What factors drive the formation of economic activity in the FinTech sector?

2019/2020 LSE Capstone Team
Supervisor: Dr. Berkay Ozcan

In partnership with EIF RMA: Dr. Antonia Botsari and Dr. Wouter Torfs

Agenda

1. Phase 1 : Database Quality Check
   - How we define FinTech
   - Methodology of Quality Check
   - Database Trends

2. Phase 2: The drivers of FinTech
   - Conceptual Framework and hypothesis
   - Regression model
   - Results and quality checks
   - Discussion

3. Policy Recommendations
   - Further Research

Key Takeaways

Key FinTech trends: post-2008 rise in FinTech formation and geographic concentration

The emergence of FinTech is driven by:

- **Local operating environment**, namely developed financial capital markets and technological infrastructure

- **Broader environmental factors**, composed of institutional and regulatory landscape, such as business-friendly policies, and a stable macroeconomic conditions.

1

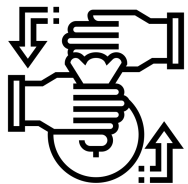# Phase 1: Database Quality Check

How we define FinTech

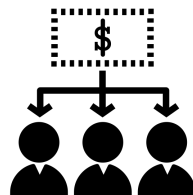A private company transforming the financial services industry

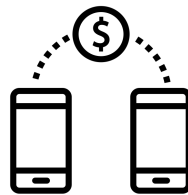Innovative business model that uses technological solutions

| Lending | Crowdfunding | Payments | Digital Banking | InsurTech | RegTech |

Methodology of Quality Check

Clean Datbase

Removing Non-FinTech using a new threshold (0.9)

Adding FinTech using keyword search

Reduced original ML database from 1,789 to 1,315 (26% drop)

Using J/K NACE Codes on Orbis, 5% of 2.491 matched

Source: Self made from Orbis Database (2018)

