

DRIVERS OF FUNDRAISING IN EUROPEAN FINTECH: THE ROLE OF THE BUSINESS ENVIRONMENT, EDUCATION, INVESTMENT, KNOWLEDGE WORKERS AND INNOVATION

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Abstract:

The research was conducted in 35 European countries. The sample selected for the study includes all fundraising in the fintech sector for each of the countries. Annual data from the period between 2013 and 2022 was used. The dependent variable is the total deal size and the independent variables are the sub-indices of the Global Innovation Index (business environment, education, investment, knowledge workers, knowledge impact). The research method used was the panel data model with fixed effects. The results show that the coefficients for knowledge workers, knowledge impact, business environment and education all have a significant negative impact on total deals size in the fintech sector. The limitations of the study is the use of the annual data from the period between 2013 and 2022, and its exclusive focus on Europe.

Keywords: fintech, fundraising, venture capital, business environment, education

INTRODUCTION

The main aim of this study is to examine the factors that influence the total amount of money raised by fintech companies in European countries. Specifically, this analysis focuses on the period from 2013 to 2022 and is undertaken to understand the relationship between different sub-indices of the Global Innovation Index and the ability of fintech startups to raise money. The research problem of the paper is to identify which aspects of innovation and market sophistication significantly affect the increase in fundraising of fintech companies in different European countries.

The literature on financial technology (fintech) has expanded rapidly in recent years (Milian et al., 2019; Niewinska, 2023), mostly highlighting the sector's transformative impact on traditional financial services (Cornelli et al., 2021; Gomber et al., 2017; Harasim, 2021; Moccia et al., 2018; Natarajan, 2020). Research has emphasized the role of innovation in driving fintech growth, particularly in terms of knowledge workers and technological output (Haddad & Hornuf, 2019). In their previous research, Haddad & Hornuf (2016) explored the key factors for the successful emergence and funding of fintech start-ups; it is centered on well-developed economies and readily available venture capital. This study extends the perspective by examining whether the levels of business environment, education, investment, knowledge workers, and knowledge impact influence the total size of deals for the fintech sector in different countries. The analysis aims to provide a better understanding of how these factors affect the fundraising landscape in the European fintech sector.

The methodology employed is a fixed effects regression model applied to a panel dataset containing annual data from 2013 to 2022 for different European countries. The dependent variable is the total deal size, measured in millions of dollars, which represents the total amount of money raised by fintech companies in a given country and year. The independent variables are derived from the Global Innovation Index and include sub-indices related to the business environment, education, investment, knowledge workers, and knowledge impact.

The results of the fixed effects panel data models reveal significant relationships between the size of fintech financing and several independent variables. In particular, knowledge workers and the impact of knowledge were found to have a significant negative effect on the total size of deals. Conversely, the quality of the

business environment and the level of education spending had a weaker, yet still notable, effect on total fundraising. These results contribute to a better understanding of the relationship between innovation rates and the volume of fintech start-up funding.

METHODOLOGY

The main aim of this study is to identify factors that influence the total size of deals by fintech companies in European countries.

Research Framework:

1. Literature review: A thorough review of existing fintech studies, focusing on financing models, market dynamics, and the impact of the following levels: business environment, education, investment, knowledge workers, and knowledge impact.
2. Defining research gap: Identifying specific gaps in the current literature, particularly the impact of different factors on financial outcomes in the fintech sector.
3. Formulating research questions: Clear expression of research questions based on the identified gaps.
4. Data collection: Describing the process for obtaining data from reliable sources: Pitchbook and World Bank Global Innovation Index.
5. Descriptive statistics and variable correlation analysis: Performance of preliminary analyses to explore relationships between variables.
6. Research model finalization: Determining the statistical model to be used and the creation of the final equation of the panel model.
7. Model selection (FE vs. RE): Justifying the choice between fixed effects and random effects models based on the results of Hausman's test.
8. Interpretation of results: Discussing how the results are consistent with or challenge existing theory and literature.

