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INNOVATION IN THE FINANCIAL INDUSTRY: FINTECH AND VENTURE CAPITAL

by Antonia Manzini¹ and Diego Scalise¹

Abstract

Technological innovation has profoundly transformed financial services. This paper examines the diffusion of technology-intensive firms operating in the financial sector (fintech) and the pivotal role of venture capital in supporting their development. The analysis reveals an ecosystem predominantly consisting of small fintech firms, which cluster in the financial centres of countries with more developed capital markets. These locations are home, in particular, to business-to-business (B2B) firms, which frequently develop digital solutions for financial institutions. In this environment, incumbent financial intermediaries become the natural acquirers of the most promising fintech start-ups, integrating their technologies and capabilities into their value chains. Access to diversified sources of finance is a key determinant of these firms' growth. Venture capital acts as a catalyst by fostering strategic partnerships and facilitating the integration of innovative technologies, thereby contributing to the transformation of traditional financial intermediation. The distribution of fintech firms and the evolution of their financing cycle portray a sector undergoing a transition from an initial phase of rapid expansion to one of gradual consolidation.

JEL Classification: G15, G24, G34.

Keywords: fintech concentration, fintech venture capital.

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1. INTRODUCTION²

Technological innovation has historically been a major driver of structural change in the financial system. The adoption of advanced digital technologies has facilitated, among other developments, the entry of new market participants into the financial industry and has blurred the traditional boundaries of the sector. At the same time, incumbent financial intermediaries have increasingly outsourced technology-intensive activities³. Digital innovation lowers transaction costs, including those associated with searching for counterparties, duplication, transportation, tracking and information verification (Goldfarb and Tucker, 2019), thereby making it possible to externalize activities that were previously performed within financial firms⁴.

In the mid-2010s, the rapid proliferation of independent fintech firms capable of using digital technologies to compete with incumbent intermediaries, including in narrowly defined market segments, led many observers to anticipate disruptive effects on the established structure of the financial industry, particularly banking (Stultz, 2019; Goldstein et al., 2019). On the one hand, greater entry could benefit consumers by strengthening competition in the provision of financial services (Philippon, 2016); on the other, it could give rise to new risks to financial stability (Financial Stability Board, 2017).

This paper studies the development of technology-intensive firms in the financial industry (fintech⁵), focusing on both the number of fintech business initiatives and the venture capital flows directed towards them (fintech VC). We analyse the diffusion of fintech globally and across a representative sample of 20 countries selected on the basis of their economic and financial relevance. The analysis considers the size, sectoral composition and geographical distribution of fintech firms, with particular attention to the concentration of firms and venture capital flows both across and within countries. The empirical analysis relies primarily on Dealroom data, supplemented and cross-checked against information from other databases⁶.

The results point to increasing complementarity between fintech firms and incumbent financial intermediaries. Incumbents integrate fintech firms through strategic partnerships and

² We thank Romina Gabbiadini, Giorgio Gobbi and Paola Rossi for their comments and suggestions. The views expressed in this paper are personal and do not necessarily reflect those of the Bank of Italy.

³ See Panetta (2025).

⁴ This phenomenon is consistent with the economic literature on the theory of the firm (Coase, 1937 and Williamson 1975 and 1991), according to which transaction costs, especially in the financial sector (Klein, 1971), are the most important variable delimiting the firm.

⁵ See FSB (2017): “Fintech refers to technology-enabled innovation in financial services that could result in new business models, applications, processes or products with a material effect on the provision of financial services”.

⁶ A statistical consistency analysis was carried out among the various databases available on the international diffusion of fintech to validate the dataset used. The Methodological Notes, in Table N1, report the survey criteria of the different databases; Tables N2 and N3 also provide information on the macro-areas analyzed and on the sample of 20 countries for which more granular data are available.

equity acquisitions. Fintech firms tend to cluster in financial centres characterized by a high density of banks and a developed financial sector, where they can benefit from specialized human capital and research capabilities at the same time exploiting network economies that facilitate collaboration with established intermediaries. To date, the disruptive effects associated with these technologies appear to have been relatively contained and largely absorbed within the financial industry, as has occurred with earlier waves of innovation (Bofondi and Gobbi, 2017).

Venture capital financing is a key element of this process. The availability of this form of financing not only facilitates market entry but also supports subsequent firm growth through scaling, consolidation and integration and spurs the emergence of successful firms that reach large valuations (unicorns).

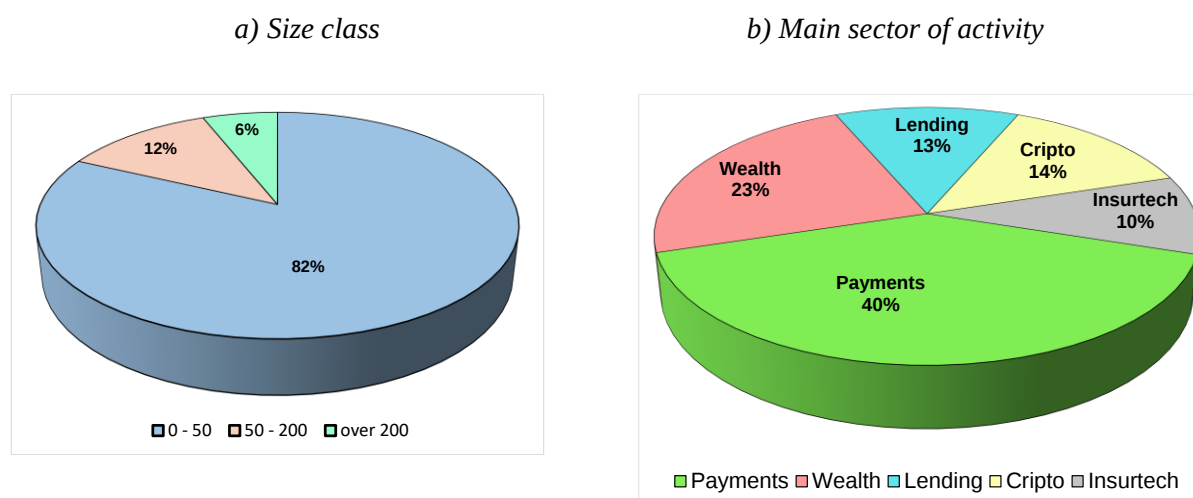
The remainder of the paper is organized as follows. Section 2 examines the international diffusion of fintech firms, with a specific focus on Italy. Section 3 analyses the venture capital investment cycle in fintech. Section 4 studies the emergence of unicorns and the role of venture capital in supporting firm growth, both organically and through integration with incumbent intermediaries. Section 5 concludes and discusses the main implications for the evolution of the financial ecosystem.

