



**BANCA D'ITALIA**

**EUROSISTEMA**

***Interchange Fee Regulation and  
Cards Payments: a cross-country  
Analysis***

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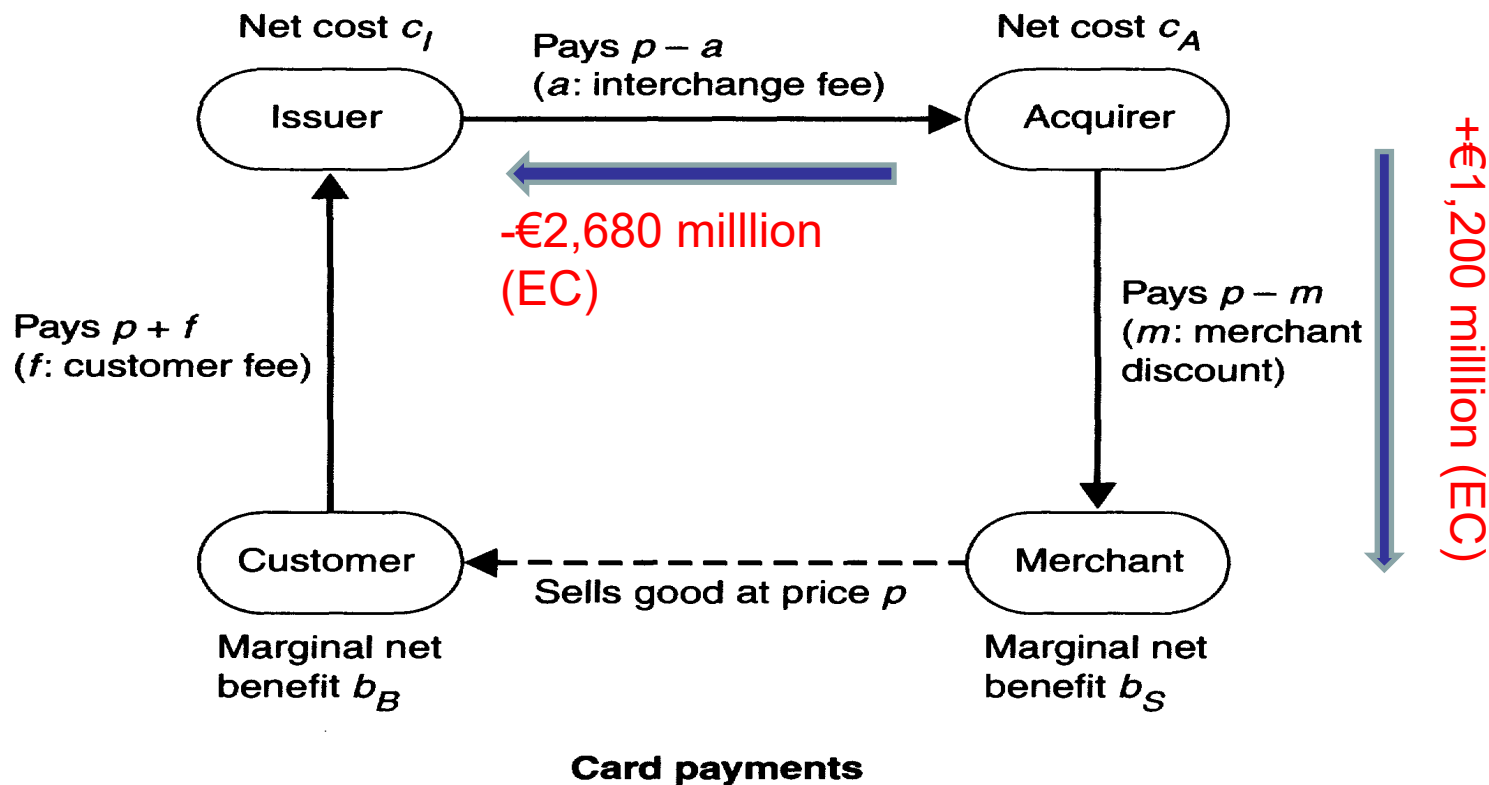


# Outline

- Motivation and issue: policy context and theoretical background
- What we do
- Literature
- Data
- Some stylized facts
- Econometric approach:
  - Panel
  - Diff in diff
- Results
- Further work and next steps ahead

## Policy context

- One of the goals of the IFR (passed in 2015): capping interchange fees in the EU=>reduce merchants' costs=> higher card acceptance and use=>compensation for issuers. Did it work?



