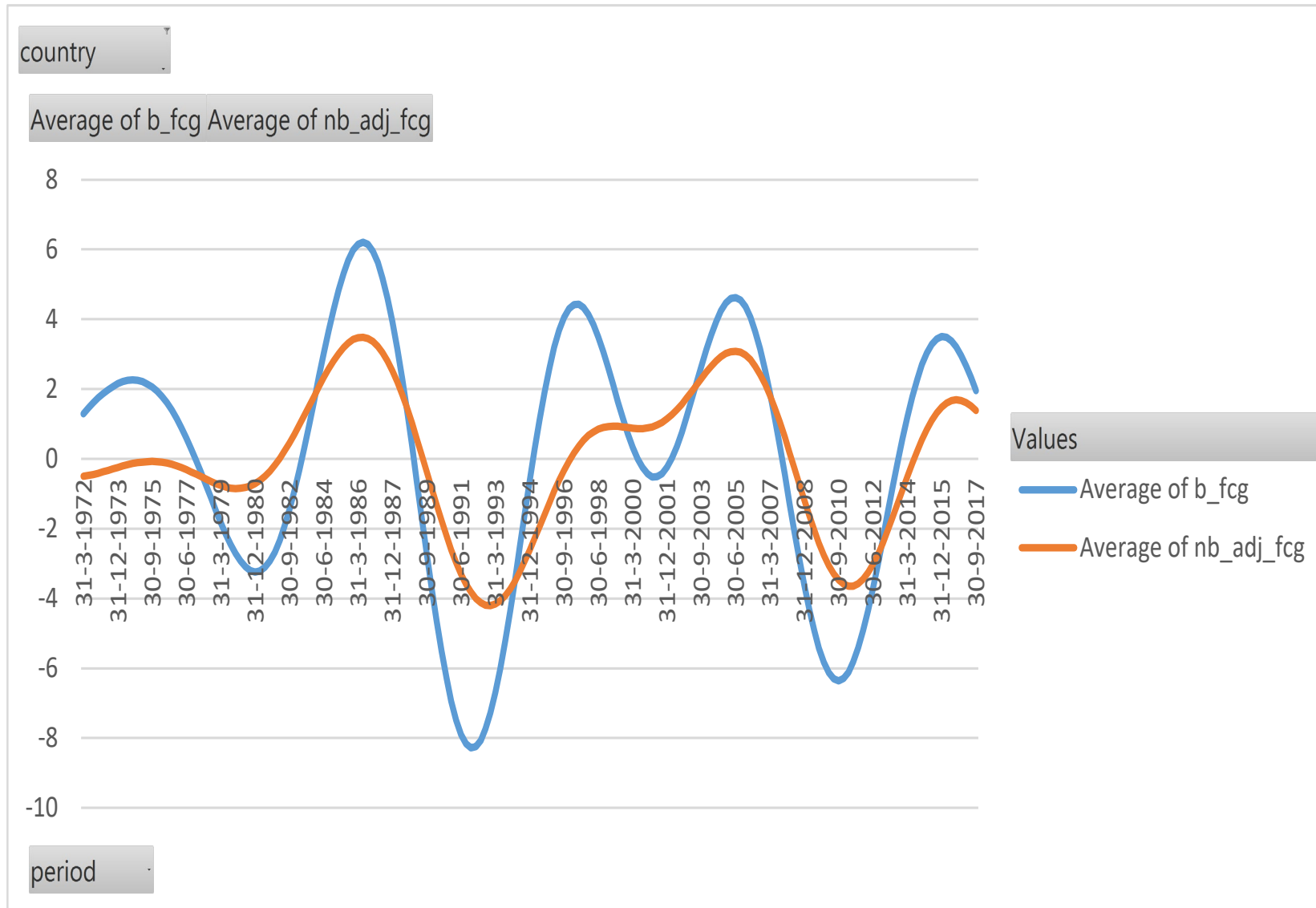


Non-bank credit booms. :

1. **EMS crisis** early 1990s
2. **Convergence plays** end 1990s
3. Before **sovereign debt crisis**

- Peaks after bank credit booms
- Role of interest rate differences triggering cross border credit flows to non-financial corporates?