2. THE INTERNATIONAL DIFFUSION OF FINTECH

2.1 DIFFUSION AT THE GLOBAL LEVEL

The relatively recent emergence of the fintech industry, together with the highly innovative organizational features of its firms, is reflected in their size distribution. Firms with fewer than 50 employees account for almost 82 per cent of the roughly 35,000 fintech firms recorded worldwide. Firms with between 50 and 200 employees represent around 12 per cent, while those with more than 200 employees account for the remaining 6 per cent (Figure 1). As shown below, larger firms are also highly concentrated geographically. Payments account for 40 per cent of fintech firms worldwide, reflecting the segment's early role in financial digitalization and its function as a gateway to more complex financial services. Wealth management follows at 23 per cent, crypto-related activities at 14 per cent, lending at 13 per cent and insurtech at 10 per cent.

Figure 1 – Distribution of fintech firms by size and sector of activity

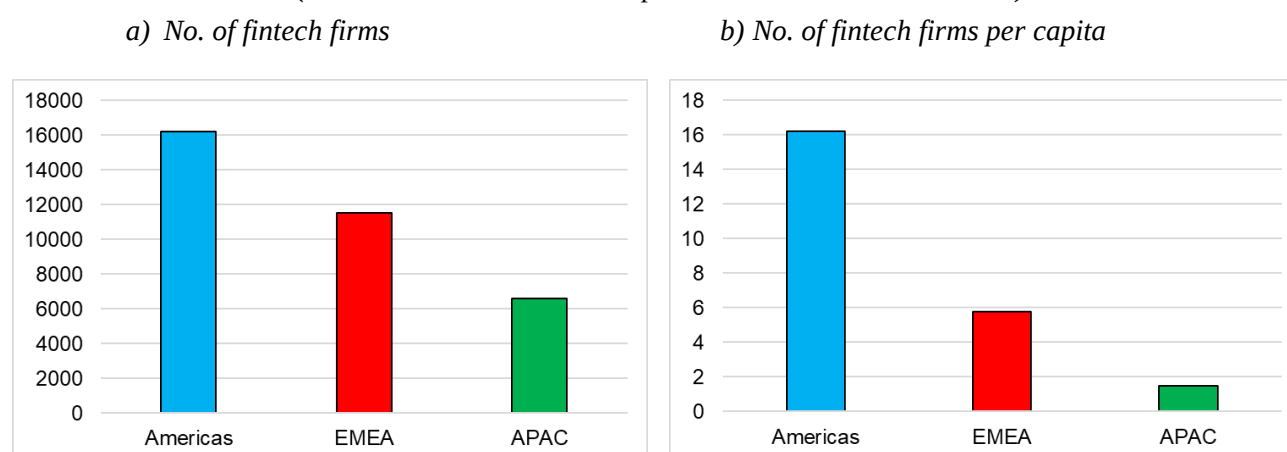


Source: 2023 data. Based on Dealroom data.

The geographical distribution of fintech firms is highly concentrated across macro-areas. The Americas host almost half of all fintech firms worldwide (Figure 2, panel a), a share that exceeds the region's weight in the global economy and financial markets (around 30 per cent of world GDP and 40 per cent of global stock market capitalization). EMEA accounts for approximately one third of fintech firms, while APAC hosts the remaining fifth. The Americas also record the highest number of fintech firms per capita (panel b), followed by EMEA and APAC, the most populous macro-area.

Figure 2 – Number of fintech firms by macro-area

(Numbers, Panel a; numbers per million inhabitants, Panel b)

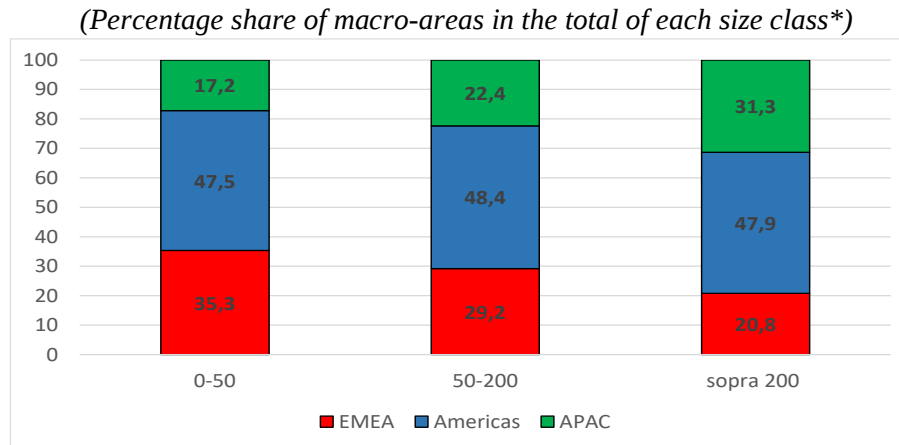


Source: Based on Dealroom data. Data updated to 2023. Population data from the World Bank.

The gap between the Americas and EMEA widens with firm size: larger fintech firms are increasingly likely to be located in the Americas (Figure 3). EMEA therefore appears less

successful in attracting or developing large fintech firms - already a relatively small group globally - and remains behind the leading global hubs of financial innovation.