# Theoretical background

- From a theoretical point of view the relationship between IF and transactions not clear (Rochet and Tirole, 2002):
  - higher IF=>lower card fees, enhanced consumer protections, services and card rewards =>increase in the use of cards at merchants that accept them=>transactions up

On the other hand

- higher IF, higher merchant fees, merchants unwilling to accept cards=>transactions down

Depending on

- Merchants elasticity (=>resistance to increases in fees), consumer resistance, competition among acquirers (pass-through), competition among issuers....

$$\frac{\text{Transactions}}{\text{Inhabitants}} = \frac{\text{Transactions}}{\text{number of POS}} * \frac{\text{Number POS}}{\text{Inhabitants}}$$

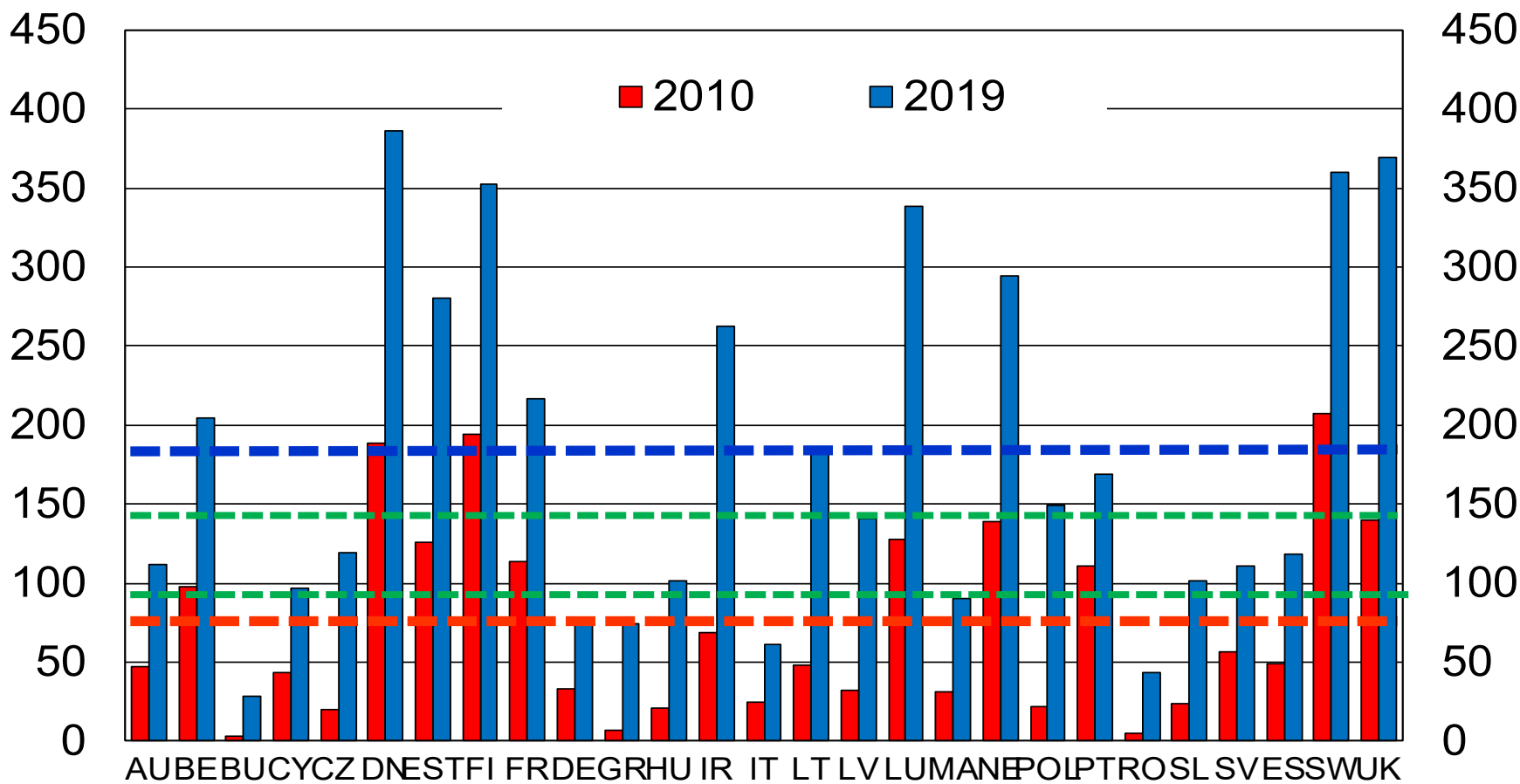


usage



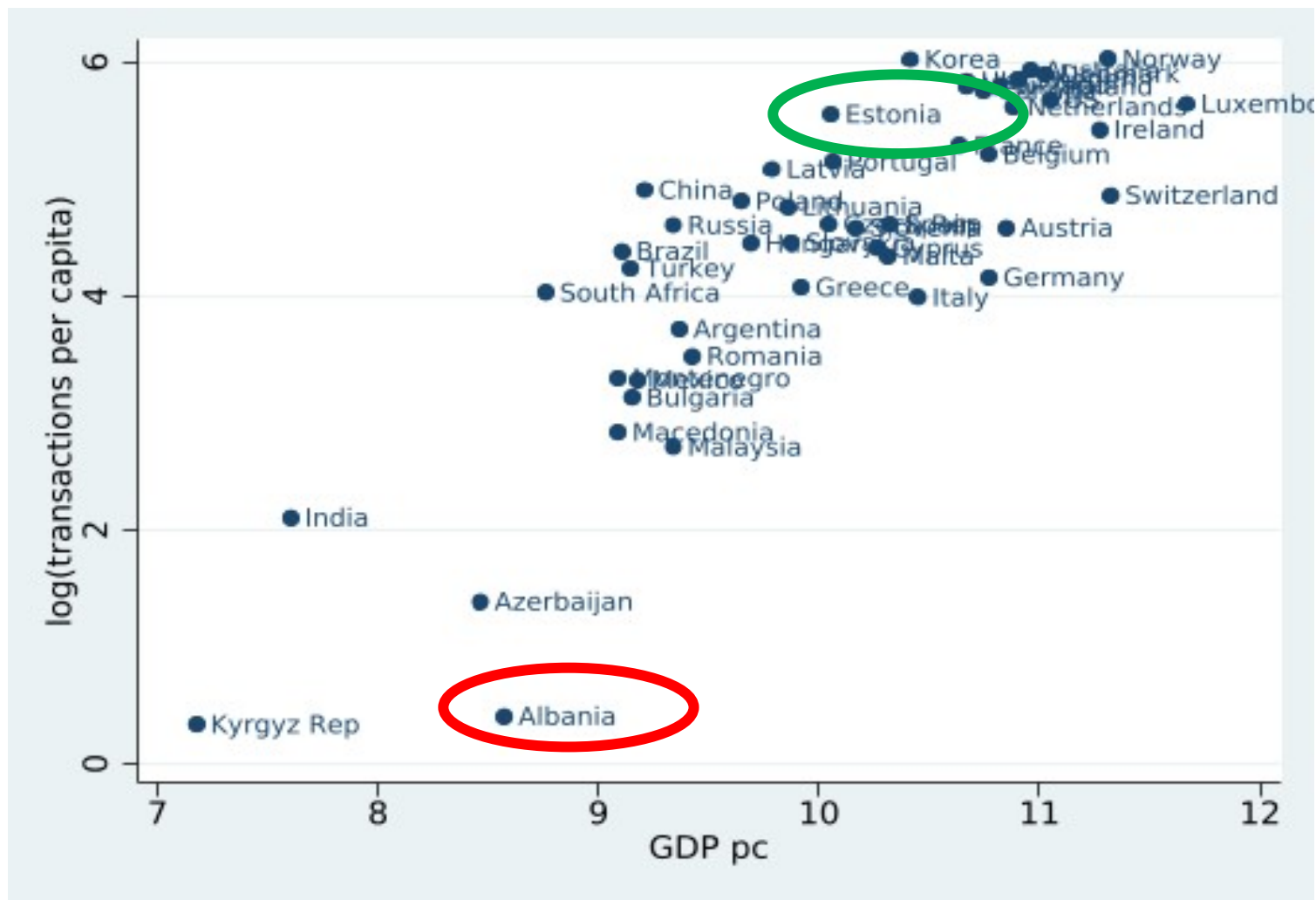
adoption

# Cards payments in Europe: the great decade

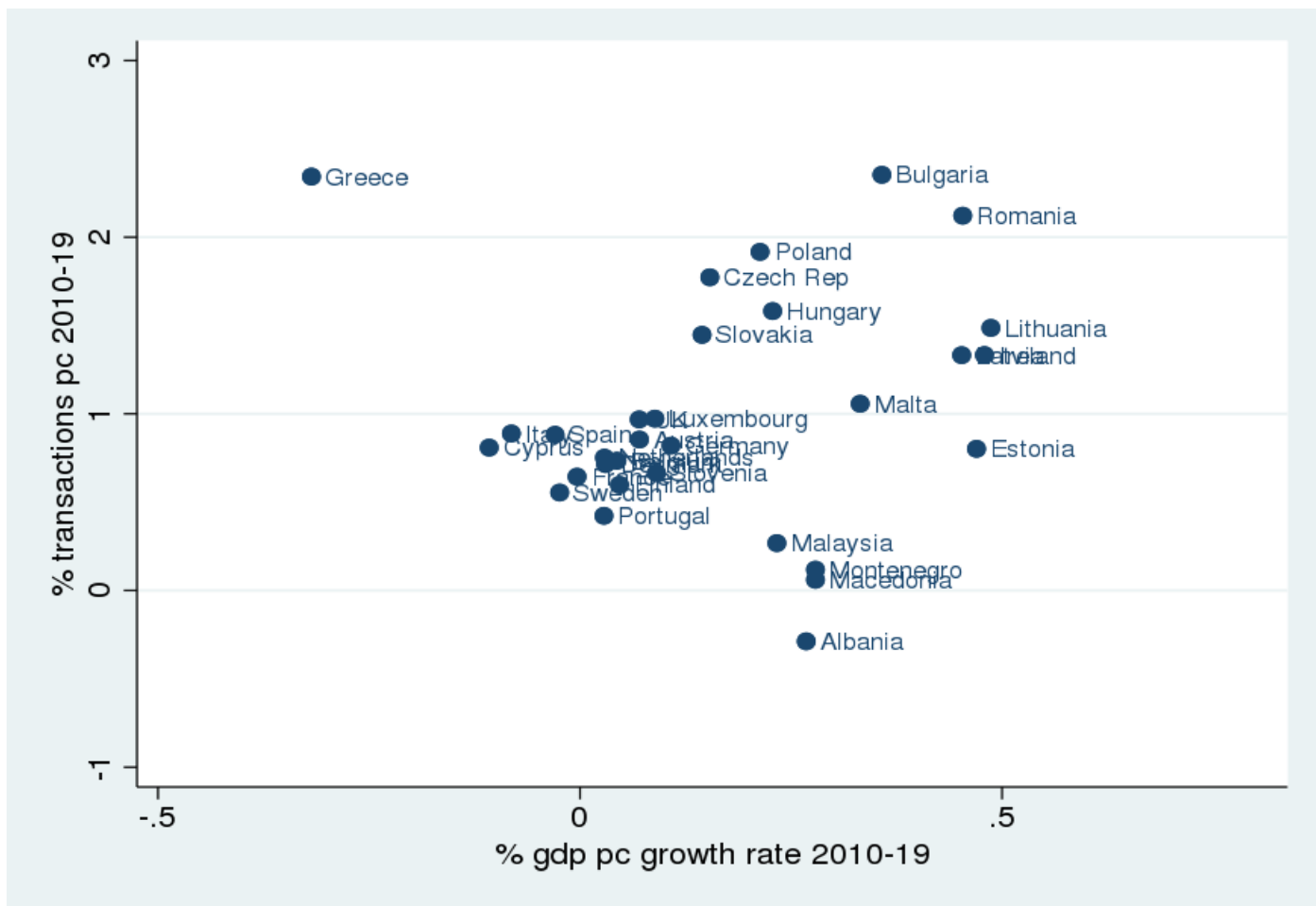


Source: elaborations on ECB, BIS and Kansas Fed data