The following research theses are formulated in the paper:

1. Does the size of fintech finance deals depend on the quality of a country's business environment?
2. Does the level of education in a country affect the size of fintech deals?
3. Does the protection of minority investors and market dynamics in venture capital deals in a country affect on the total size of deals in the fintech sector?
4. Does the size of fintech financing deals depend on knowledge workers in the country?
5. Does the size of fintech financing deals depend on knowledge impact in the country?

Database and research method:

The research encompassed 35 European countries. The database includes yearly data from 2013 to 2022, sourced from PitchBook (for the dependent variable: total deal size) and the World Bank's Global Innovation Index (for independent variables: business environment, education, investment, knowledge workers, and knowledge impact).

Dependent variable:

- Total deal size (in \$M): Represents the total amount of money raised by fintech companies in a given country and year, sourced from PitchBook.com.

Independent variables: Sub-indices from the Global Innovation Index (GII) published by the World Bank, categorized as follows:

- **INSTITUTIONS - Business environment:** Measures the ease of starting a business and resolving insolvency, which has a direct impact on entrepreneurial ventures.

- HUMAN CAPITAL AND RESEARCH - **Education**: Assesses education spending, school life expectancy, government funding per secondary student and PISA results, which reflect the quality and coverage of education.
- MARKET SOPHISTICATION - **Investment**: Includes ease of protection for minority investors and transaction levels, indicating market dynamics and venture capital activity.
- BUSINESS SOPHISTICATION - **Knowledge workers**: Includes employment in knowledge-intensive services, availability of formal education, R&D expenditure as a percentage of GDP, and the percentage of employed women with advanced degrees, highlighting the presence of skilled labor.
- KNOWLEDGE AND TECHNOLOGY OUTPUTS - **Knowledge impact**: Includes labor productivity growth, new business entry density, computer software expenditure, ISO 9001 certification and high technology industrial output, representing the macro and micro economic impact of innovation.

Table 1. Main Descriptive Statistics

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---------------------|-----|----------|-----------|------|----------|
| Country | 350 | 1018 | 10,11396 | 1001 | 1035 |
| year | 350 | 2017,5 | 2,876393 | 2013 | 2022 |
| deals | 350 | 451,5257 | 903,3023 | 1 | 6391 |
| totaldealsize | 350 | 1444,019 | 4139,91 | 0,03 | 42125,19 |
| avgdealsize | 350 | 3,51340 | 8,742137 | 0,02 | 149,08 |
| mediandealsize | 350 | 0,44334 | 0,4367961 | 0,01 | 2,8 |
| Knowledgeworkers | 350 | 54,56629 | 12,35986 | 25,8 | 81,8 |
| Knowledgeimpact | 350 | 44,03486 | 8,85835 | 15,6 | 75,3 |
| Businessenvironment | 350 | 76,34571 | 13,08815 | 17,9 | 93,1 |
| Education | 350 | 58,26743 | 8,186663 | 35,3 | 86,3 |
| Investment | 350 | 39,55686 | 16,53738 | 1,4 | 96,2 |

Reference: Own calculations.

Table 2. Pearson's correlation coefficients and statistical significance

| | <i>ln_deals</i> | <i>ln_tot~s</i> | <i>ln_avg~e</i> | <i>ln_med~e</i> | <i>ln_kno~s</i> | <i>ln_kno~t</i> | <i>ln_bus~t</i> | <i>ln_edu~n</i> | <i>ln_inv~t</i> |
|---------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| <i>ln_deals</i> | 1.0000 | | | | | | | | |
| <i>ln_totalde~s</i> | 0.9013* | 1.0000 | | | | | | | |
| | 0.0000 | | | | | | | | |
| <i>ln_avgdeal~e</i> | 0.4748* | 0.8010* | 1.0000 | | | | | | |
| | 0.0000 | 0.0000 | | | | | | | |
| <i>ln_mediand~e</i> | 0.4064* | 0.6326* | 0.7555* | 1.0000 | | | | | |
| | 0.0000 | 0.0000 | 0.0000 | | | | | | |
| <i>ln_knowled~s</i> | 0.5719* | 0.6005* | 0.4392* | 0.3753* | 1.0000 | | | | |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | | | |

| | | | | | | | | | |
|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| <i>ln_knowled~t</i> | 0.2178* | 0.1171* | -0.0478 | 0.0103 | 0.1619* | 1.0000 | | | |
| | 0.0000 | 0.0285 | 0.3726 | 0.8476 | 0.0024 | | | | |
| <i>ln_busines~t</i> | 0.2535* | 0.1776* | 0.0158 | 0.0444 | 0.3631* | 0.1616* | 1.0000 | | |
| | 0.0000 | 0.0008 | 0.7676 | 0.4077 | 0.0000 | 0.0024 | | | |
| <i>ln_education</i> | 0.1963* | 0.2674* | 0.2773* | 0.2994* | 0.4926* | -0.1046 | 0.1626* | 1.0000 | |
| | 0.0002 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0505 | 0.0023 | | |
| <i>ln_investm~t</i> | 0.2710* | 0.2350* | 0.0819 | 0.1356* | 0.4388* | 0.1227* | 0.6813* | 0.1523* | 1.0000 |
| | 0.0000 | 0.0000 | 0.1262 | 0.0111 | 0.0000 | 0.0217 | 0.0000 | 0.0043 | |

Reference: Own calculations.

The dependent and independent variables were logarithmized, and the final model structure was developed based on the conducted Pearson correlation analysis. The research method applied was the panel data model with fixed effects. The general equation used in these models is as follows:

$$y_{i,t} = \sum_{k=0}^n \gamma_k x_{i,t}^T + \mu_{i,t}, \quad i = 1, \dots, N, \quad t = 1, \dots, T \quad (1)$$

where:

$y_{i,t}^T$ - total deal size (in \$M) in a European country (i-t) over time (t)

$x_{i,t}^T$ - vector of independent variables of a total deal size in a European country (i-t) over time (t)

[ln_knowledgeworkers – Knowledge workers, ln_knowledgeimpact – Knowledge impact, ln_businessenvironment – Business environment, ln_education - Education]

γ – vector of structural parameters

$\mu_{i,t}$ - random component

FINDINGS

The results from the fixed effects panel data model show that the coefficients for knowledge workers (ln_knowledgeworkers), knowledge impact (ln_knowledgeimpact), business environment (ln_businessenvironment) and education (ln_education) are all significantly negative, indicating that any increase in these variables is correlated with a decrease in the total deal size. In contrast, the investment variable (ln_investment) is statistically insignificant, suggesting that it has no meaningful effect on the total deal size in the fintech sector. These findings are consistent with previous research suggesting that regions with lower trust in traditional financial services see increased funding for fintech startups, but regions with historically low trust attract less overall fintech investment (Cojoianu et al., 2021). By incorporating sub-indices from the Global Innovation Index, the study suggests that despite improvements in business environment, education and knowledge impact, venture capital fund managers may still favour established markets, reflecting broader trust and stability in these environments over purely improved sub-indices.

Table 3. Fixed effects panel data model results

Fixed-effects (within) regression
 Group variable: **Country**

Number of obs = **350**
 Number of groups = **35**

R-sq:

within = **0.1927**
 between = **0.5658**
 overall = **0.2419**

Obs per group:

min = **10**
 avg = **10.0**
 max = **10**

corr(u_i, Xb) = **-0.7502**

F(5,310) = **14.80**
 Prob > F = **0.0000**

| ln_totaldeals | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] | |
|---------------------|------------------|-----------------------------------|--------------|--------------|----------------------|------------------|
| ln_knowledgeworkers | -2.275458 | .7181935 | -3.17 | 0.002 | -3.688608 | -.8623075 |
| ln_knowledgeimpact | -1.817968 | .4327347 | -4.20 | 0.000 | -2.669436 | -.966499 |
| ln_businessenvirt | -1.429616 | .3967945 | -3.60 | 0.000 | -2.210367 | -.6488648 |
| ln_education | -1.159297 | .7005759 | -1.65 | 0.099 | -2.537782 | .2191884 |
| ln_investment | -.111629 | .1801618 | -0.62 | 0.536 | -.4661236 | .2428656 |
| _cons | 32.1876 | 4.106353 | 7.84 | 0.000 | 24.10776 | 40.26745 |
| sigma_u | 3.017466 | | | | | |
| sigma_e | 1.0611955 | | | | | |
| rho | .8899316 | (fraction of variance due to u_i) | | | | |

F test that all u_i=0: F(34, 310) = **28.19**

Prob > F = **0.0000**

Reference: Own calculations.

