Digital disruptors at the gate. Does FinTech lending affect bank market power and stability?

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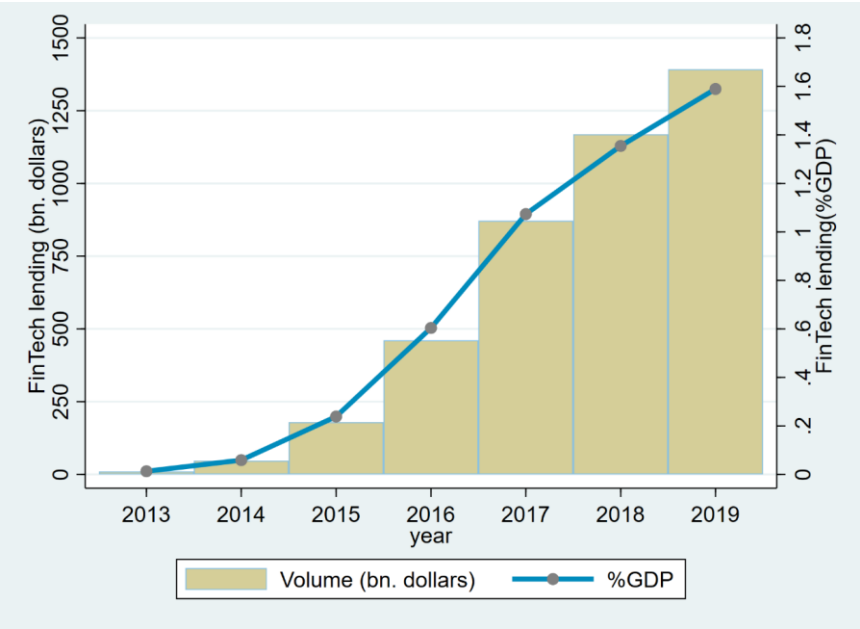
Motivation

- The advent of recent innovations in information technology - data collection and processing - and communication - distribution and connectivity - is having a deep impact on financial intermediation.
- This digital revolution has fostered the arrival of new players in the credit market who, unlike incumbents (traditional banks), are digitally native.
- At the forefront of this disruption are **FinTech lenders**, who have proved their ability to provide a growing amount of credit to borrowers all over the world.
- FinTech lending has gained ground as an alternative to traditional bank-based funding sources.
- Credit provided by the FinTech sector has experienced sizeable growth during the period 2013-2019.



To what extent the FinTech phenomenon is impacting the incumbent banking industry?

This paper . . .

- This paper aims to explore the impact of FinTech lending on the **market power** and **financial stability** of **the banking sector**.
  - ❑ Does the institutional environment (legal and institutional quality) shape the impact of FinTech lending?
  - ❑ Is market power one of the channels by which Fintech lending affects bank stability?

- Methodology:
  - ❑ Sample: International database composed of 6,309 banks from 70 countries over the period 2013–2019
  - ❑ Measuring FinTech: Total volume of FinTech lending provided in each country (Cornelli et al. 2020).
  - ❑ Addressing endogeneity
  - ❑ Bank-level and Country level analysis

- Findings:
  - ❑ There is a **negative relationship** between FinTech lending and bank market power and bank stability.
  - ❑ The **economic impact** of FinTech lending has **increased over time**
  - ❑ This negative effect is **less relevant in countries with greater protection of creditor rights**.
  - ❑ The impact of FinTech lending on bank stability is partially **channeled by** the effect of FinTech credit on the **market power** of incumbent banks..

Hypotheses development

- Impact on banks' **market power**:
  - Preliminary evidence: Irani et al. (2021) and Buchak et al. (2018) document that an upward trend in FinTech lending is putting pressure on banks.
  - Cornaggia et al. (2018) observe that a one-standard-deviation increase in FinTech lending activity reduces the relative fraction of the bank's personal loan segment by 1.2%.
  - Di Maggio & Yao (2021) use a unique dataset of loans originated by FinTech and banks to conclude that FinTech lenders are attracting market share away from banks.