# Cards payments and GDP: not the whole story...



# especially over time



## What we do

- We study explicitly the role of interchange fees (IF) in explaining heterogeneity in cards payments across countries and over time
  - Exploiting the huge drop in IF in EU countries following the IF Directive 2015
- and
- The significant heterogeneity in economic, structural conditions and in cards payments evolution in a large sample of 50 countries over 10 years



## Literature

- Interchange fee theoretical rationale and implications: Rochet and Tirole (2002): balancing externalities in twosided market
- Interchange fee regulation and cards payments: scant international evidence: European Commission (2020). Within country evidence: Ardizzi (2013), Ardizzi Zangrande (2018); Carbó Valverde et al. (2016)=>increase in merchants' acceptance of card-based transactions through increased merchants' adoption. More mixed evidence on US (Kay et al. 2014 and Wang et al. , 2014)
- No cross-country and over time empirical evidence:
  - No country fixed factors (preference for cash)
  - No country wide and regional trends



# Data

- Novel dataset:
  - interchange fees on credit and debit cards in over 50 countries from 2010 to 2020: by type of card (VISA, Mastercard, premium no premium), by type of merchant (Gas, Grocery etc.): Kansas Fed paper reports complemented with VISA and Mastercard country reports
  - Number of cards payments per capita from 2010 to 2020: ECB (EU27 countries), BIS (CPMI countries), Kansas Fed (other countries), national BCNs
  - GDP per capita and other macro controls: ECB, World Bank, IMF
  - Other structural payment systems' characteristics: BIS
  - The result is a pretty balanced panel of around 50 countries from 2010 to 2020



# Some stylized facts

## Correlations

Log (cards transactions p.c.)

Log (cards transactions p.c)

1

Log (GDP p.c.)

0.81\*\*\*

Linear time trend

0.18\*\*\*

Average interchange fee

-0.45\*\*\*

## Variables

Obs

Mean (var)

Range

Log (cards transactions p.c)

458

4.05 (1.41)

0.22-6.12

Log (GDP p.c.)

