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THE EFFECTS OF OPEN BANKING ON FINTECH FIRMS' DYNAMICS AND FUNDING STRUCTURE

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DGA FINANCIAL INNOVATION AND MARKET INFRASTRUCTURE

INTRODUCTION

In this paper

Do open banking initiatives affect the development of the FinTech sector?

- Identification strategy: **Implementation of Payment Services Directive PSD2 (2018)** on the Spanish FinTech ecosystem

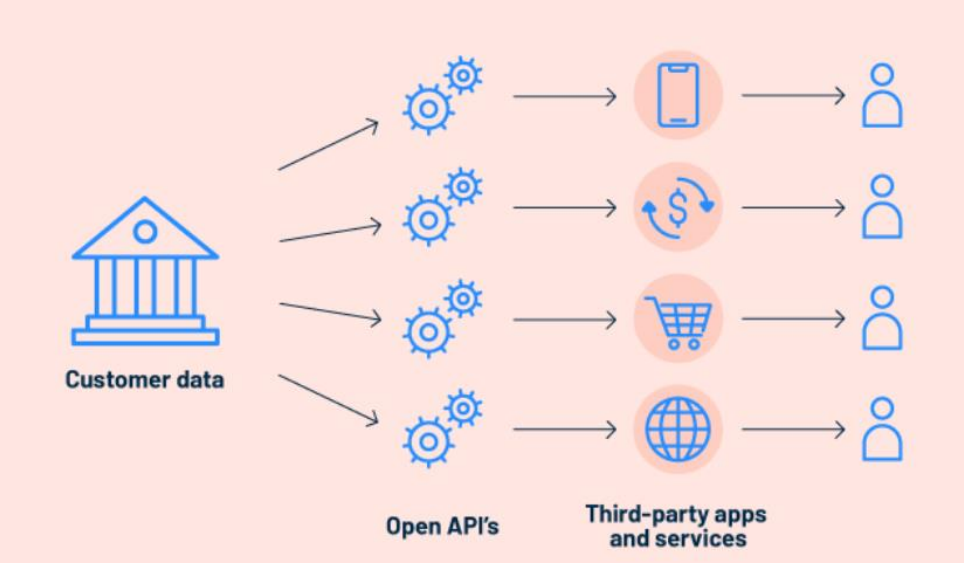
- Methodologically: difference-in-differences:
  - **Treated firms** (payment FinTechs)
  - **Control firms** (remaining Fintechs)

- Data: Fintech panel data:
  - Central Balance Sheet Data Office (Central de Balances) [BeLab] + Fintech Radar

- We quantify **PSD2 impact on**:
  - ➢ **Profitability and performance (ROA, ROE)**
  - ➢ **Access to funding (sources, maturity, and cost)**
  - ➢ Labor intensity, productivity, investments

} Today we focus on these

- Open banking describes a broad trend where, upon customer consent, financial intermediaries share - willingly or by regulatory fiat - access to their customers' data with other financial service providers.



- There are several potential reasons to promote the adoption of these policies:
  - ❖ **innovation** → e.g. development of new products and services
  - ❖ **competition** → e.g. non-traditional financial intermediaries could offer services
  - ❖ **financial inclusion** → e.g. allowing underbanked people to access to financial services

- Open banking has been one of the most important trends in the financial industry
  - In European Union: Revised **Payment Services Directive (PSD2), a set of laws and regulations for payment services**

- **Main changes and distinct factors of PSD2**
  1. **Strong customer authentication (SCA)**: mandatory two-factor authentication
  2. **Mandatory data sharing**: not market-led, but regulation-led
  3. **Payments focus**: explicitly targets payment accounts and services
  4. **New regulated roles (TPPs)**:
     - PISPs: initiate payments
     - AISPs: aggregate account info
     - CISPs: issue cards linked to third-party accounts

EMPIRICAL APPROACH

Data

BELab
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- **CBI:** prepared by the Central Balance Sheet Data Office that contains information on consolidated balance sheets of non-financial corporate groups in Spain. Available at BELab

- **Fintech Radar:** With the aim of understanding and monitoring financial innovation, since December 2019, the Financial Innovation Division has been building the**.**
  - Expert judgment using public (official records) and private information (consulting firms).
  - Updated every 6 months. 794 fintechs identified.