Database Trends

1. Geographic Concentration of FinTech

Core vs. Non-Core Countries

2. FinTech rise post Financial Crisis

Average of 86.5
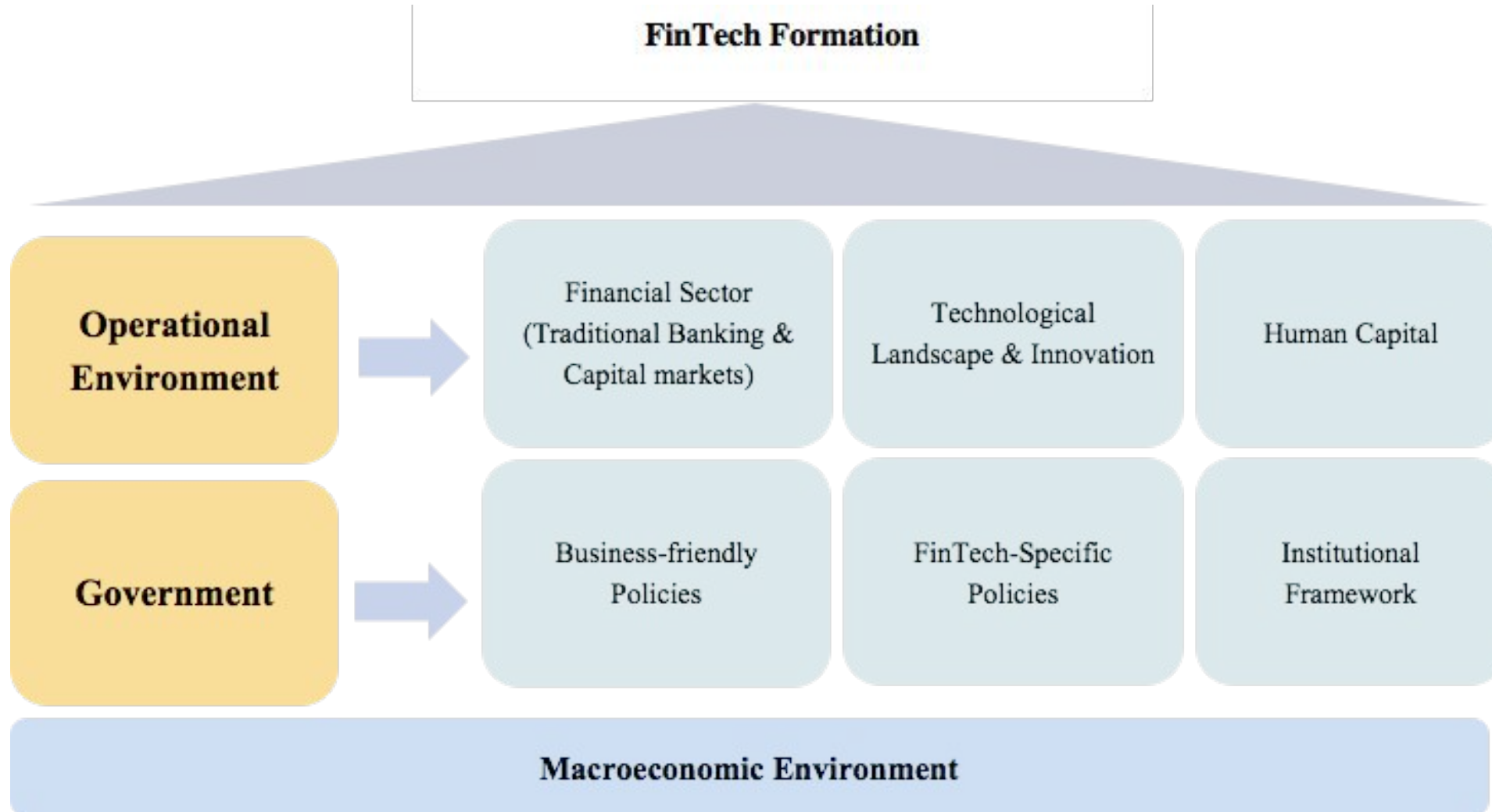Fintech formed from 2009-2017
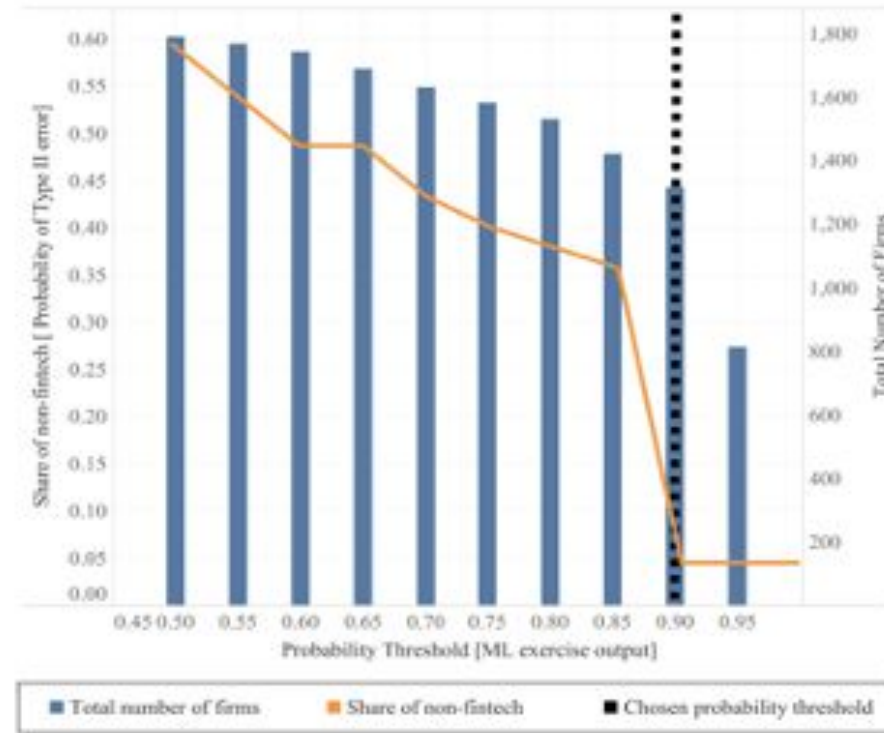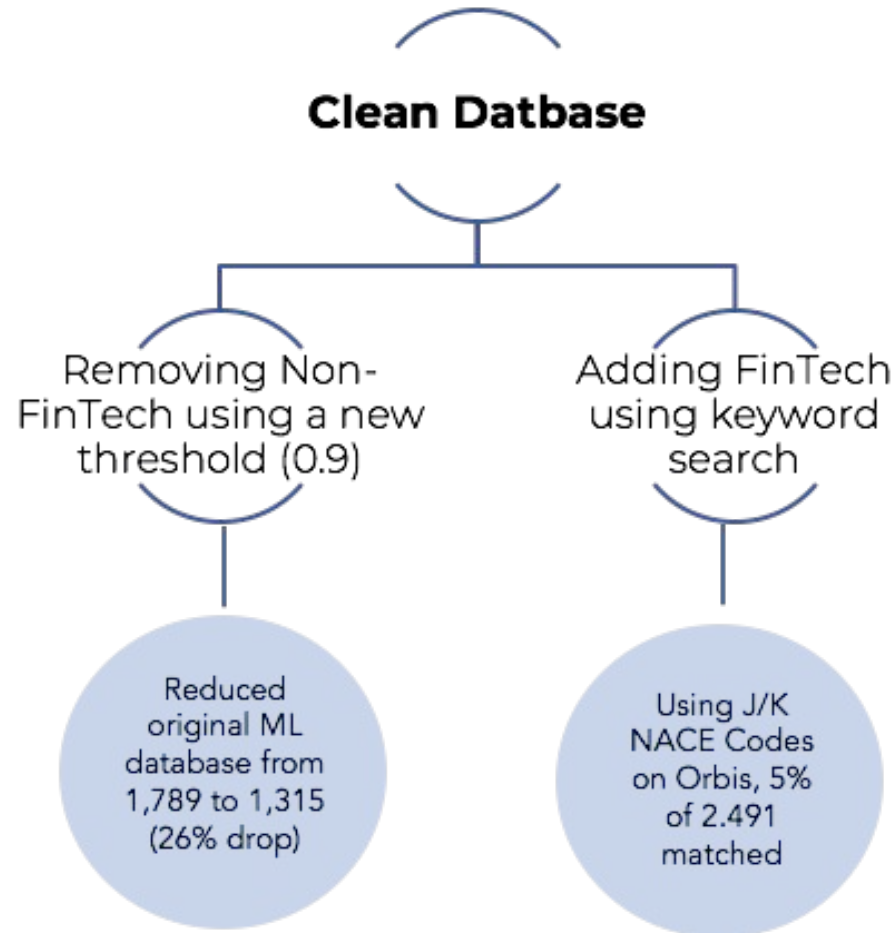
Source: Orbis Database (2018)