577

0.85 (0.51)

0.18-2.9

Average interchange fee

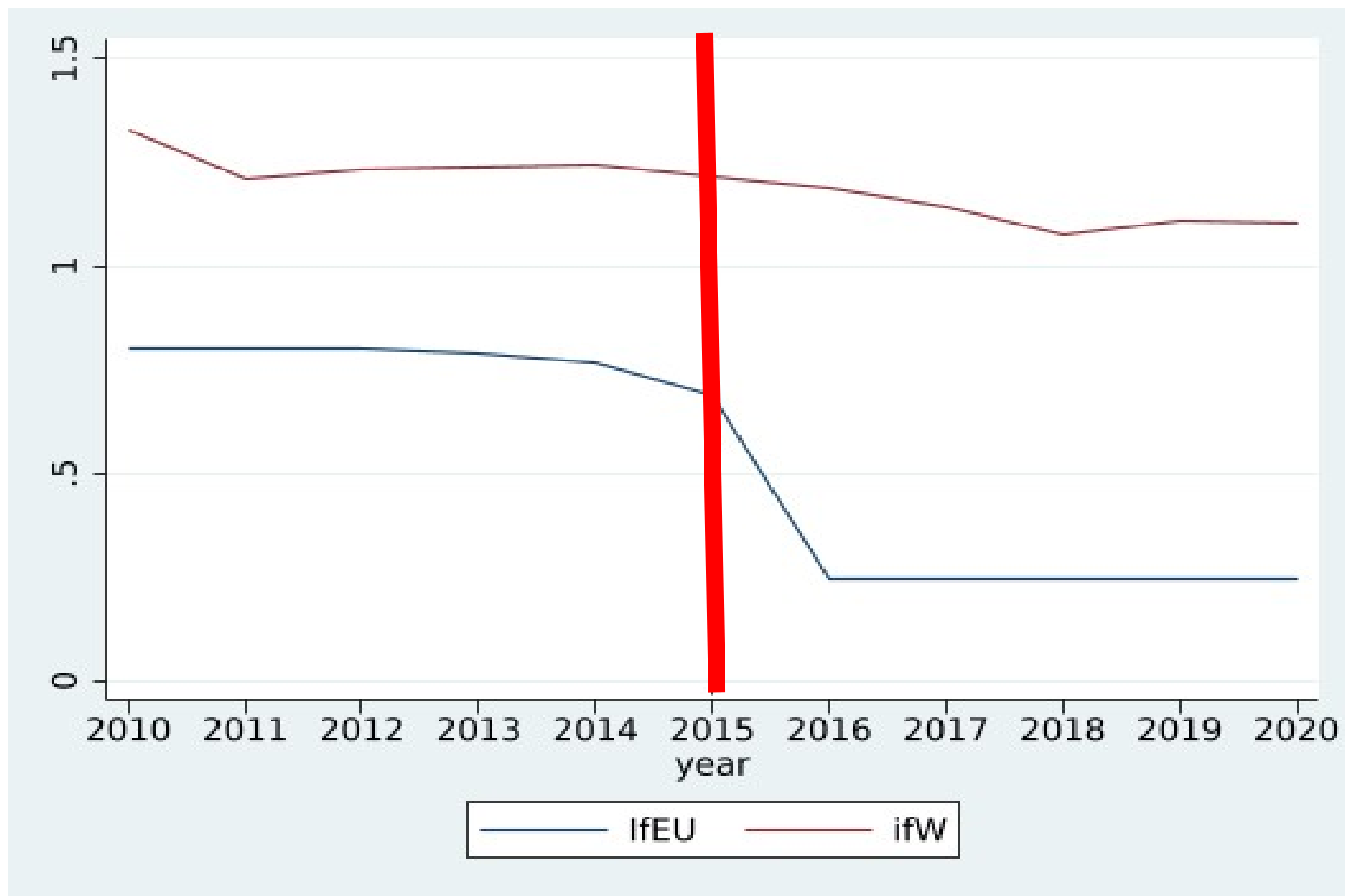
550

9.8 (1.03)

6.7-11.6

Source: elaborations on World Bank, ECB, BIS and Kansas Fed data

# Interchange fees evolution around the world





# Econometric Strategy

- In this work we exploit variance doubly:
  - Panel dimension: different levels and changes of IF over time across countries (full sample)
  - Diff-in diff: observe the evolution of transactions per capita in countries exposed to the intervention (treated, EU) and in similar countries not exposed to the intervention (control), both before and after the intervention



## Panel approach

- Panel with fixed effects (in level and in differences...)

$$\text{Log}(y_{it}) = \beta_0 * \log(y_{it-1}) + \beta_1 * \text{IF}_{it} + \beta_2 * \text{GDP pc}_{it} + \beta_3 * t + \sum_{j=1}^N \beta_j X_{ijt} + \delta_i + \mu_t + \epsilon_{it}$$

$\log(y_{it})$  number of cards (credit and debit) transactions per capita

$\text{IF}_{it}$  **average interchange fee (credit and debit)**

$\text{GDP pc}_{it}$  gdp per capita (current US\$)