Figure 3 – Distribution of fintech firms by macro-area and size class



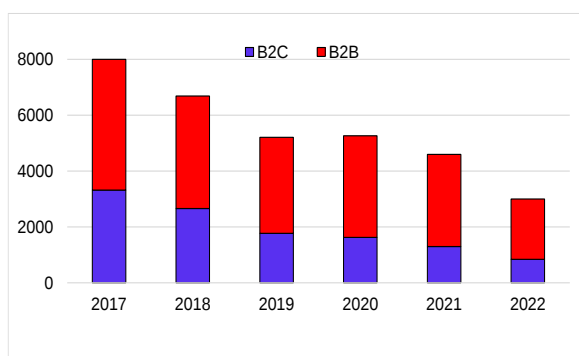
Source: Based on Dealroom data. Only Dealroom reports a geographical-size breakdown. *In the histograms, the total number of firms for each size class (0-50, 50-200, over 200 employees) is set at 100, and the shares of the macro-areas are shown.

Over time, fintech business models have increasingly shifted towards the provision of services to other businesses (B2B), rather than the direct provision of financial services to end users (B2C), both in terms of firm numbers and investment flows.

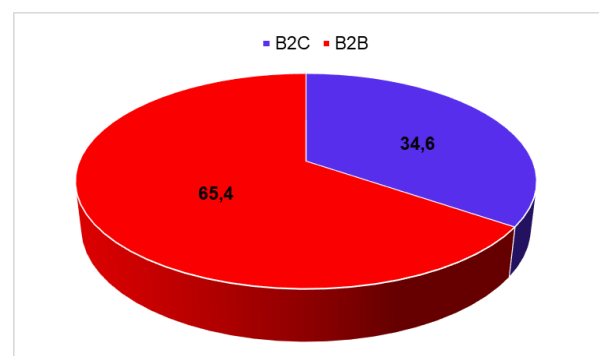
Figure 4 – Distribution of fintech firms by business model: B2B and B2C

(Number of firms; percentage shares)

a) No. of firms founded per year worldwide by business model



b) Percentage share of total fintech firms active worldwide in 2023



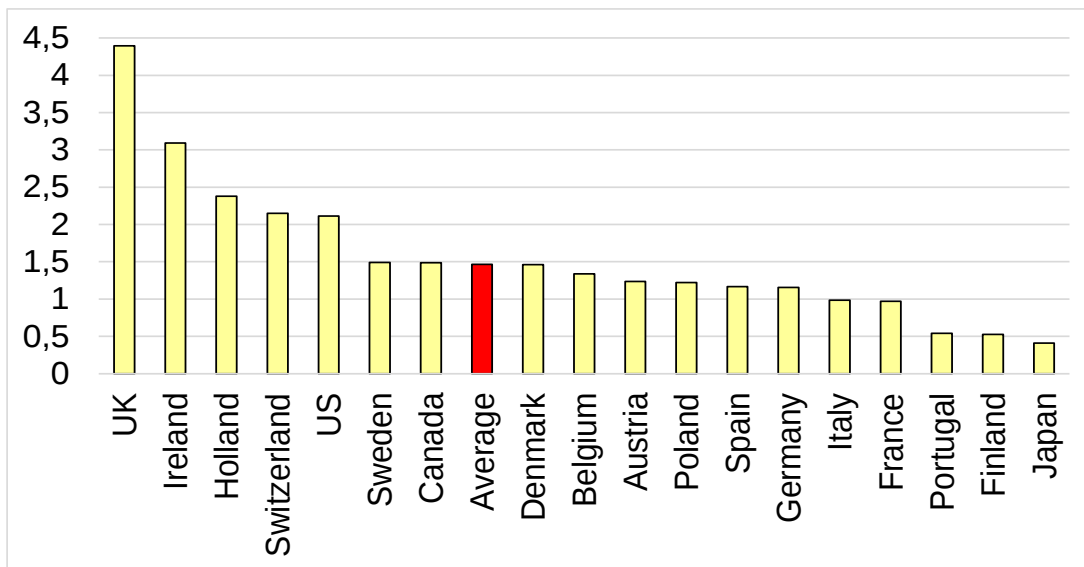
Source: Based on Dealroom data. The 2023 figure is not available for the breakdowns considered.

The shift towards B2B business models is apparent in both the flow of new entrants and the stock of active fintech firms. Among fintech firms founded each year worldwide (Figure 4, panel a), the B2B share has risen steadily, reaching approximately two thirds of newly established firms by the end of the period (Figure 4, panel b).

Fintech activity is also highly concentrated within macro-areas. After normalizing by total financial assets, the five countries with the highest number of fintech firms are the United Kingdom, Ireland, the Netherlands, Switzerland⁷ and the United States (Figure 5)⁸. This ranking points to a stronger presence of fintech firms in countries with more developed capital markets. Concentration is also pronounced within countries, as fintech firms tend to locate in or around the main national financial centres.

Figure 5 – Fintech firms by country

(No. of firms relative to financial assets)



Source: Based on Dealroom and International Monetary Fund data. Data updated to 2023.

In the international comparison, Italy records a number of fintech firms below the sample average, both in absolute terms and relative to financial assets (Table A1 in the Statistical Appendix). According to the Fintech & Insurtech Observatory of the Polytechnic University of Milan (Figure 6), 485⁹ fintech firms were operating in Italy at the end of 2025, down from 622 in 2023¹⁰. This decline may indicate that the Italian fintech sector has entered a phase of consolidation¹¹. As in other countries, Italian fintech firms are concentrated around the main national financial centre, Milan, with an even stronger concentration among B2B firms.

⁷ Gambardella (2025).