2

Phase 2: The drivers of FinTech

Conceptual Framework

Hypotheses

Hypothesis 1

FinTech formation is negatively associated with a strong traditional banking sector

Hypothesis 2

A well-developed capital market industry with alternative sources of financing is positively associated with FinTech formation

Hypothesis 3

The presence of innovation and a well-developed technological infrastructure is positively associated with FinTech formation

Hypothesis 4

A skilled and competent labour force is positively associated with FinTech emergence
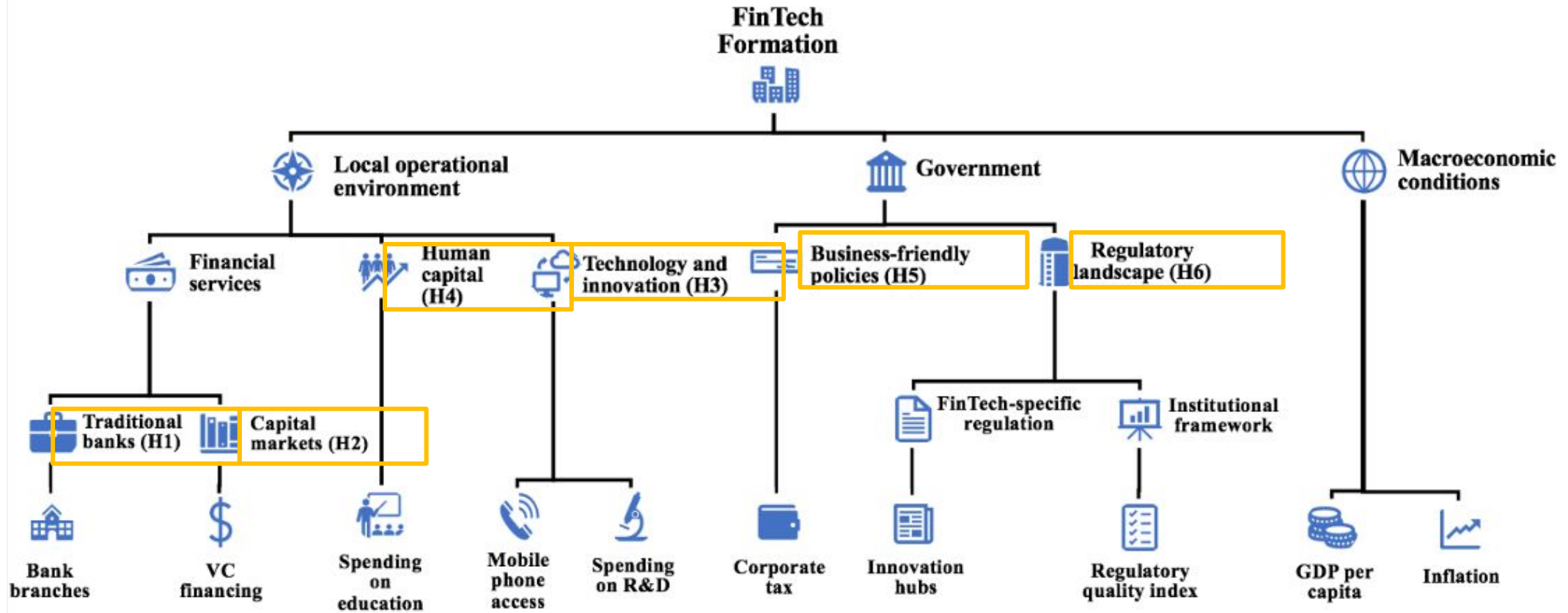
Hypothesis 5