$X_{it}$  other covariates among

$\delta_i$  country fixed effects

$\mu_t$  time fixed effects

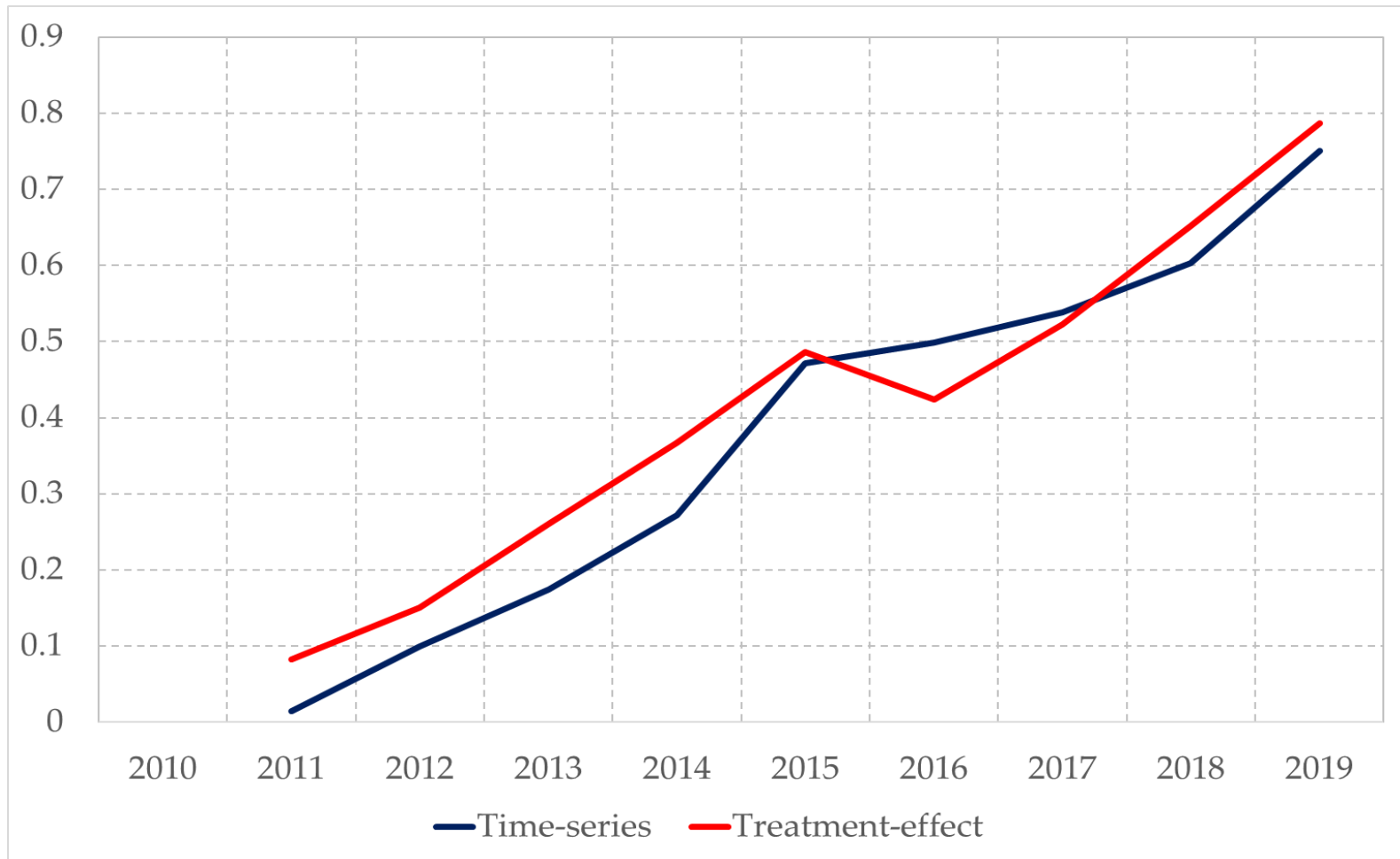
$t$  time trend

# Baseline I

dependent variable: Log(transactions per capita)

	benchmark	year FE
Average Interchange Fee	-0.917***	-0.342***
Log(GDP per capita)	0.758***	0.778***
Linear time trend		
$y_{t-1}$		
Constant	-2.712***	-3.752***
Year FE	NO	YES (significant)
Country FE	NO	NO
$R^2$	0.68	0.47
Sample period	2010 - 2019	2010 - 2019
Number of groups	46	46
Observations	430	430