- We cross-checked both datasets, **2702 observations of 423 fintechs from 2014 to 2022**

- **Dealroom**: Market intelligence platform That provides data on startups, scaleups, venture capital

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Identification of treatment and control groups

Who is treated (by PSD2) and who is not?

Identified as Payment fintech by the FinTech Radar

- **Treated (49 firms)** Detail
  - **3 AISP** (Account Information Service Providers)
  - **6 PISP** (Payment Initiation Service Providers)
  - **3 EMIs** (Electronic money institutions)
  - **36 Other paytechs.** E.g.:
    - E-wallet
    - Payment gateways
    - App/Mobile payments

Paytech FinTech

- **Control (357 firms)** Detail
  - **Investment services**
  - **Other** (mainly technology and infrastructures)

Non-paytech FinTech

2. We restrict our analysis to non-financial players

- **Further research:** PSD2 impact in financial intermediaries (banks, and other credit institutions)

Methodology

- **Difference-in-difference (diff-in-diff):**

  - Intervention: 2018 dummy variable (PSD2 coming into effect)
  - Identification of groups:
    - **Treatment:** paytechs
    - **Control:** other fintechs, not involved in digital payments

$$y_{i,t} = \beta_0 + \beta_1 Post_PSD2_{i,t} \; x \; Payment\; FinTech_{i,t} + \beta_2 X_{i,t-1} + \delta_t + \varepsilon_i + u_{i,t}$$

DID term | **Year FE** | **Firm FE**

- All the **independen**t financial variables are **lagged by one period**
- All variables are **winsorized** to the minimum and maximum values at the 1st and 99th
- Sample years: 2014-2022

Performance

VARIABLES	(1) ROA	(2) ROE
Post-PSD2 x Payment FinTech	**0.230*** **	**-0.237**
	(0.078)	**(0.254)**
Controls	Yes	Yes
Firm FE	Yes	Yes
Time FE	Yes	Yes
Observations	1,766	1,766
R-squared	0.049	0.030
Number of firms	406	406

- FinTech payments (treated) **perform better** after the implementation of the PSD2 compared to the rest of the FinTech (control). (Revenue improvement channel)

- We **do not find an effect on the ROE**. Why?:
  - ❑ This could be explained by a higher increase in equity funding by FinTech payments (treated) compared to the rest of the FinTech (control).

Access to funding: Bank vs Non-bank debt

	Bank debt	Non Bank debt
	(1)	(2)
VARIABLES	Bank debt to total liabilities	Non bank debt to total liabilities
Post-PSD2 x Payment FinTech	**-0.110****	**0.058**
	(0.053)	**(0.045)**
Controls	Yes	Yes
Firm FE	Yes	Yes
Time FE	Yes	Yes
Observations	1,727	1,741
R-squared	0.047	0.024
Number of firms	402	406

- The effect on bank debt seems to be driven by FinTech payments (treated) **relying less on bank debt** after the implementation of the PSD2 compared to the rest of the FinTech (control) which is not compensated by an increase in non-bank debt.
- This suggests that treated firms could have substituted bank debt for equity funding

Alternative finance

Dependent variables	(1) Total funding obtained	(2) Total funding obtained	(3) Has received alternative funding?	Subsample: Alternative equity market funding=1 (4) Total funding obtained	(5) SD funding obtained	(6) Number of investors	(7) Has received for the 1st time alternative funding?	(8) Number of months since previous funding round
Post-PSD2 × Payment FinTech	-0.091	-0.084	-0.045	1.097**	-0.915***	3.345***	0.436**	-1.484***
	(0.067)	(0.061)	(0.043)	(0.534)	(0.143)	(0.839)	(0.176)	(0.500)
Post-PSD2 × Payment FinTech × 1st Round		0.933**						
		(0.361)						
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,929	1,929	1,929	137	137	137	137	137
R-squared	0.741	0.745	0.466	0.741	0.837	0.614	0.781	0.689
Number of firms	423	423	423	74	74	74	74	74

- **Entry effect:** First-time equity rounds are larger after PSD2 for payment fintechs (β = 0.933)
- **Intensive margin**: Conditional on getting funded, payment fintechs raise more per round (β = 1.097)
- **Stability:** Funding is less volatile (β = −0.915)
- **Depth & speed:** More investors per round (β = 3.345) and shorter time between rounds (β = −1.484)