Business-friendly policies that promote entrepreneurial activities are positively associated with FinTech formation

Hypothesis 6

FinTech formation is positively associated with the presence of a flexible and transparent regulatory environment and institutions that enhance innovation

11

Hypothesis Framework

Construction of Variables

Main Dependent Variable

Our main dependent **FinTech_Formation** counts the number of FinTech firms that were created in each EU member state for a given year from 2000-2017 (inclusive 18 years). We use a cross-sectional panel data of 504 observations

We use a total of 1,106 FinTechs from the 1,315 identified in Phase 1 for two main reasons:

1. We do not include firms which Orbis does not record year of Formation

2. We do not include firms formed prior to 2000 and after 2017

Regression Model

- Given that our dependent variable is non-negative count data we chose our poisson specification for our regression that takes the following form:

$$\text{FinTech\_Formation}_{it} = \beta_0 + \beta_1(\text{log\_bank\_branches})_{it} + \beta_2(\text{log\_VC\_total})_{it} + \beta_3(\text{log\_mobile\_subscriptions})_{it}$$
$$+ \beta_4(\text{L1\_R\&D\_spending})_{it-1} + \beta_5(\text{L3\_education\_spending})_{it-3} + \beta_6(\text{Corporate\_tax})_{it}$$
$$+ \beta_7(\text{Regulatory\_quality\_index})_{it} + \beta_8(\text{Innovation\_hub})_{it} + \beta_9(\text{Interaction\_term})_{it}$$
$$+ \beta_{10}(\text{Inflation})_{it} + \beta_{11}(\text{log\_GDP\_capita})_{it} + \delta_t + \gamma_i + \varepsilon_{it}$$

Single-Variable Regressions

- We carried single variable regressions to observe the underlying relationship between FinTech formation and each explanatory variable independently.

  All of the single-variable regressions followed the following form:

$$Y_{it} = b_0 + b_1 (\text{VarX})_{it} + b_2 (\text{Inflation})_{it} + b_3 (\text{log\_GDP\_capita})_{it} + d_t + g_i + e_{it}$$

Single-variable overview

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
log_bank_branches	-0.339** (0.158)								
log_VC_total		0.169** (0.0688)							
Log_mobile_subscribers			-0.918** (0.426)						
L1_R&D_spending				0.471** (0.187)					
L3_education_spending					-0.0876 (0.106)				
corporate_tax						-0.0214 (0.0176)			
Regulatory_quality_index							0.0244 (0.0177)		
Innovation_hub								1.261*** (0.360)	
Interaction_term									0.157*** (0.0384)
Inflation	-0.0966* (0.0581)	-0.118** (0.0468)	-0.114** (0.0463)	-0.154*** (0.0504)	-0.0445 (0.0545)	-0.118** (0.0470)	-0.0867* (0.0488)	-0.120** (0.0469)	-0.141*** (0.0474)
log_GDP_Capita	0.453 (0.668)	0.937* (0.569)	1.650*** (0.590)	0.612 (0.609)	-0.273 (0.647)	1.247** (0.571)	0.459 (0.614)	1.483** (0.579)	1.538*** (0.581)
Observations	372	468	440	468	375	468	442	468	468
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

15

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Main Regression Model Results