US

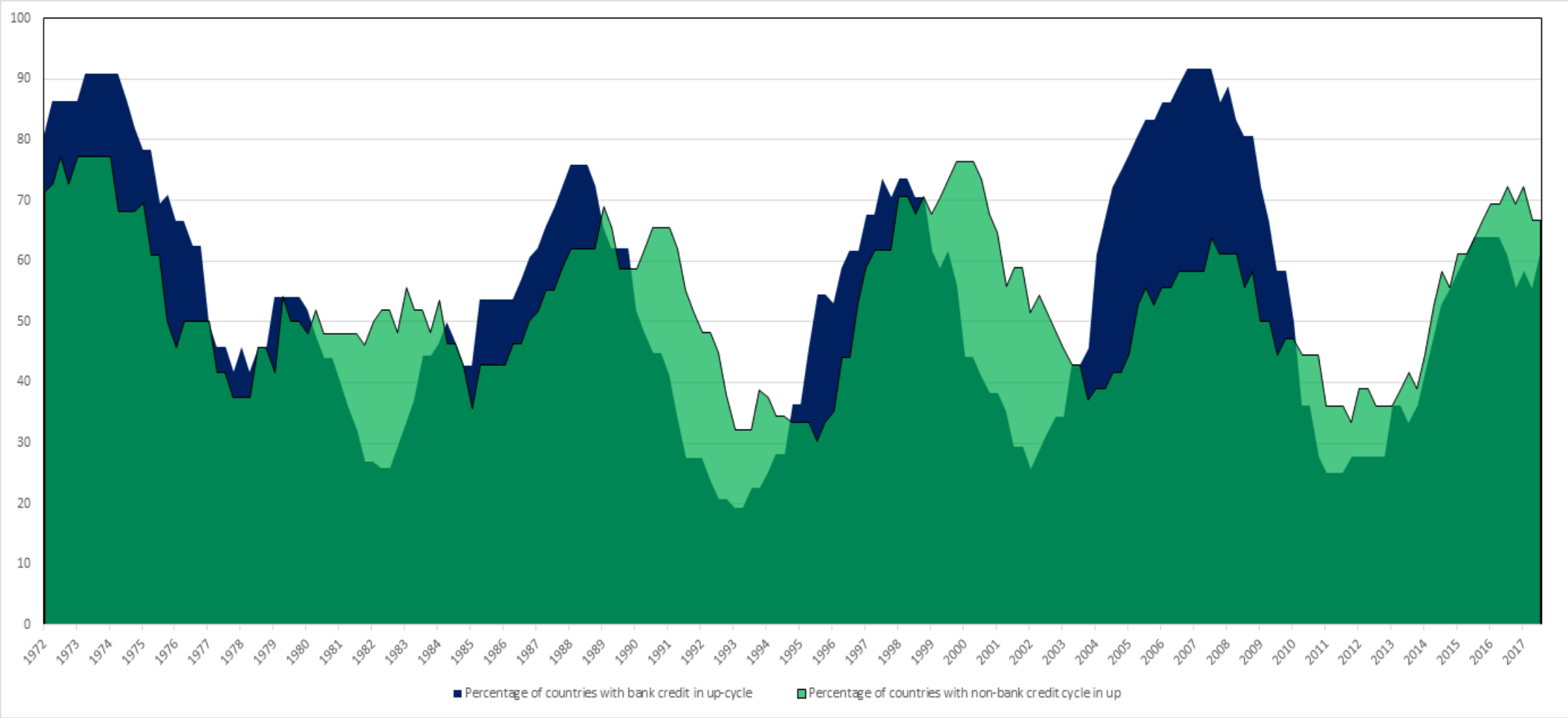


Bora Durdu and Zhong (2019, FED) focus on the **non-financial business sector in the US**. They compare their empirical results with ours. Find **similar results**:

- **Positive correlation; bank credit growth more pro-cyclical** than non-bank
- Bank credit: S&Ls crisis 1980s, milder credit crunch 2000 recession, declines in both series after great recession