Alternative finance

Dependent variables	(1) Growth Rate (Amount_Equity)	(2) Bank funding	(3) Long-term Bank funding
Amount Funding		-0.0005**	-0.0005
		(0.000)	(0.000)
Post-PSD2 × Payment FinTech	0.068**	-0.108**	-0.080**
	(0.033)	(0.052)	(0.038)
Post-PSD2 × Payment FinTech × Amount Funding		-0.004**	-0.004**
		(0.002)	(0.001)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	1,929	1,879	1,910
R-squared	0.182	0.613	0.578
Number of firms	423	420	423

- **Equity accelerates:** The growth rate of equity funding rises for treated payment fintechs (β = 0.068)
- **Bank debt falls:** Total bank debt ↓ (β = −0.108) and long-term bank debt ↓ (β = −0.080).
- **Evidence of a rebalancing from bank loans to equity among payment fintechs post-PSD2.**

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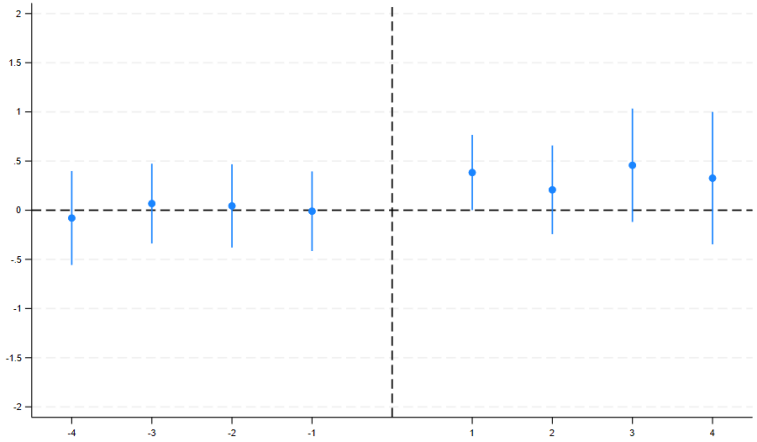
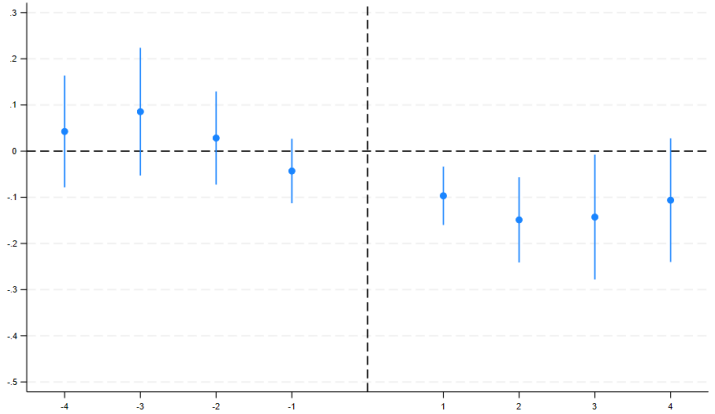
Parallel trends ii

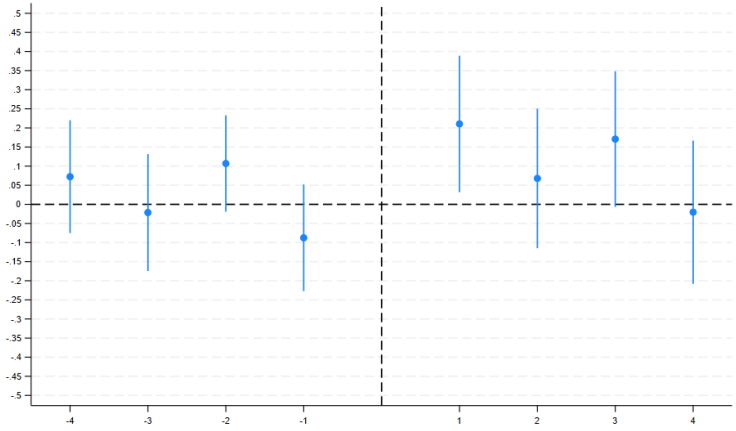
ROA



Bank Funding (% liabilities)



Growth alternative finance



Event study: Each dot shows the **difference in ROA/Funding** between treated and control fintechs for a given year, relative to the baseline year, 2018

ROBUSTNESS CHECKS

- Results on ROA, bank debt and long bank debt are robust to a series of exercises:

1. **Different subsamples:**
   - What is the effect of excluding certain firms or years?