H1: FinTech lending reduces incumbent banks' market power (increases competition)

Hypotheses development

- **Impact on bank stability**:
  - Superior capacity of FinTech lenders to assess borrowers' creditworthiness compared to incumbent lenders (Frost et al., 2019; Fuster et al., 2019; Gambacorta et al., 2019).
    - Ghosh et al. (2021) find that, compared to traditional banks, FinTech lenders are able to screen borrowers more efficiently.
  - This superior capacity of FinTech lenders might create adverse selection problems for incumbent commercial lenders.
  - Hence, if FinTech companies are better than traditional banks at evaluating the creditworthiness of potential clients, we may expect them to be more able to discern safe investments more quickly and to be ahead of banks in their financing (Havrylchyk, 2018)
  - **The arrival of FinTech as lenders could make banks willing to take more risks in order to reduce borrower migration as much as possible**

H2: FinTech lending reduces incumbent banks' stability

Hypotheses development

- **The emergence of FinTech lenders is explained by several factors – a combination of economic, technological, and regulatory aspects.**
  - High cost of traditional financial services: Philippon (2018)
  - Uncompetitive banking markets: Frost (2020); Claessens et al. (2018)
  - Unbanked population: Jagtiani & Lemieux (2018); Zhang et al. (2020)
  - Less stringent banking regulation: Claessens et al., (2018); Cornelli et al., (2020); Kowalewski et al. (2021)

H3: The legal and institutional framework shapes the effect of FinTech lending on incumbent banks' market power and stability.

Empirics

- **Sample:**
  - 6,309 banks and 28,695 bank-year observations
  - 70 countries (Developed and developing countries)
    - Over the period 2013–2019
- **Sources:**
  - Bank-level information: ORBIS Bank Focus Database (Bureau Van Dijk).
  - FinTech lending information computed by the Bank for International Settlements (Cornelli et al. 2020).
  - Characteristics of the banking industry and macroeconomic indicators are obtained from the Global Financial Development database (World Bank) and from the International Monetary Fund (IMF).

Empirics

- Our empirical approach relies on a **linear regression with panel data estimators: bank and time fixed effects.**

$$LERNER_{it} = \beta_0 + \beta_1 FINTECH_{jt} + \sum_{l=1}^{6} \gamma_l \; BANK_{it-1} + \sum_{h=1}^{3} \delta_h \; COUNTRY_{jt} + \mu_i + \lambda_t + \varepsilon_{i,t}$$

$$ZSCORE_{it} = \beta_0 + \beta_1 FINTECH_{jt} + \sum_{l=1}^{6} \gamma_l \; BANK_{it-1} + \sum_{h=1}^{3} \delta_h \; COUNTRY_{jt} + \mu_i + \lambda_t + \varepsilon_{i,t}$$

Dependent variables:

- **The Lerner index ($LERNER_{it}$) measures the level of bank market power → inverse proxy for bank competition** (Beck et al., 2013; Cruz-García et al., 2021; Cubillas & González, 2014; Maudos & Fernández de Guevara, 2004).
- **Z-score as a proxy for bank stability ($ZSCORE_{it}$) → inverse measure of bank risk** (Beck et al., 2013; Laeven & Levine, 2009; Schaeck & Cihák, 2014, among others).

Main explanatory variable:

- $FINTECH_{jt}$ captures the annual credit volumes provided by FinTech lenders in each country (Cornelli et al., 2020).

Controls:

- Bank: Total capital-to-assets ratio, Bank business activity, Bank entity efficiency, Annual growth rate in total profits Annual growth rate in the volume of granted loans
- Country: Percentage growth rate of GDP per capita, Percentage change of end-of-period consumer price index, Private credit by deposit money banks and other financial institutions to GDP.

Results

Dependent variable:	PANEL A: LERNER		PANEL B: Z-SCORE	
	Eq. (1)		Eq. (2)	
	(1)	(2)	(3)	(4)
		Ec. impact (%ΔLERNER)		Ec. impact (%ΔZ-SCORE)
FINTECH	-0.0016**	-0.35%	-0.0309***	-6.57%
	(-1.96)		(-3.00)	
LERNER			0.253*	4.44%
			(1.84)	
Controls	Yes		Yes	
Time FE	Yes		Yes	
Bank FE	Yes		Yes	
Observations	28,695		28,295	
F-test (p-value)	0.00		0.00	

- **FinTech lending is negatively associated with incumbent banks' market power (LERNER)**
  - ❖ The emergence of FinTech companies as suppliers of alternative credit implies an increased level of competition in the lending market.