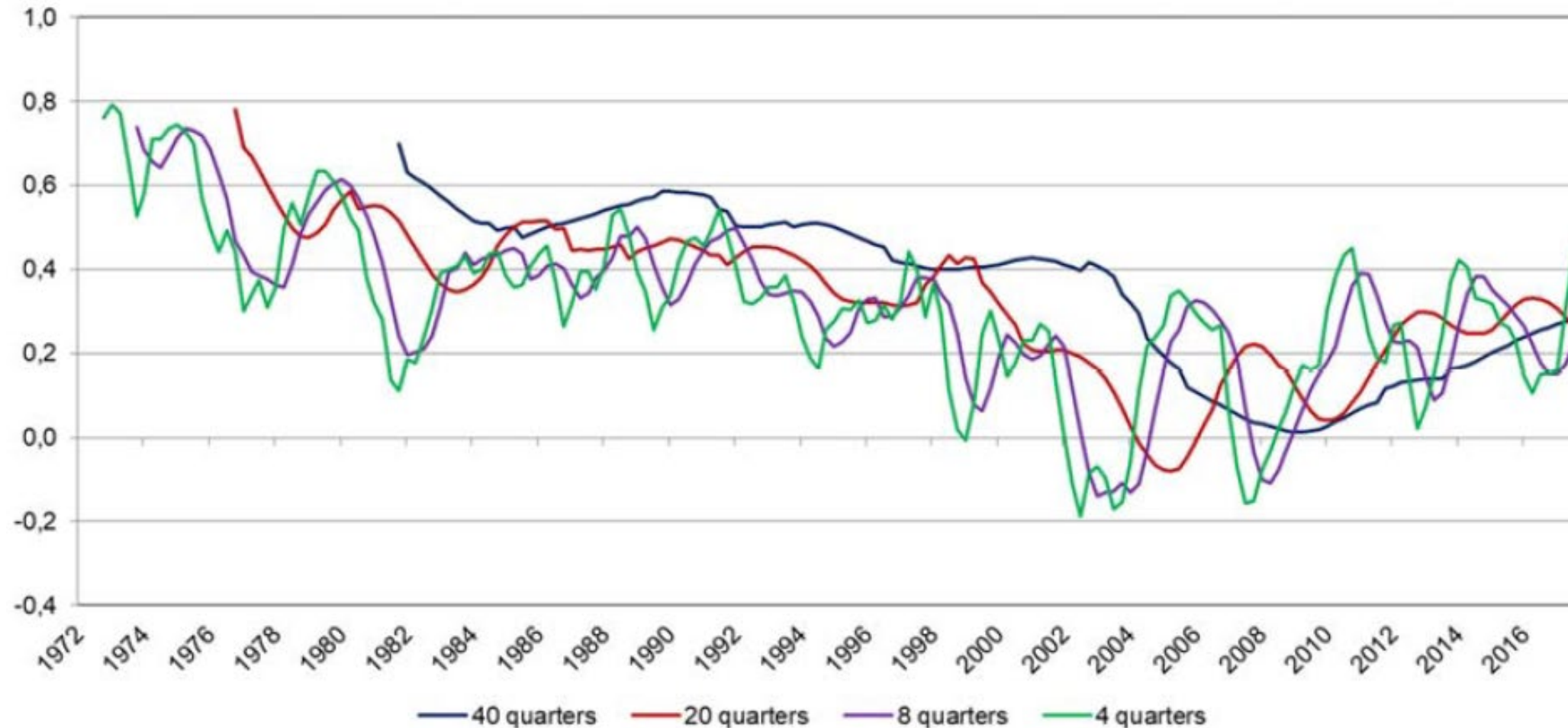
Bank credit cycles are more synchronized across countries than non-bank credit cycles

(Percentage of countries in an upward phase of the bank or non-bank credit cycle; blue is for banks)



Before GFC: bank and non-bank credit cycles became less synchronised cycles within countries

(Rolling Spearman rank correlations between bank and non-bank growth cycles, within countries, average for all countries)



Different dynamics for bank & non-bank credit:
investigate separately link between non-bank credit
and financial crises

$$\text{logit}(C_{i,t}^j) = \beta X_{i,t-1} + \gamma \Gamma_{i,t-1} + \theta_i + \varepsilon_{i,t},$$

$$C_{i,t}^j \quad j \in \{all, systemic, currency, sovereign\}$$

$$X_{i,t-1} = \Delta^4 \log(\text{real credit}_{t-1}) = \log(\text{real credit}_{t-1}) - \log(\text{real credit}_{t-5})$$