2. **Anticipation effects (changing year of treatment)**
   - Could PSD2 had an effect before 2018?

3. **Treated as Random assignments**
   - Could are results be random?

4. **Treated firms only licensed (i.e.: EMI, AISP, PISP)**
   - What is the effect on firms with licenses, ie, firms directly affected by regulation?

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- Open banking policy had an impact on FinTech Firms' Dynamics and Funding Structure:

  - **Performance:**
    - **Profitability:** ↑ ROA (revenue-improvement channel)

  - **Funding structure:**
    - **Less bank dependent**: ↓ (long-term) bank debt
    - **More alternative (market-based) finance:** ↑ stable equity finance

  - **Investments, labor intensity, and productivity**
    - ↑ liquid assets
    - ↓ labor intensity
    - ↑ labor costs
    - ↑ productivity

Appendix

Timeline of PSD2 Implementation

- **2015**: PSD2 adopted by the European Parliament
- **January 13, 2018**: PSD2 enters into force across the EU
  - Key legal provisions (e.g., access to account data, role of TPPs) take effect
- **September 14, 2019**: Regulatory Technical Standards (RTS) on Strong Customer Authentication (SCA) become enforceable

Risks for Causal Identification

- Could firms have anticipated the regulation before 2018?
- Could effects come only after 2019, when SCA became binding?
- **Our Strategy:** We define 2018 as the treatment year:
  - Entry into force, legal certainty. Authorization of AISPs and PISPs begins

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Parallel trends i

ΔROA	Treated	Control	T-test
2014 (t-4)	0.012	0.004	-0.044
2015 (t-3)	0.347	0.118	-0.956
2016 (t-2)	-0.017	-0.020	-0.030
2017 (t-1)	-0.070	0.012	0.684
ΔBank debt (to Liab)	**Treated**	**Control**	**T-test**
2014 (t-4)	0.009	0.008	-0.008
2015 (t-3)	0.040	0.007	-0.556
2016 (t-2)	0.042	0.021	-0.503
2017 (t-1)	-0.018	0.035	1.196

- We examine the parallel trends assumption in the spirit of **Lemmon and Roberts (2010):**
  - T-tests for differences in means for changes in performance and bank funding between treatment and control groups over four years before PSD2.
  - All t-tests remain insignificant. Then, the parallel trends assumption holds.

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Treated vs control

Year	Control FinTechs	Treated FinTechs	% Treated
2014	130	15	10.34%
2015	152	20	11.63%
2016	163	24	12.83%
2017	181	27	12.98%
2018	191	26	11.98%
2019	222	28	11.20%
2020	238	29	10.86%
2021	209	22	9.52%
2022	83	6	6.74%

Variable	Treated	Control
ROA	-0.29	-0.14
Bank debt	0.14	0.17
Employees	2.7	3.5
Age	6.8	7.1

- The main findings of the paper are qualitatively similar if the sample period is restricted to 2014 – 2021.

- **Open banking literature:** Babina et al. (2021); Bijlsma et al. (2022); Dratva, (2020); He et al. (2023); Parlour et al. (2019); Polasik et al. (2020).
  - This paper would contribute to this literature by showing how **an open banking framework (as a policy intervention)** could effectively **foster competition** and could have **effects beyond the financial sector.**

- **Fintech literature:** Carbó-Valverde et al. (2021); Cornelli et al. (2023); Ehrentraud et al. (2022); Feyen et al. (2021); Frost et al. (2019).
  - This paper would contribute to this literature by showing how the **development and growth of the FinTech sector** is impacted by **policy (regulatory) interventions**