- **FinTech lending is negatively associated with incumbent banks' stability (Z-score)**
  - ❖ More risk-aggressive response by banks to the arrival of new competitors in the lending market.

Results

How does the institutional environment shape the effect of FinTech lending on market power and stability?

Dependent variable:	PANEL A: LERNER				PANEL B: Z-SCORE			
	Eq. (3)				Eq. (4)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FINTECH	-0.0021**	-0.0017**	-0.0023***	-0.0075**	-0.0373***	-0.0426***	-0.0730***	-0.102***
	(-2.47)	(-2.04)	(-3.16)	(-2.56)	(-3.31)	(-3.95)	(-5.09)	(-2.86)
LERNER					0.240*	0.235*	0.273**	0.252*
					(1.74)	(1.72)	(1.99)	(1.81)
FINTECH * Regulatory Quality	0.001				0.0225***			
	(1.43)				(2.96)			
FINTECH * Rule of Law		0.0003				0.0346***		
		(0.59)				(5.28)		
FINTECH * Creditor Rights			2.50e-05*				0.001***	
			(1.93)				(4.17)	
FINTECH * Resolving Insolvency				7.72e-05**				0.001**
				(2.08)				(2.52)
Regulatory Quality	-0.004				0.215**			
	(-0.61)				(2.50)			
Rule of Law		-0.009				0.154		
		(-1.17)				(1.55)		
Creditor Rights			-0.0002***				0.002	
			(-3.13)				(1.49)	
Resolving Insolvency				0.0001				-0.0186***
				(0.57)				(-4.68)

- **The effect on market power is less relevant in countries with greater creditor rights protection and a stronger legal framework**
- **The effect on bank stability is lower in countries characterized by higher levels of institutional quality**

Results

Is bank market power a channel underlying the relationship between FinTech lending and bank stability? Instrumental variables in a **Two-Stage Least Squares (2SLS)** procedure for panel-data model

1st Stage

$$LERNER_{it} = \beta_0 + \beta_1 FINTECH_{jt} + \beta_2 Concentration_{jt} + \beta_3 Fin.Development_{jt} + \sum_{l=1}^{6} \gamma_l \ BANK_{it-1} + \sum_{h=1}^{3} \delta_h \ COUNTRY_{jt} + \mu_i + \lambda_t + \varepsilon_{i,t}$$

2nd Stage

$$ZSCORE_{it} = \beta_0 + \beta_1 FINTECH_{jt} + \beta_2 \widehat{LERNER}_{it-1} + \sum_{l=1}^{6} \gamma_l \ BANK_{it-1} + \sum_{h=1}^{3} \delta_h \ COUNTRY_{jt} + \mu_i + \lambda_t + \varepsilon_{i,j,t}$$

Dependent variable:	**MECHANISM**	
	1st Stage	2nd Stage
	LERNER	Z-SCORE
	(1)	(2)
FinFree	-0.00204***	
	(-11.02)	
Concentration	0.00016***	
	(2.60)	
FINTECH	-0.0040***	-0.0382***
	(-4.11)	(-3.30)
$\widehat{LERNER}$		0.0133***
		(5.94)

- **First stage, results according to the literature:**
  - ❖ Financial liberalization leads to lower levels of market power (Salas & Saurina, (2003).
  - ❖ In concentrated banking markets, banks have a higher degree of market power (Cubillas & González, 2014).
- **Second stage, FinTech effect:**
  - ❖ Direct effect→ coefficient of Fintech is negative and statistically significant
  - ❖ Indirect effect of fintech lending on bank stability through bank market power→ predicted lerner is positive and statistically significant

Additional Results

Country level analysis and the endogeneity of fintech lending

	PANEL A: COUNTRY-LEVEL EVIDENCE		PANEL B: ENDOGENEITY		
Dependent variable	LERNERBS	ZSCOREBS	1st-Stage FINTECH	2nd Stage LERNERBS	2nd Stage ZSCOREBS
	(1)	(2)	(3)	(4)	(5)
FINTECH	-0.0071**	-0.0140*			
	(-2.07)	(-1.77)			
$\widehat{FINTECH}$				-0.0193*	-0.0661*
				(-1.79)	(-1.68)
LERNERBS		0.301**			0.294*
		(2.27)			(1.72)
Rural			0.514***		
			(2.90)		

- Our results are consistent at the country-level and after addressing the potential endogeneity of FinTech lending.