Bank credit growth and financial crises

	All crises		Systemic crises		Currency crises		Sovereign crises	
$\Delta^4 \text{ real } b \text{ credit}_{t-1}$	1.41** (0.69)	2.14*** (0.60)	3.10*** (0.88)	3.32*** (0.94)	-0.04 (0.83)	0.42 (1.80)	0.21 (0.84)	3.28 (2.54)
$\Delta^1 \text{ real } gdp_{t-1}$		-4.68 (3.75)		-1.72 (3.89)		0.81 (0.11)		-54.05** (25.29)
inflation_{t-1}		3.58** (1.58)		1.58 (3.00)		3.29 (1.86)		-4.45 (10.50)
Num. of Obs.	962	962	873	873	453	453	103	103
Pseudo R ²	0.06	0.08	0.07	0.07	0.04	0.05	0.00	0.55
AUROC	0.70	0.71	0.70	0.70	0.62	0.67	0.54	0.94
<u>Marginal effects</u>								
$\Delta^4 \text{ real } b \text{ credit}_{t-1}$	0.06	0.08	0.08	0.09				

*** p<0.01, ** p<0.05, * p<0.1. All of the specifications include fixed. The standard errors, reported in parentheses, are robust and clustered at the country level. We report marginal effects only when the coefficients are statistically significant.

Non-bank credit growth and financial crises

	All crises		Systemic crises		Currency crises		Sovereign crises	
$\Delta^4 \text{ real nb credit}_{t-1}$	1.24** (0.54)	1.20** (0.54)	0.45 (0.47)	0.43 (0.46)	1.51** (0.69)	1.58** (0.79)	3.56 (2.58)	3.69*** (0.79)
$\Delta^1 \text{ real gdp}_{t-1}$		-2.59 (3.68)		0.96 (4.17)		3.37 (7.76)		-51.23** (27.39)
inflation_{t-1}		1.61 (1.62)		-1.41 (2.08)		3.12 (2.07)		-7.66 (9.12)
Num. of Obs.	953	953	864	864	444	444	103	103
Pseudo R ²	0.06	0.07	0.03	0.03	0.07	0.08	0.19	0.58
AUROC	0.70	0.70	0.58	0.63	0.71	0.73	0.79	0.95
<u>Marginal effects</u>								
$\Delta^4 \text{ real nb credit}_{t-1}$	0.05	0.05			0.04	0.04		0.003

*** p<0.01, ** p<0.05, * p<0.1. All of the specifications include fixed. The standard errors, reported in parentheses, are robust and clustered at the country level. We report marginal effects only when the coefficients are statistically significant.

Why leading indicator for currency crises?

Additional analysis needed to uncover mechanism. Especially macro data on the relevance of non-bank credit from domestic vs. cross-border sources

Non-bank credit cycle – proxy for financial cycles in **(cross border) credit to corporates**, related to differences in monetary conditions?

- Interest rates differences (especially vis-à-vis dollar): currency mismatches in corporate debt
- Reversal: exchange rate depreciation, worsens ability of firms to roll-over debt
- Panics related to sudden stops related to non-bank credit reversals

Conclusions

- Non-bank credit: supplied by **diverse set of financial intermediaries**
- Non bank credit cycles:
 - Less correlated across countries than bank credit cycles.
 - But: regional booms, e.g. Asian crisis, EU early 1990s, run-up to the euro, EMEs 2nd phase of global liquidity after 2010
 - Before GFC: less correlated with bank credit cycles within countries
 - **Mixed evidence on *spare tyre* argument:** strongly correlated with bank credit cycles in some countries but not in others
- **Early warning indicator** for currency crises. Value added in monitoring non-bank credit
- **Relevance of data - further decompositions:** national vs cross-border, which currency, type of lender, type of credit (loans, bonds)
 - Euro area data: majority of **debt securities** issued by non-financial corporates held by **foreign investors**

Summary of all elements of total credit to the private non financial sector (2017q3, % GDP)