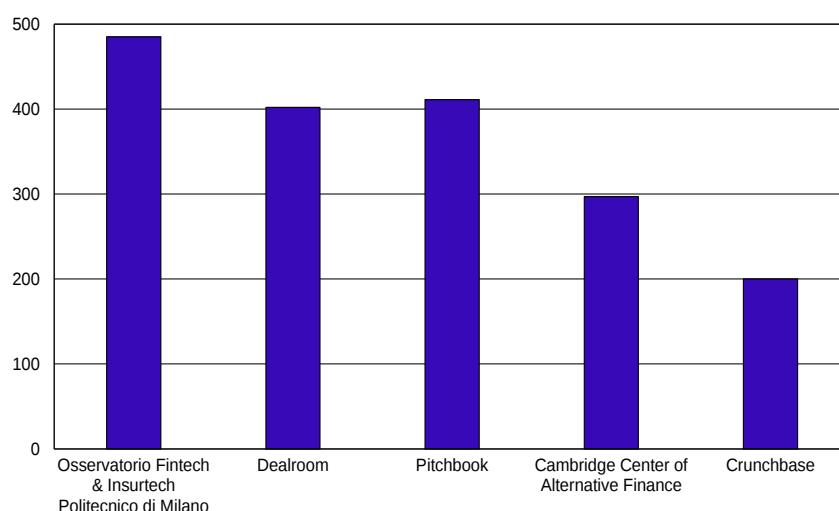
⁸ Data on financial assets are not available for China and Singapore.

⁹ The databases used in this paper (Dealroom, Pitchbook, CCAF, Crunchbase) show lower numbers than the Polytechnic University of Milan Fintech & Insurtech Observatory, owing to different survey criteria (see Table N1 in the Methodological Notes). The Observatory's survey includes financial and insurance firms, including those supervised by the Bank of Italy, that are innovative, founded since 2009, with an operating office in Italy or based abroad but with Italian founding shareholders; the Observatory administers an online questionnaire to firms, supplemented with information gathered from other sources (website, press releases, LinkedIn, Crunchbase, Pitchbook).

¹⁰ This figure is broadly in line with the findings of Bank of Italy.

¹¹ See Polytechnic University of Milan (2022); Fintech District (2023;2024).

Figure 6 – Number of fintech business initiatives in Italy
(Number)



Source: Based on data from Polytechnic University of Milan, Dealroom, Pitchbook, CCAF and Crunchbase, end 2025.

2.2 THE ROLE OF FINANCIAL CENTRES

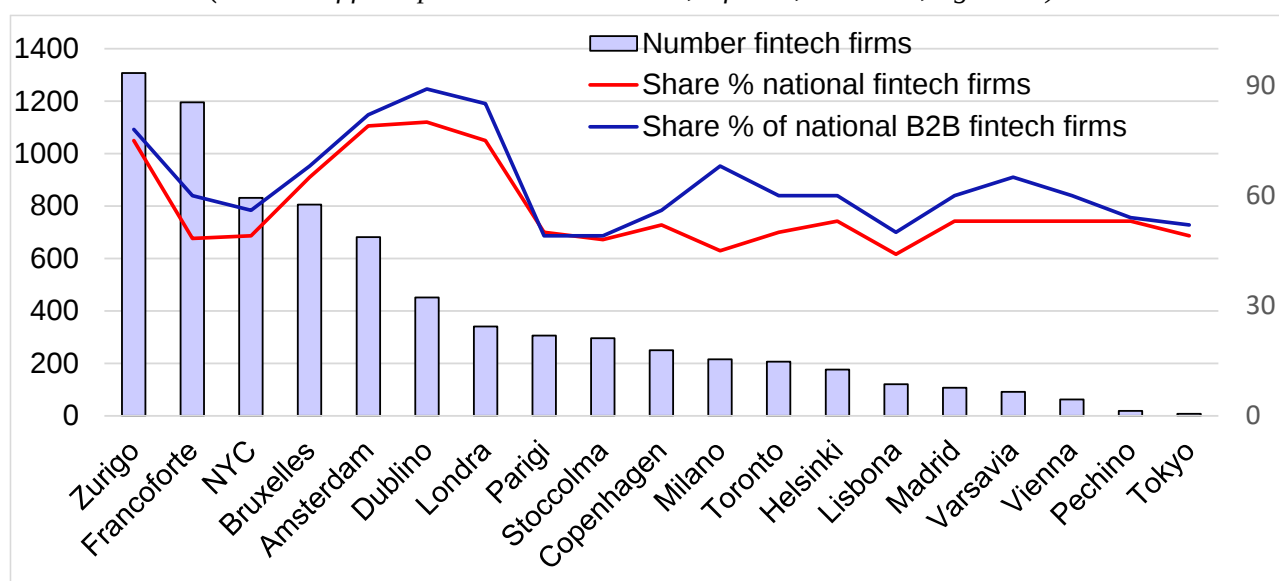
Proximity to financial centres may foster fintech activity through several channels. These include easier access to equity finance and to a diversified pool of capital capable of matching the risk profile and financing needs of innovative firms (European Central Bank, 2024).

Figure 7 identifies the main national financial centres¹² in the 20 sample countries and examines the location of fintech firms within them. Fintech activity is far from evenly distributed within countries: on average, more than 55 per cent of fintech firms in the sample are located in the main national financial centre, with relatively limited dispersion around the mean and shares above 75 per cent in some of the most developed centres, including Dublin, Amsterdam and Zurich.

The concentration of fintech firms in national financial centres is even more pronounced among B2B firms (Figure 7, blue line). This pattern is consistent with an agglomeration effect whereby financial centres generate a concentrated pool of demand for partnerships and new digital services supplied by fintech firms.

¹² A national financial centre is defined as the metropolitan region in the country with the highest share of value added attributable to the financial sector and characterised by the presence of a stock exchange. This evidence is consistent with an ECB study (2024) showing that around 53 per cent of European fintech business initiatives are in a financial centre.