FinTech	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
log_bank_branches	-0.747	0.193	-3.87	0.000	-1.125	-0.368	***
log_VC_Total	0.134	0.075	1.79	0.074	-0.013	0.281	*
log_mobile_subscribers	-0.554	0.697	-0.79	0.427	-1.921	0.813	
L1_R&D_spending	0.847	0.270	3.14	0.002	0.318	1.375	***
L3_education_spending	-0.158	0.115	-1.38	0.169	-0.382	0.067	
Corporate_tax	-0.012	0.022	-0.54	0.592	-0.056	0.032	
Regulatory_quality_index	0.019	0.022	0.86	0.388	-0.024	0.061	
Innovation_hub	-0.669	0.681	-0.98	0.326	-2.004	0.667	
Interaction_term	0.250	0.081	3.10	0.002	0.092	0.408	***
Inflation	-0.116	0.059	-1.98	0.048	-0.231	-0.001	**
log_GDP_capita	0.961	0.831	1.16	0.248	-0.668	2.591	

Mean dependent var	2.646	SD dependent var	6.417
Number of obs	370	Chi-square	288.598
Prob > chi2	0.000	Akaike crit. (AIC)	823.185

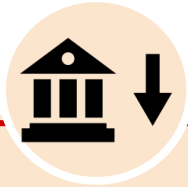*** p<0.01, ** p<0.05, * p<0.1

Results

Legend:
- 🟥 Negative and significant association
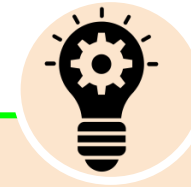- 🟩 Positive and significant association

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Quality Checks

Specification Checks:

- We re-run the same regression as the one specified in our main model but removing a single independent variable from the right-hand-side at a time.

Results:

- The sign, effect and level of statistical significance of our main variables do not change. In particular the Interaction term, R&D as a share of GDP remain positive and significant in 8 out of 9 tests.

- The number of bank branches remains negative and statistically significant at the 5% level in all the 9 tests.
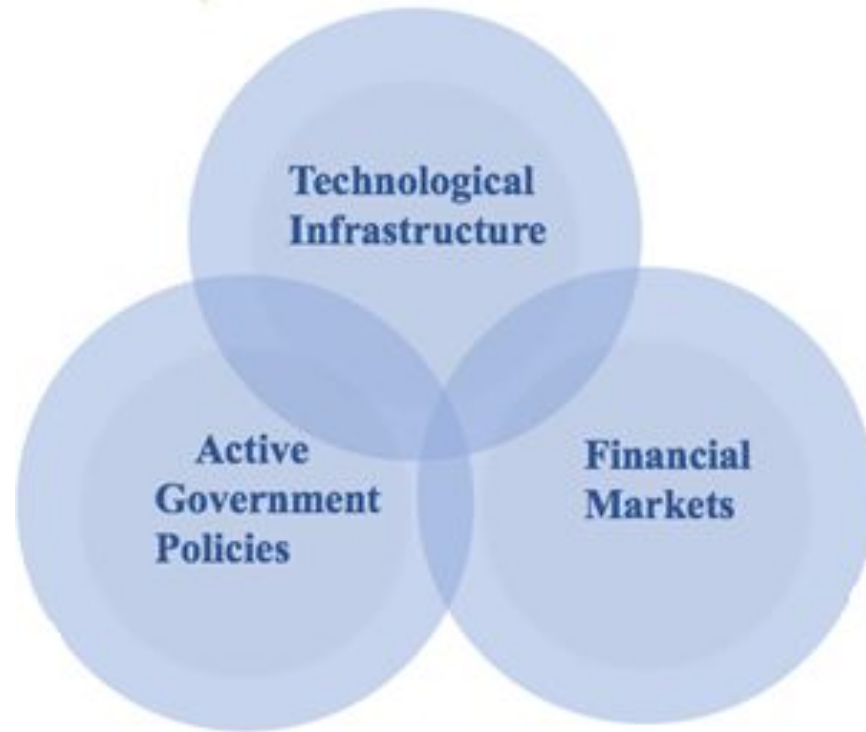
Robustness Checks:

- We re-run the regression without Germany, as it is an outlier country with the largest number of FinTech firms (364). By removing the main outlier, we check whether the results of our main model were driven by it.
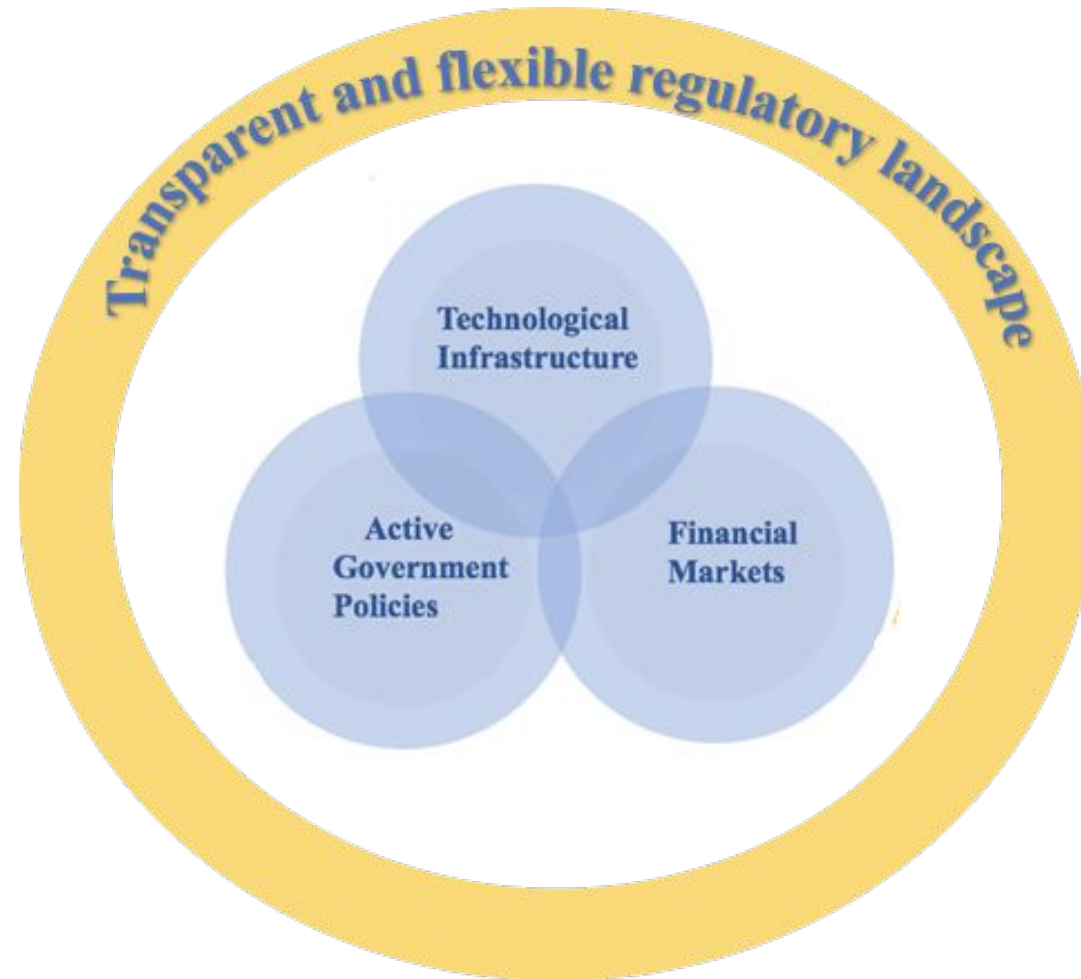
Results:

- All explanatory variables of interest maintain direction, magnitude of association and statistical significance.
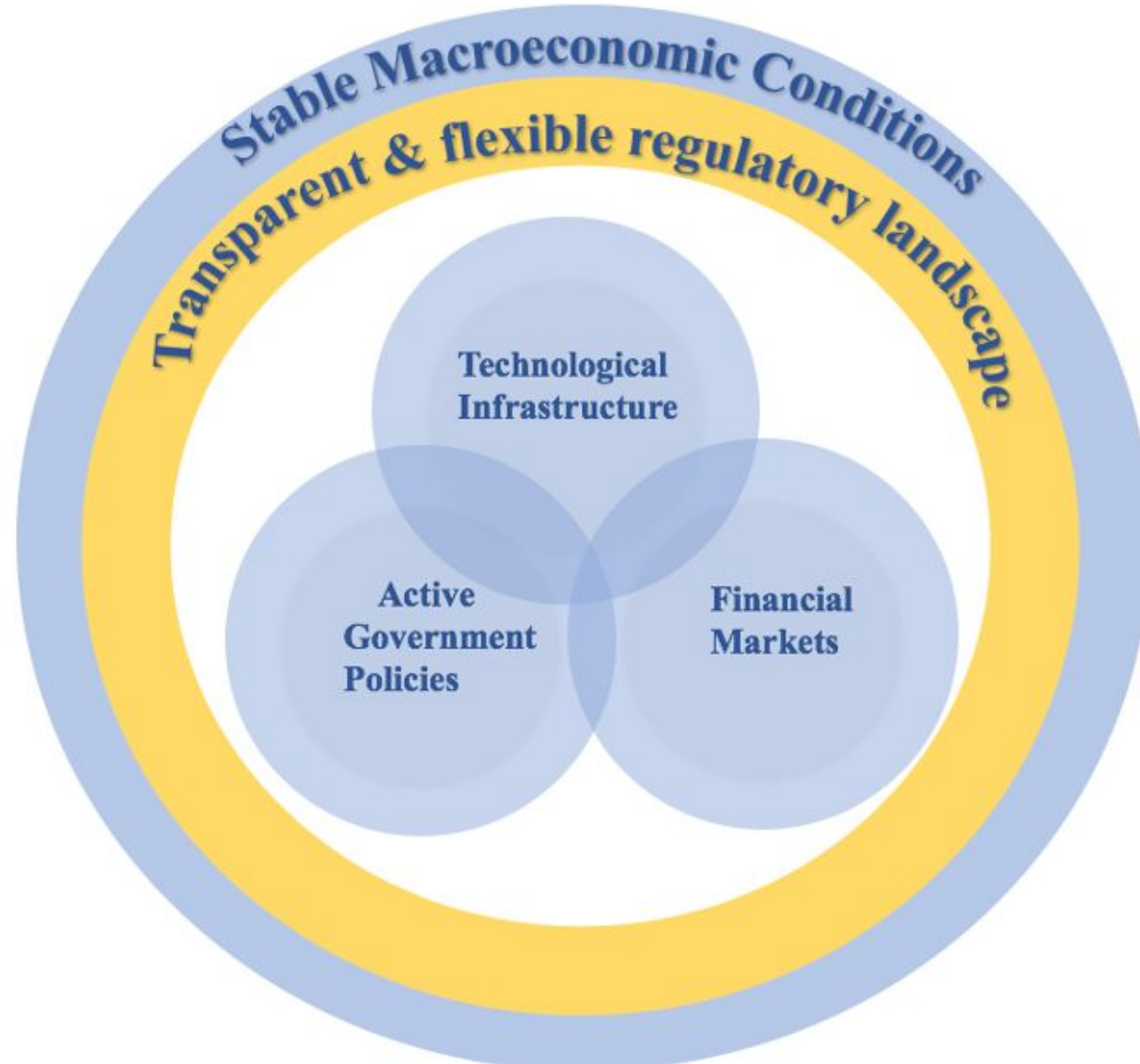
Discussion

Discussion

Discussion

3 Policy Recommendations

Policy Recommendations

1. Expand available Finance and Strengthen Financial Market Conditions

   a. Increase available financing for FinTech
   b. Promote stable Macroeconomic conditions

2. Enhance the Institutional Landscape through Innovative Regulation

3. Develop innovative capacity of the local environment

   a. Increase R&D Investment through Fiscal Incentives
   b. Promote public Incentives for Investment in R&D

Further Research

- **Identifying causal inference:** to inform policy recommendations and estimate their specific impact, it is important to identify the expected direct causal effect of such policies

- **Considering factors beyond FinTech formation:** we have focused on the determinants of FinTech formation (number of new firms), but it is important to consider other aspects such as size, longevity and the overall economic impact of FinTech firms

- **Sub-sectoral analysis of FinTech firms:** we have treated all FinTech firms as the same, without differentiating between categories

- **Level of analysis:** we focused on country-level analysis, but sub- and supra-national analysis can inform policies at different levels