Robustness

Alternative measure of market power:

- Net interest margin
- Lerner index using the number of employees as the denominator of the price of labor

Alternative measure of bank stability:

- Z-score using different moving windows
- Sharpe ratio, which is defined as the return on equity divided by the standard deviation of the return on equity using a 3-year rolling time window

Alternative measures of the relevance of the FinTech phenomenon

- Logarithm of annual total investments in the FinTech sector per capita
- Total investments received by the FinTech sector in each country

Subsample analyses:

- **Excluding those countries with the highest volumes of FinTech** lending during our sample period (China, USA and UK).

Alternative econometric modeling:

- Random effects with country fixed effects

Conclusions

This paper aims to explore the impact of FinTech lending on the **market power** and **financial stability** of **the banking sector**.

- FinTech lending is **negatively associated** with incumbent banks' **market power** (LERNER) and incumbent **banks' stability** (Z-score).
    - These **effects** have **increased** during the period analyzed and become even more prominent than other traditional determinants of market power and bank stability.

- **Country's legal and institutional environmen**t shape the relatiobship
- FinTech lending may affect **bank stability through market power**.
- The results are **robust** at the **country-level** and after **addressing the potential endogeneity** of FinTech lending and several robustness tests.

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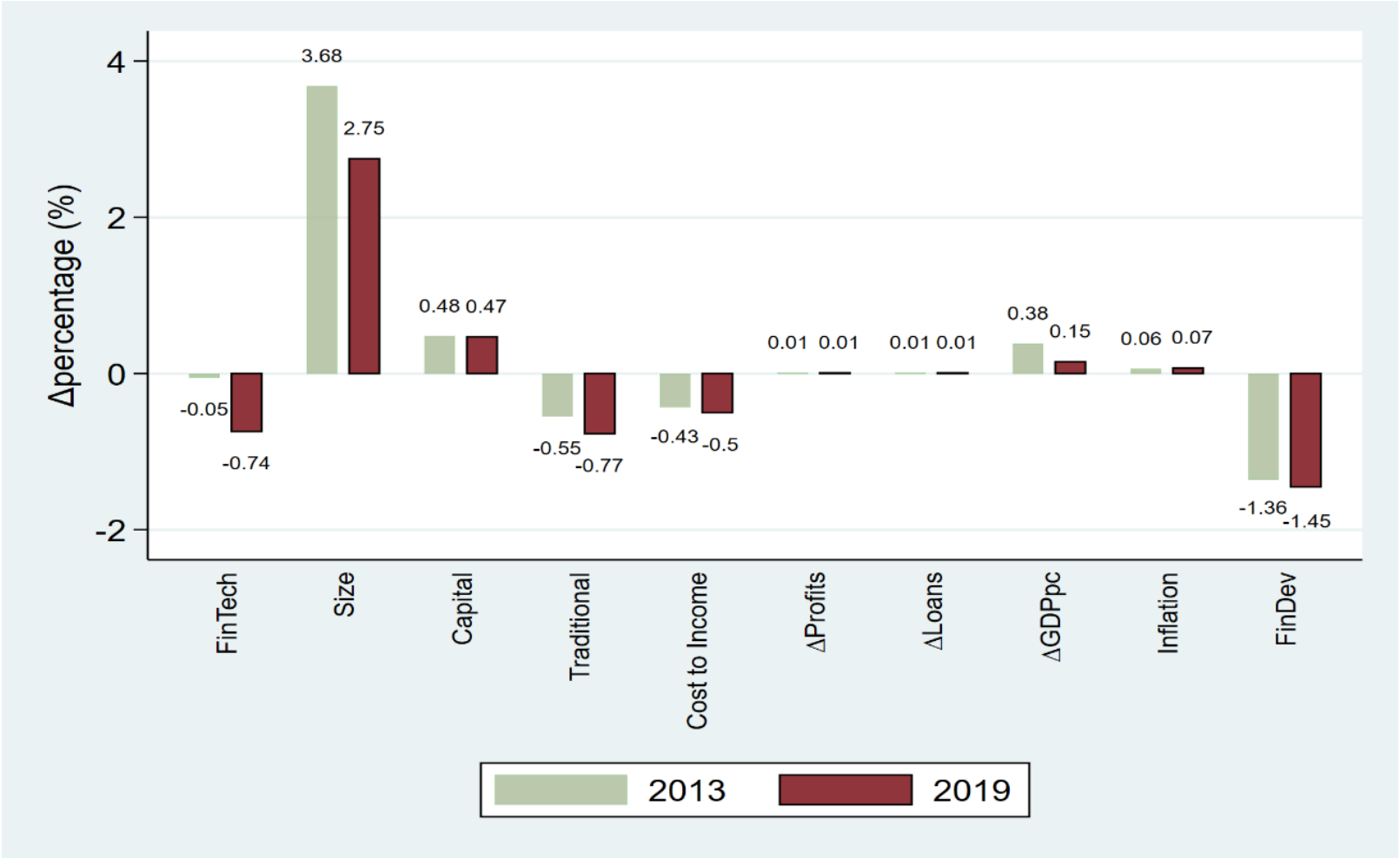
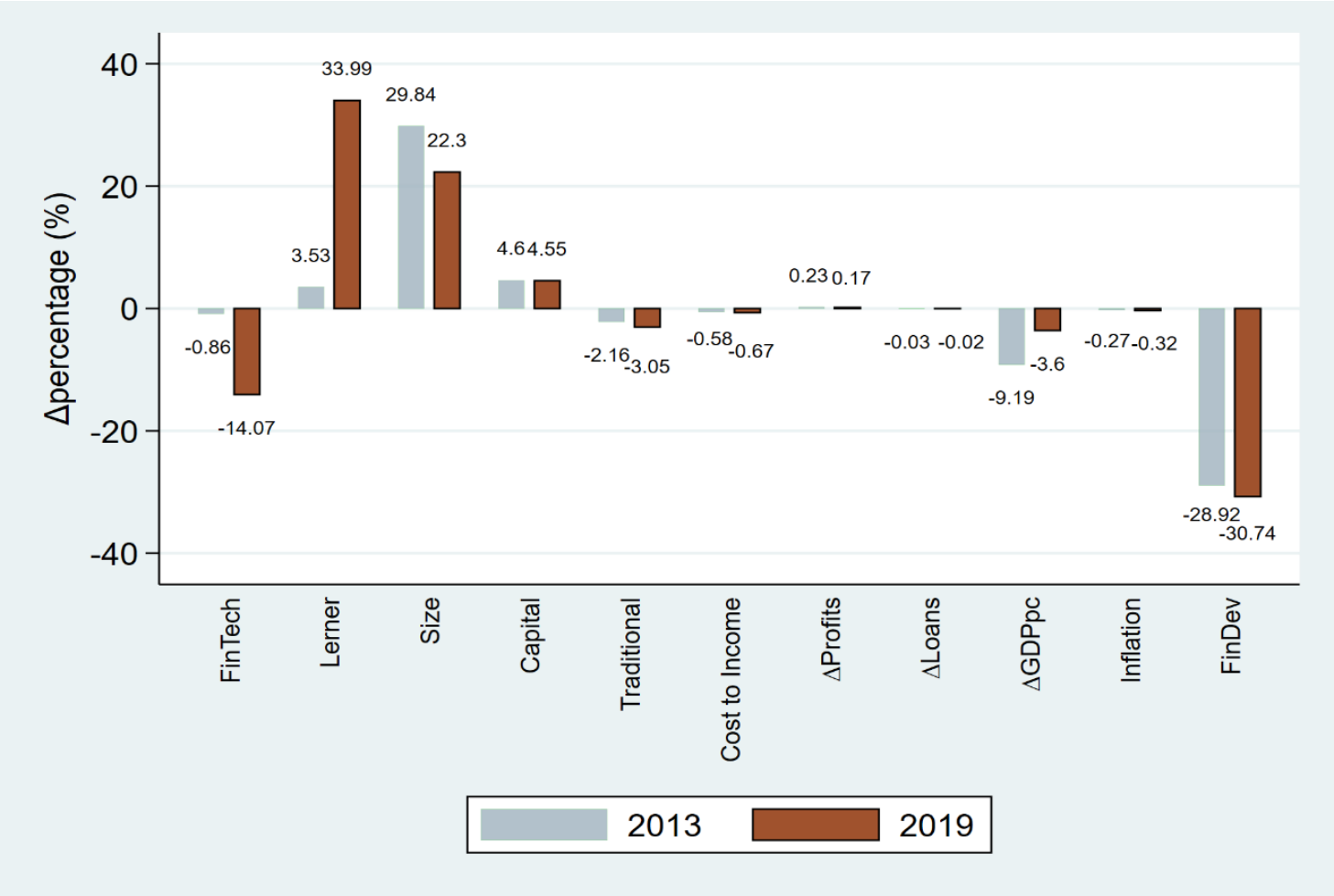
Additional Results