# Time dummies





# Baseline II

dependent variable: Log(transactions per capita)

	benchmark	year FE	year FE + linear trend	country FE + linear trend	year FE + country FE + linear trend + lagged dep	Arellano-Bond
Average Interchange Fee	-0.917***	-0.342***	-0.342***	-0.332***	-0.076***	-0.155***
Log(GDP per capita)	0.758***	0.778***	0.778***	0.307***	0.037	0.044
Linear time trend			0.083***	0.090***	0.008**	
$Y_{t-1}$					0.938***	0.868***
Constant	-2.712***	-3.752***	-3.752***	0.867	0.005	0.328
Year FE	NO	YES (significant)	YES (not significant)	NO	YES (not significant)	NO
Country FE	NO	NO	NO	YES	YES	NO
$R^2$	0.68	0.47	0.68	0.67 (within)	0.95 (within)	
Sample period	2010 - 2019	2010 - 2019	2010 - 2019	2010 - 2019	2010 - 2019	2010 - 2019
Number of groups	46	46	46	46	46	46
Observations	430	430	430	430	384	338

## Estimates in differences

	dependent variable: $\Delta\text{Log}(\text{transactions per capita})$	
	year FE + linear trend + lagged level	country FE + linear trend + lagged diff
Average Interchange Fee	-0.063***	-0.051**
Log(GDP per capita)	0.003	-0.022
Linear time trend	0.005*	0.002
$y_{t-1}$	-0.02	
$\Delta y_{t-1}$		-0.045
Constant	0.184	0.367
Year FE	YES (not significant)	NO
Country FE	NO	YES
Sample period	2010 - 2019	2010 - 2019
Number of groups	46	46
Observations	384	338



## Diff in Diff approach

- Diff in Diff specification

$$\text{Log}(y_{it}) = \beta_0 * (\text{TREAT}_{it} * \text{POST}_{it}) + \beta_1 * \text{GDP pc}_{it} + \beta_2 * t + \delta_i + \mu_t + \epsilon_{it}$$

$\log(y_{it})$  number of cards (credit and debit) transactions per capita

$\text{TREAT}_{it}$  Being part of the treatment group (EU countries to which the regulation applies)

$\text{POST}_{it}$  Treatment period (post 2015)

$\text{GDP pc}_{it}$  gdp per capita (current US\$)

$X_{it}$  other covariates among

$\delta_i$  country fixed effects

$\mu_t$  time fixed effects

$t$  time trend



## The control group

- 14 Countries with no legal or de facto (material) changes in IF between 2010 and 2020. Good coverage in terms of:
  - geographical areas (5 non EU European, 3 Asia, 2 North America, 1 Africa, 2 South America, 1 Oceania), economic development and starting conditions

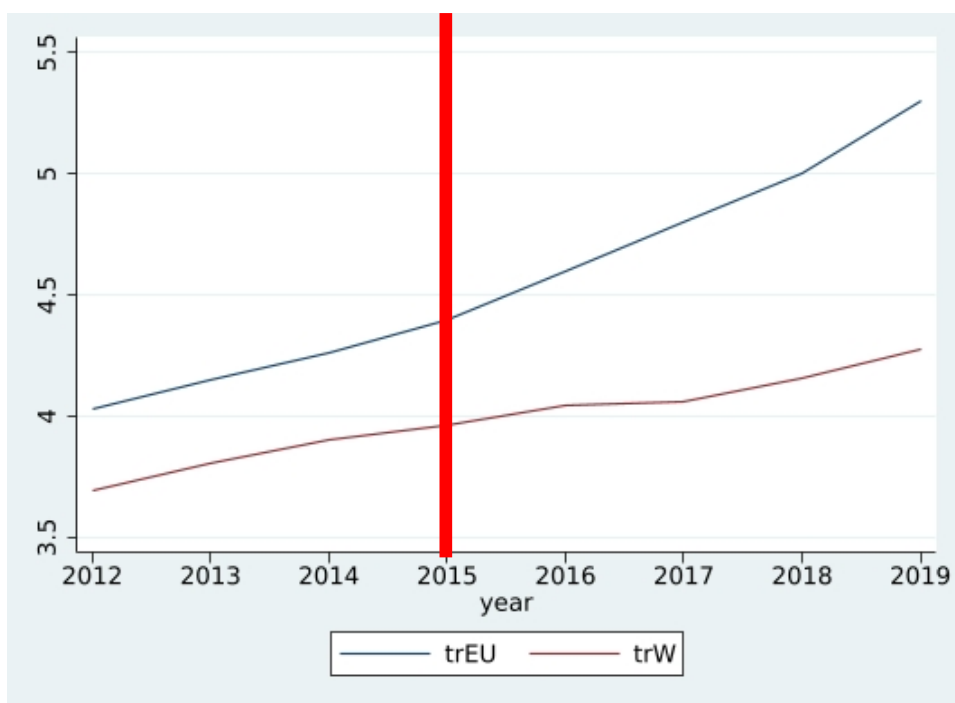
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	Treated	Control
Interchange fee 2015	0.25-1.6	0.77-1.8
Log (transactions p.c.) 2015	2.4-5.7	1.38-5.9
Log (GDP per capita) 2015	8.9-11.5	8.7-11.1
Var% 2012-15 transactions p.c.	22,3%	25%
Var% 2016-2019 transactions p.c.	49,8%	38,2%