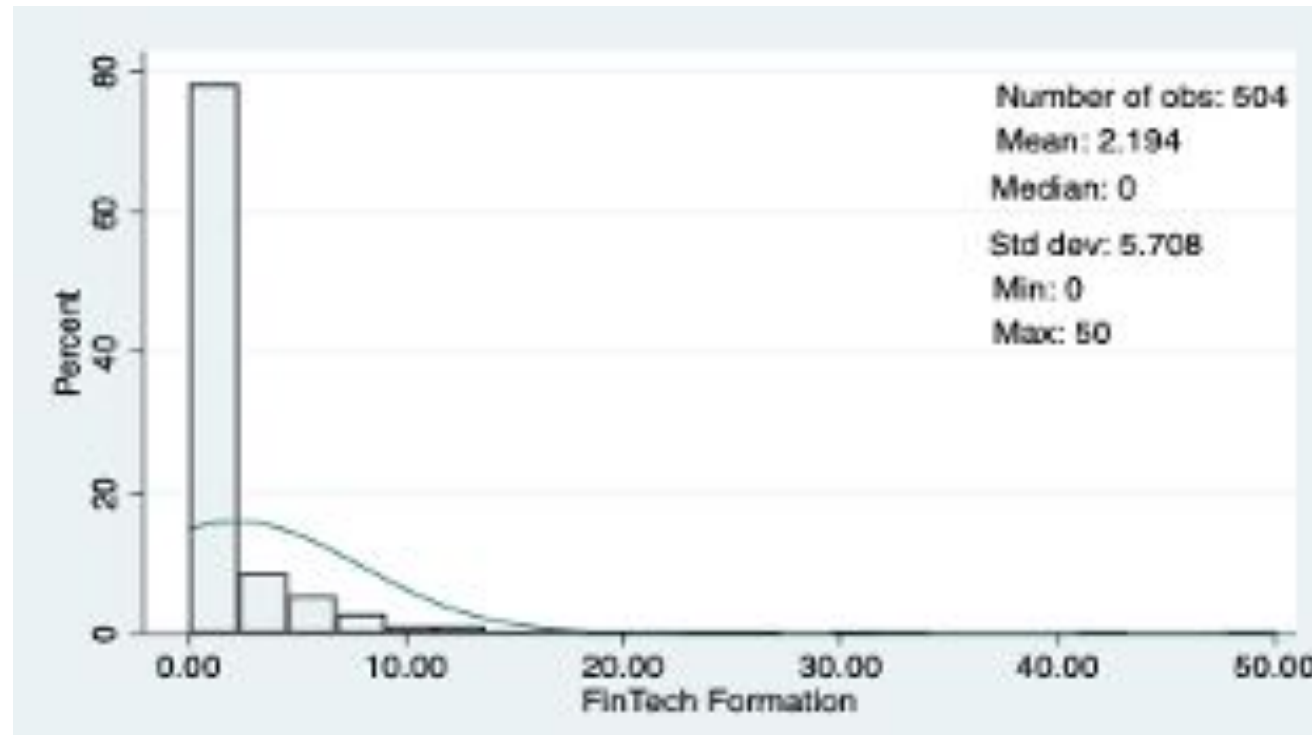# Thank you for your attention

Any Questions?

Appendix

Variable	Source	Description	Measurement
Bank branches	IMF - Financial Access Survey	Strength of the banking sector in a given country by capturing the physical presence of banks.	(Number of institutions + number of bank branches) × 100,000 / adult population in the reporting country
Total Venture Capital Investment	PitchBook	The variable examines innovation hub's role in pioneering Fintech innovation and capture their varying effects across the EU.	The amount of venture capital (VC) investment from 2000 - 2017 in each country.
R&D Expenditure as a share of GDP	Eurostat	Investment into Research and Development (R&D) from private and public sector.	The share of expenditures on R&D as a share of GDP in each country from the 2000-2017.
Public spending on education as a share of GDP	UNESCO	The variable aims to capture the impact of investing and improving education as crucial to foster economic development and building technological capabilities.	The total government expenditures on education as a share of GDP for each country from the period 2000-2017.

Appendix

Variable	Source	Description	Measurement
Mobile phone subscriptions	The International Telecommunication Union	As a proxy of presence and strength of technological infrastructure.	The total number of mobile subscribers per a million people in each country from 2000-2017.
Corporate tax rate	KPMG	As a proxy of the transactions costs that a company face in each country.	The highest statutory tax rate at central government level for each country from the period 2006 - 2017.
Regulatory Quality Index	World Bank's Regulatory Quality Index	This variable examines the importance of the regulatory and policy landscape to build a favourable entrepreneurial environment	Index composed by the following factors: transparency of regulation, business regulatory environment and labour regulations, the degree of protectionism and the degree of competition it fosters.
Innovation Hubs	European Supervisory Markets Authority (ESMA)	The variable examines innovation hub's role in pioneering Fintech innovation	Is a dummy variable equal to 1 if there is presence of innovation hubs or 0 otherwise.

Distribution of FinTech Formation (Y)

Source: Self made from Orbis Database (2018)