Figure 7 – Fintech firms per capita and concentration of fintech in financial centres
(Number of firms per million inhabitants, left axis; % shares, right axis)



Source: Based on Dealroom data. Singapore was excluded from the chart because, being a city-state, it holds 100 per cent of the fintech firms present by definition. Data as of 2023.

Zurich, Frankfurt and New York rank among the top three financial centres in terms of fintech firms per capita. Frankfurt, Brussels and Paris also perform better in the international comparison than their respective national averages. Milan hosts around half of Italy's fintech firms and exerts an even stronger pull on B2B firms. Its location in Lombardy - a region with a large and diversified productive base and a comparatively high level of economic development - further strengthens demand for B2B digital services from both industrial and service-sector firms¹³.

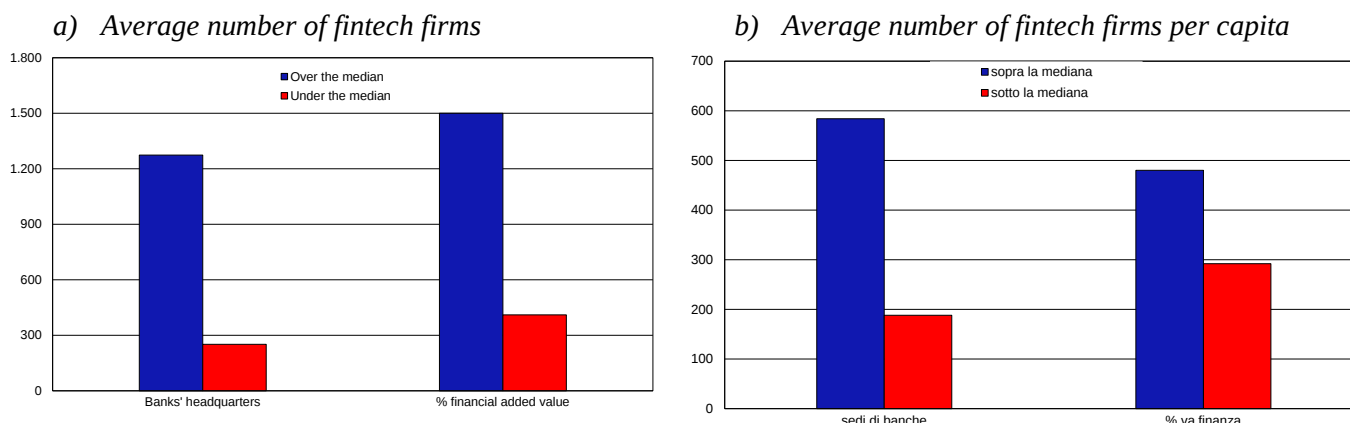
Financial centres are themselves highly heterogeneous. To assess how their structural characteristics are associated with fintech attractiveness, we focus on two variables: the density of bank headquarters (the number of headquarters per unit of area) and the size of the financial sector relative to the local economy (the share of financial-sector value added in total value added). The latter captures the broader degree of financial development, including the presence and importance of non-bank financial intermediation¹⁴.

Figure 8 compares fintech activity, both in absolute terms (panel a) and per capita (panel b), across the financial centres of the 20 sample countries. Centres are classified according to whether bank-headquarters density and the share of financial value added lie above or below the corresponding sample medians.

¹³ Bank of Italy (2025).

¹⁴ For a more in-depth discussion of these variables and their distribution across European Union areas, see Affinito and Piazza (2009), Rossi and Scalise (2022).

Figure 8: Number of fintech firms, banks' headquarters and financial value added



Source: Based on Dealroom, Eurostat and national statistics.

Financial centres with an above-median density of bank headquarters host substantially more fintech firms: approximately four times as many in absolute terms and three times as many per capita as centres below the median. Similarly, centres with an above-median share of financial value added host almost five times as many fintech firms in absolute terms and around 50 per cent more on a per capita basis.

These patterns are consistent with an increasingly complementary relationship between fintech firms and traditional finance, in which incumbent intermediaries integrate fintech capabilities through strategic partnerships and acquisitions of minority or controlling equity stakes.

The stronger concentration of fintech firms - particularly B2B firms - in financial centres characterized by high bank density and a large financial sector may reflect the value of proximity in making collaboration with incumbent intermediaries more likely and less costly. These benefits are reinforced by standard financial agglomeration economies, including access to specialized human capital, advanced university training and opportunities for knowledge spillovers (Rosenthal and Strange, 2020).

3. FINANCING FINTECH INITIATIVES: FINTECH VENTURE CAPITAL

A large literature emphasizes the central role of venture capital in financing innovation (Gobbi, 2024; Angelini, 2025). Lerner and Nanda (2020), for example, show that seven of the eight largest US companies by market capitalization received venture capital financing at an early stage of their development (including Alphabet, Apple, Amazon, Meta and Microsoft). Venture capital can have a substantial impact on portfolio companies by strengthening their capacity to innovate and compete¹⁵. More generally, access to financing that is diversified in amount,

¹⁵ See the initiatives envisaged at European level by the European Commission's Competitiveness Compass of January 2025.