Economic impact of each determinant of LERNER (2013 vs 2019)



Additional Results

Economic impact of each determinant of Z-SCORE (2013 vs 2019)



Additional Results

ALTERNATIVE MARKET POWER AND BANK STABILITY MEASURES

PANEL A. ALTERNATIVE MARKET POWER AND BANK STABILITY MEASURES

	Alternative dependent variables					
Dependent variable:	Net interest margin (1)	Alternative Lerner (2)	Z-score [5yrs] (3)	Sharpe Ratio (4)	Sd (ROA) (5)	Impaired loans/Equity (6)
FINTECH	-0.0004**	-0.0015*	-0.0499***	-0.0443***	0.0003***	0.0453***
	(-2.42)	(-1.82)	(-5.26)	(-4.25)	(3.27)	(5.55)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Std. Errors	Bank-level	Bank-level	Bank-level	Bank-level	Bank-level	Bank-level
Observations	28,695	19,514	24,776	26,937	28,695	22,365
Number of banks	6,309	4,326	6,014	6,053	6,309	5,103
F-Test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00

Additional Results

ALTERNATIVE FINTECH VARIABLE, SUBSAMPLE ANALYSES AND COUNTRY FIXED EFFECTS

PANEL B. ALTERNATIVE FINTECH VARIABLE, SUBSAMPLE ANALYSES AND COUNTRY FIXED EFFECTS

	Alternative FinTech variable: FinTech investments		Excluding the U.S., China and United Kingdom		Subsample: Countries with a lower presence of banks	
Dependent variable:	Lerner	Zscore	Lerner	Zscore	Lerner	Zscore
	(1)	(2)	(3)	(4)	(5)	(6)
FINTECH	-0.0010*	-0.0166**	-0.0036***	-0.0399**	-0.0057***	-0.0388***
	(-1.66)	(-2.22)	(-4.11)	(-3.64)	(-4.51)	(-2.76)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Country	Country
Clustered Std. Errors	Bank-level	Bank-level	Bank-level	Bank-level	Bank-level	Bank-level
Observations	28,070	28,070	24,035	24,035	10,649	10,649
Number of banks	6,120	6,120	5,530	5,530	3,199	3,199
F-Test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00

Additional Results

COUNTRY FIXED EFFECTS AND BANKS' BUSINESS ORIENTATION

PANEL C. COUNTRY FIXED EFFECTS AND BANKS' BUSINESS ORIENTATION

	Alternative econometric modelling: Country FE		Banks' Business Orientation			
			Less traditionally oriented (more diversified sources of income)		More traditionally oriented (less diversified sources of income)	
Dependent variable:	Lerner	Z-score	Lerner	Z-score	Lerner	Z-score
	(6)	(7)	(8)	(9)	(10)	(11)
FINTECH	-0.0013*	-0.0247**	-0.0045**	-0.0331**	-0.0008*	-0.0283**
	(-1.65)	(-2.50)	(-2.28)	(-2.09)	(-1.79)	(-2.22)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Country	Country	Yes	Yes	Country	Country
Clustered Std. Errors	Bank-level	Bank-level	Bank-level	Bank-level	Bank-level	Bank-level
Observations	28,695	28,695	14,348	14,347	14,348	14,347
Number of banks	6,309	6,309	3,860	4,401	3,860	4,401
F-Test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00