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## Identification assumptions

- Radomness of the treatment: being part of the EU
- Parallel trend: untreated units provide the appropriate counterfactual of the trend that the treated units would have followed if they had not been treated; Kahn-Lane and Lang (2019)=>Similar in pre treatment trend & levels



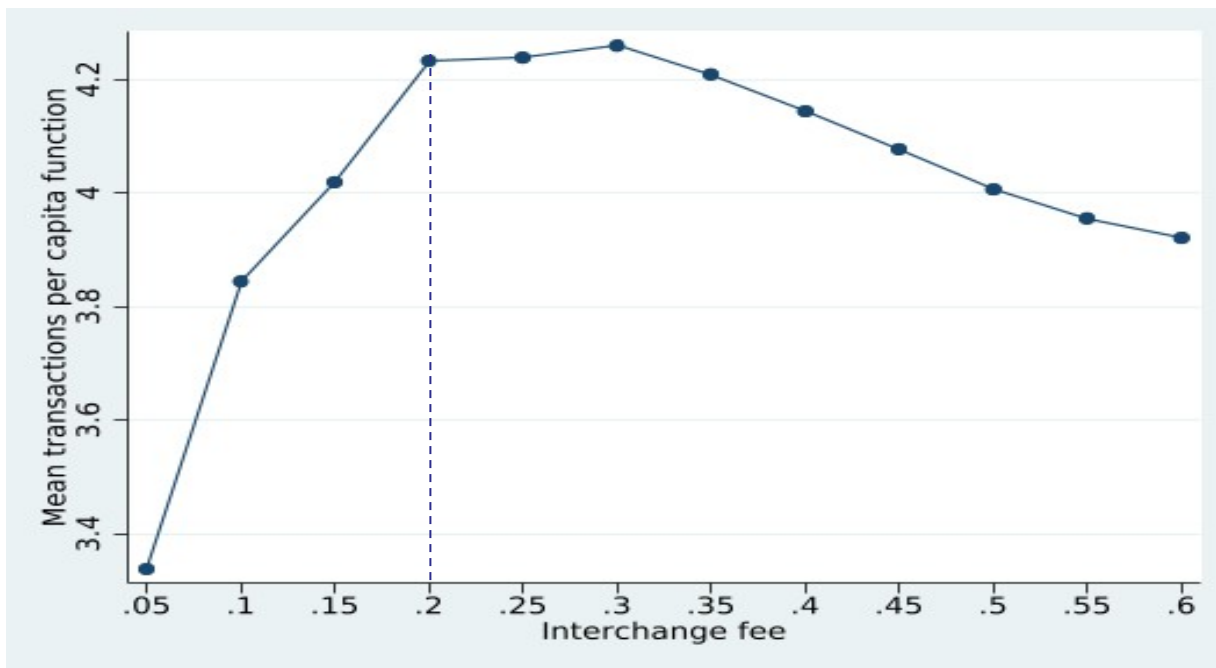
## Diff in Diff estimates

dependent variable:	Log(transactions per capita)			$\Delta$ Log(transactions per capita)	
	benchmark	year FE + linear trend	year FE + country FE	year FE + country FE	year FE + country FE
EU*post2015	0.182***	0.231***	0.291***	0.037*	0.049*
Log(GDP per capita)	0.493***	0.538***	0.047	-0.017	0.158
Linear time trend	0.092***	0.087***			
Constant	-1.209	-1.619*	3.280***	0.257	-1.478
Year FE	NO	YES (not significant)	YES (significant)	YES (not significant)	YES (not significant)
Country FE	NO	NO	YES	YES	YES
Sample period	2010 - 2019	2010 - 2019	2010 - 2019	2010 - 2019	2013 - 2017
Number of groups	41	41	41	16	16
Observations	388	388	388	347	205

## Sensitivity analysis around the cap

- Can the diffusion of card payments benefit by further reductions of the interchange fees?

=>local non-parametric estimator around the threshold








## Further work and next steps

- Enrich the set of time varying covariates to study the role of competition and concentration in payments systems
  - Diff in diff with heterogeneous effect
  - Other characteristics of the market (BIS)
- Opening the box of the link between transactions per capita and IF: number of POS (adoption), number of cards.
- Use IF differential rates for merchants:
  - Insert year-country fixed effects
  - Study the role of concentration in economic sectors
- Strengthen Diff in diff:
  - placebos



# Conclusions

- We find:
  - negative and significant relationship between interchange fees and both the number of card transactions per capita and their growth rates
  - IF  10 basis point  card transactions per capita 3,5 per cent
  - IFR, after its implementation, significantly boosted card usage in EU member countries, in line with the regulatory intentions: card transactions  30 per cent
- Possible unintended effects with “near zero interchange fee”
- Issues of sustainability, competition and technological developments



**Thanks for the attention**



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