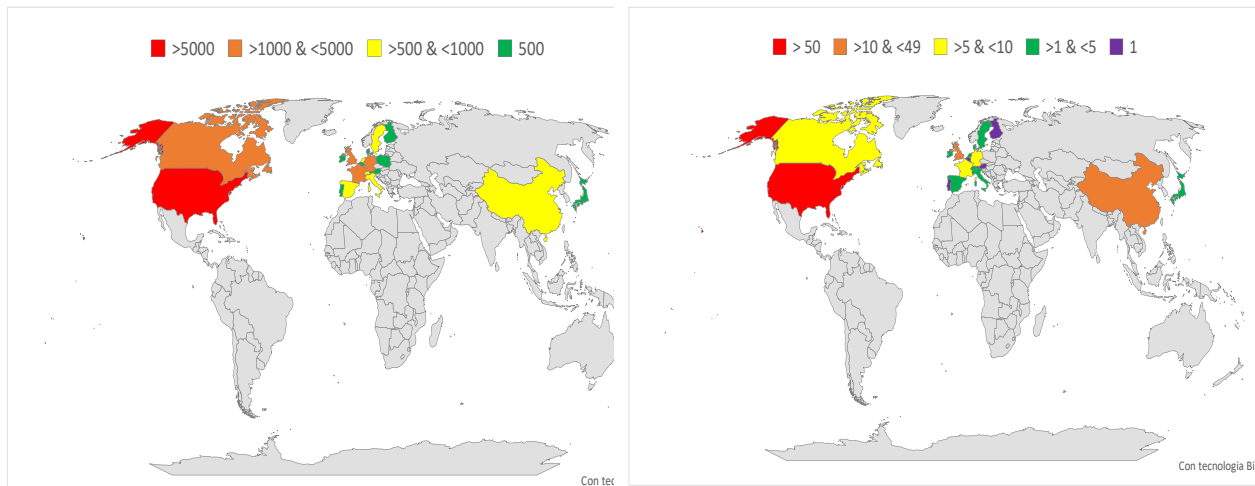
structure, maturity and investor type is a key condition for the creation and growth of fintech firms, whose financing needs are typically concentrated in risk capital. Consistent with this view, the availability of equity financing is among the main determinants of fintech diffusion across European regions (European Central Bank, 2024).

Figure 9 – Number of fintech firms and fintech VC¹⁶ flows in the sample

(Numbers, Panel a; billions of US dollars, Panel b)

a) No. of fintech firms 2023

b) Fintech VC flows 2018-23



Source: Based on Dealroom data.

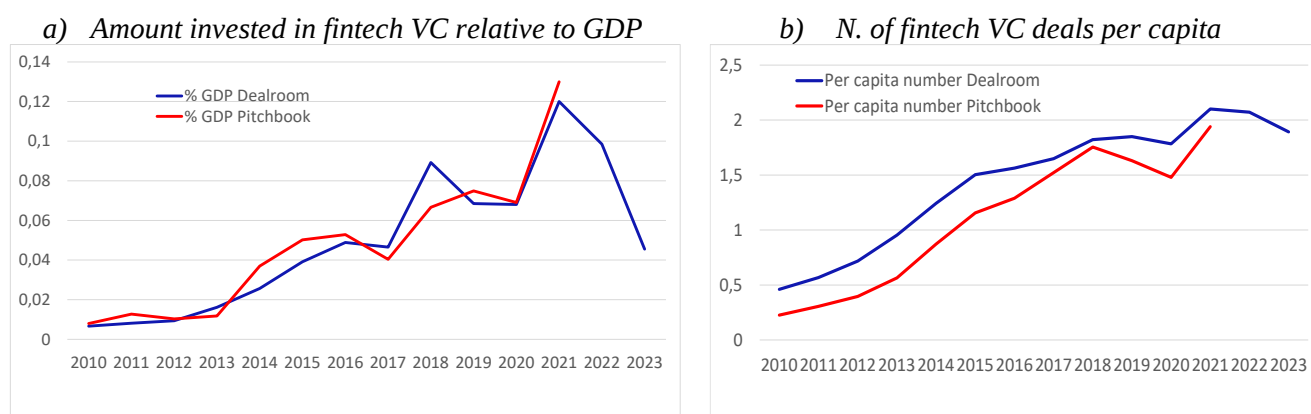
Across the 20 sample countries, the geographical distribution of fintech firms is strongly correlated with the spatial distribution of venture capital flows directed towards them over the preceding five years (Figure 9).

Fintech VC is particularly important in the early stages of firms' life cycles, supporting both entry and subsequent growth. Risk-capital investment in fintech firms increased markedly between 2010 and 2021 across the sample countries, before declining in 2022-23 (Figure 10). The expansion was broad-based but highly heterogeneous across countries, with the leading markets growing substantially faster than the sample average (Figure 15 and Table A2). By the end of the period, these countries accounted for shares of global fintech activity systematically exceeding their respective shares of world GDP and global listed-equity capitalization. Italy remains below the sample average across all these dimensions.

¹⁶ For the operational definition of fintech VC used in the databases used, see Table N4 in the Methodological Note.

Figure 10 – Trend in fintech VC

(Percentage values relative to GDP and number of transactions per capita)

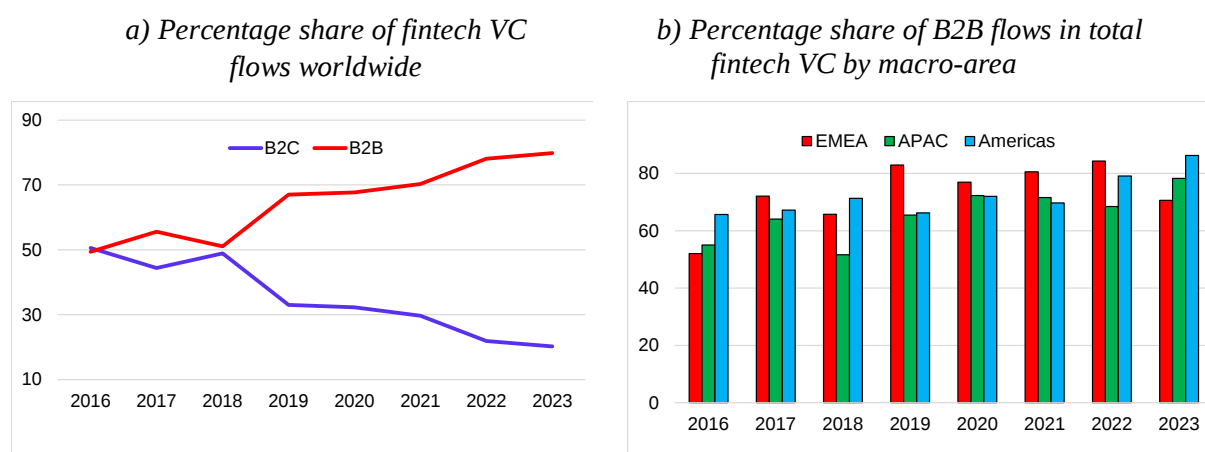


Source: Based on Dealroom and Pitchbook data. Data from 2022 onwards are available only for Dealroom. GDP at current values in US dollars and resident population from the World Bank.