Table 4. Comparison of fixed effects and random effects models

| | —— Coefficients —— | | | |
|--------------|--------------------|--------------|------------|---------------------|
| | (b) | (B) | (b-B) | sqrt(diag(V_b-V_B)) |
| | FE_totalde~s | RE_totalde~s | Difference | S.E. |
| ln_knowled~s | -2.275458 | .4252172 | -2.700675 | .1922817 |
| ln_knowled~t | -1.817968 | -1.740215 | -.0777529 | . |
| ln_busines~t | -1.429616 | -1.331598 | -.0980183 | . |
| ln_education | -1.159297 | -.6243878 | -.5349092 | . |
| ln_investm~t | -.111629 | -.0328243 | -.0788046 | . |

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
 = 123.56
 Prob>chi2 = 0.0000
 (V_b-V_B is not positive definite)

Reference: Own calculations

CONCLUSIONS

In conclusion, the study shows that increases in knowledge workers, knowledge impact, business environment and education are associated with decreases in the total size of fintech deals, while investment levels do not significantly affect fundraising success. These findings suggest that venture capital fund managers may prefer established markets, reflecting broader confidence and stability rather than improvements in specific sub-indices. This is consistent with previous research showing that regions with lower trust in traditional financial services experience increased funding for fintech startups, but overall fintech investment remains lower in regions with historically low levels of trust. The study is limited to annual data from 2013 to 2022 and focuses exclusively on Europe due to the availability of data from the World Bank.

REFERENCES

- Cornelli, G., Doerr, S., Franco, L., & Frost, J. (2021). Funding for fintechs: patterns and drivers. In *BIS Quarterly Review*.
- Gomber, P., Koch, J.-A., & Siering, M. (2017). Digital Finance and fintech: current research and future research directions. *Journal of Business Economics*, 87(5), 537–580.
<https://doi.org/10.1007/s11573-017-0852-x>
- Haddad, C., & Hornuf, L. (2016). The Emergence of the Global fintech Market: Economic and Technological Determinants. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2830124>
- Haddad, C., & Hornuf, L. (2019). The emergence of the global fintech market: economic and technological determinants. *Small Business Economics*, 53(1), 81–105.
<https://doi.org/10.1007/s11187-018-9991-x>
- Harasim, J. (2021). FinTechs, BigTechs and structural changes in capital markets. In *The Digitalization of Financial Markets* (pp. 80–100). Routledge. <https://doi.org/10.4324/9781003095354-5>

- Milian, E. Z., Spinola, M. D. M., & Carvalho, M. M. D. (2019). Fintechs: A literature review and research agenda. *Electronic Commerce Research and Applications*, 34. <https://doi.org/10.1016/j.elerap.2019.100833>
- Moccia, S., Passerini, K., & Tomic, I. (2018). fintech: Challenges, drivers, and future opportunities. *Cutter Business Technology Journal*, 31(11–12), 6–11. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85064404797&partnerID=40&md5=e3909c43b06c2bb469d7f0f08d2c1ec0>
- Natarajan, H. (2020). fintech's impact on payments - Part 1. *Journal of Payments Strategy and Systems*, 14(4), 312–314. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85102244532&partnerID=40&md5=99d2568b0e317e28e8648ea2f16a0da2>
- Niewinska, K. (2023). fintech Sector: A Review of Research Trends for the Period of 2015-2022. *Scientific Papers of Silesian University of Technology. Organization & Management/Zeszyty Naukowe Politechniki Slaskiej. Seria Organizacji i Zarzadzanie*, 181.