OPEN BANKING AND FINTECH

2. Internal Fintech Radar of Financial Innovation Division sources

Source of infomation	Date of last consultation	Information gathered from this source of information
EBA Payment Institutions Register	feb-24	Activities, registration numbers, date of registration
BdE´s Oficial Registry of Entities	sep-23	Activities, registration numbers, date of registration
Crypto assets and electronic wallet service providers and Real Statate Lending intermediarries BdE´s Registrys	sep-23	Activities, registration numbers, date of registration
CNMV´s Oficial registry of entities	sep-23	Activities, registration numbers, date of registration
List of crowdfunding providers registerd in CNMV	nov-23	Activities, registration numbers, date of registration
News in digital media (i.e.: El Referente, gen beta, El Economista)	we it´s needed	Detailed activity, related firms, headquarters,verification that the company is active (sometimes the webpage is not working or the domian is for sale), technologies that are being used, geographies, funding rounds
FinTech webpage	we it´s needed	Detailed activity, related firms, headquarters,verification that the company is active (sometimes the webpage is not working or the domian is for sale), technologies that are being used, geographies…
Finnovating platform	sep-23	headquarters, technologies that are being used, geographies, funding rounds
Informa / Axesor	we it´s needed	TIN, date of stablishment, NACE code, relevant relevant facts such as the company going into liquidation"
Fintech mapping of the EU Digital Finance Platform	dic-23	Fintech brand names
FinTech Map of the Spanish FinTech and InsurTech Association (AEFI)	jun-23	Fintech brand names grouped in 13 "verticales"
BdE Statistics Department´s Fintech Observatory	sep-23	Fintech brand names

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ROBUSTNESS CHECKS

1. Subsample analysis (ROA)

1. Different subsamples:

	ROA original	Subsample= Data accuracy	Subsample period = 2012 - 2022	Excluding pandemic	Subsample = Microfirm	Subsample = Excluding clusters
Coefficient (Std dev)	**0.230*** (0.078)**	**0.272*** (0.076)**	**0.173* (0.096)**	**0.237*** (0.088)**		**0.209* (0.113)**
Observation	1,766	1,162	2,033	1,533		482
% treated	12.06%	12.13%	12.54%	12.52%		12.24%
R-squared	0.049	0.045	0.034	0.039		0.077

2. Anticipation effects

- Post-PSD2 = 1 if t>= 2016
- **Sample period:** 2012 - 2019

	ROA original	ROA anticipated	Bank debt	Bank debt anticipated
Coefficient (Std dev)	**0.230*** (0.078)**	**-0.032 (0.096)**	**-0.110** (0.053)**	**-0.081 (0.051)**
Observation	1,766	1,429	1,727	1,392
R-squared	0.049	0.045	0.048	0.039

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3. Random assignments

- Treated = random

	ROA original	ROA random	Bank debt	Bank debt random
Coefficient (Std dev)	**0.230*** (0.078)**	**0.061 (0.086)**	**-0.110** (0.053)**	**0.014 (0.036)**
Observation	1,766	1,811	1,727	1,770
R-squared	0.049	0.051	0.048	0.043

4. Directly treated

- Treated = EMI, AISP or PISP
- Control = The rest

	ROA original	ROA random	Bank debt	Bank debt random
Coefficient (Std dev)	**0.230*** (0.078)**	**0.331*** (0.)**	**-0.110** (0.053)**	**-0.047* (0.028)**
Observation	1,766	1,638	1,727	1,628
R-squared	0.049	0.053	0.048	0.063

Potential mechanisms

	△Revenues	▽Costs	Investors' and Consumers' attention	Internal Growth (Retained Earnings)
Dependent variables	(1) Growth of output value (sales + change in stock)	(2) Growth of operating costs (inputs + personnel expenses)	(3) Google Trends	(4) Growth of Retained earnings
Post-PSD2 × Payment FinTech	2.275*	-4.161	4.252*	-10.627
	(1.203)	(4.187)	(2.522)	(6.685)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	1,758	1,915	1,929	1,920
R-squared	0.333	0.330	0.743	0.295
Number of firms	392	422	423	421

- **Revenue-driven channel dominates**. Not cost-cutting–led
- **Attention channel matters**: Google Trends (proxy for investor/consumer attention) increases significantly post-PSD2, visibility-driven demand & funding.
- **No internal-funding mechanism**: Retained earnings growth shows no significant change, rebalancing is driven by external attention/investors, not self-finance.