B2B fintech firms attract the largest - and an increasing - share of venture capital investment, rising from around one half of global fintech VC flows in 2016 to almost 80 per cent in 2023 (Figure 11, panel a).

Across macro-areas (Figure 11, panel b), investment is concentrated primarily in the Americas, which also recorded the largest increase in the B2B share of fintech VC between 2016 and 2023. In EMEA, notwithstanding cyclical fluctuations, the share of investment directed towards B2B fintech firms has remained above 60 per cent in most years.

Figure 11 – Distribution of fintech VC flows by business model: B2B and B2C



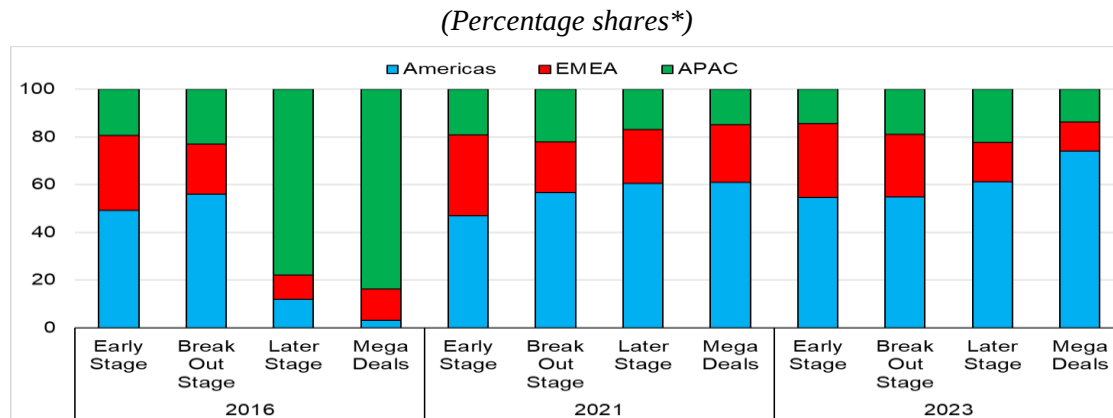
Source: Based on Dealroom data.

The composition of fintech VC investment across stages of firm development remained broadly stable over the period considered. Around 40 per cent of invested capital was directed towards later-stage transactions supporting the scaling of more mature firms. The remainder was allocated, in descending order, to mega deals supporting the international expansion of the largest firms (around 30 per cent), break-out-stage transactions financing firms that were still

consolidating their market position (around 20 per cent), and early-stage transactions supporting new ventures (around 10 per cent).

The fintech VC market in the Americas is the most mature, consistent with the broader evidence on venture capital markets¹⁷.

Figure 12 – Stage of fintech VC investment – Distribution by macro-area



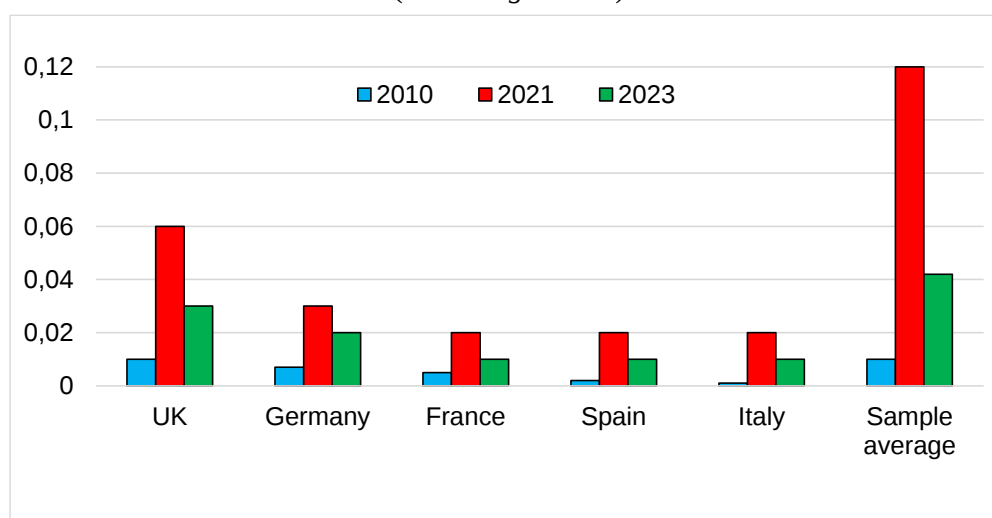
Source: Based on Dealroom data. *With the total amounts invested in the main stages set at 100, the bars show the percentage shares held in the various years by the different macro-areas. The stages are defined as follows: Early Stage (transactions under 15 USD million), Break Out Stage (transactions between 15 and 100 USD million), Later Stage (transactions over 100 USD million). Mega Deals of more than 300 USD million are also shown.

By the end of the period, the Americas accounted for the largest global share at every investment stage and dominated both later-stage financing and mega deals (Figure 12). In 2023, the region attracted more than 60 per cent of later-stage investment and over 75 per cent of global mega deals; together, these two categories represented almost 70 per cent of total fintech VC investment worldwide. EMEA recorded the smallest share among the three macro-areas at the end of 2023, consistent with the comparatively later development of the European fintech VC market.

Fintech VC investment in Italy remains limited, in line with the country's lower density of fintech firms (Table A2 in the Statistical Appendix). Relative to GDP, however, investment increased between 2010 and 2021 and, despite starting from very low levels, reached a ratio comparable to those observed in France and Spain (Figure 13).

¹⁷ See Gobbi (2024) and Gallo et al. (2025).

Figure 13 – Fintech VC investment relative to GDP: Italy in international comparison
(Percentage ratio*)



Source: Based on Dealroom and World Bank data. *The ratio is obtained by dividing the amount of fintech VC investment in current US dollars by GDP in current US dollars.

Several large transactions in the payments sector subsequently raised fintech VC investment in Italy to around EUR 500 million in 2022, the highest level observed over the period considered¹⁸.

Fintech has historically attracted more venture capital than any other sector in Italy. Nevertheless, significant constraints remain, particularly with respect to deal size. According to the 2025 Fintech District and EY survey 'Founders vs Investors: Two Faces of Fintech Funding', 70 per cent of fintech firms raised less risk capital than planned over 2022-24, with transactions typically below EUR 3 million¹⁹. Firms identify unfavourable contractual terms as a major constraint, while investors emphasize the limited prevalence of credible international expansion strategies.

4. FINTECH VC AND THE RISE OF UNICORNS

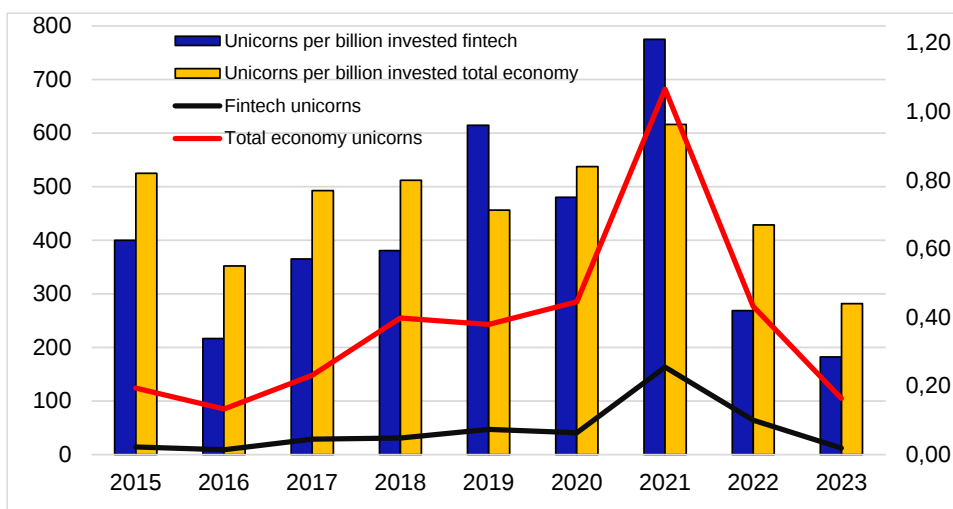
Risk-capital financing is closely associated with the emergence of successful firms that reach large valuations (unicorns; Cristofaro et al., 2024). Figure 14 traces the creation of fintech unicorns over time. The number of new fintech unicorns broadly follows the same cyclical pattern as unicorn creation in the economy as a whole. Conditional on the amount of capital invested, however, fintech appears less effective than other sectors in generating unicorns: the number of new unicorns per billion dollars invested is systematically lower in fintech than in the economy as

¹⁸ According to the Venture Capital Monitor – VeM Observatory based at LIUC Business School, in 2022, 695 million was raised out of total VC investment in the economy of 1,862 million. This evidence is consistent with the Ernst & Young Report for the same years.

¹⁹ The sample surveyed comprises 90 fintech firms and 50 investors active on the Italian market.

a whole, except in 2019 and 2021, years characterized by particularly strong momentum in the digitalization of financial services.

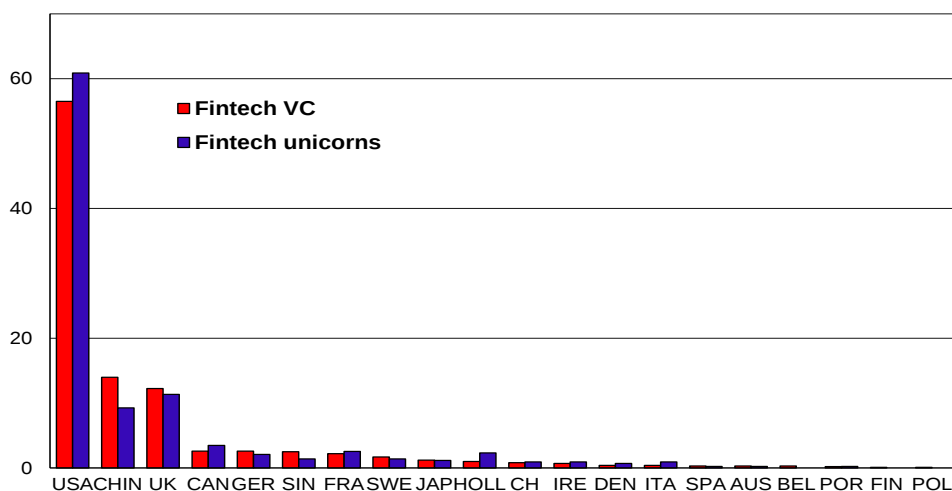
Figure 14: New unicorns and incidence per USD billion invested
(Number, left-hand scale; unicorns per USD billion, right-hand scale)



Source: Based on Dealroom data. The red and black lines show the number of new unicorns born in fintech and in the economy per year; the bars show the number of new fintech unicorns per USD billion invested in fintech VC and the number of new unicorns in the economy as a whole per USD billion invested in venture capital in general.

The emergence of fintech unicorns is closely associated with the development of the fintech VC market, and both phenomena display pronounced geographical concentration (Figure 15). The six leading countries among the 20 considered account for more than 90 per cent of both fintech unicorns and fintech VC funding.

Figure 15: New fintech unicorns and fintech VC funding
(Percentage shares)

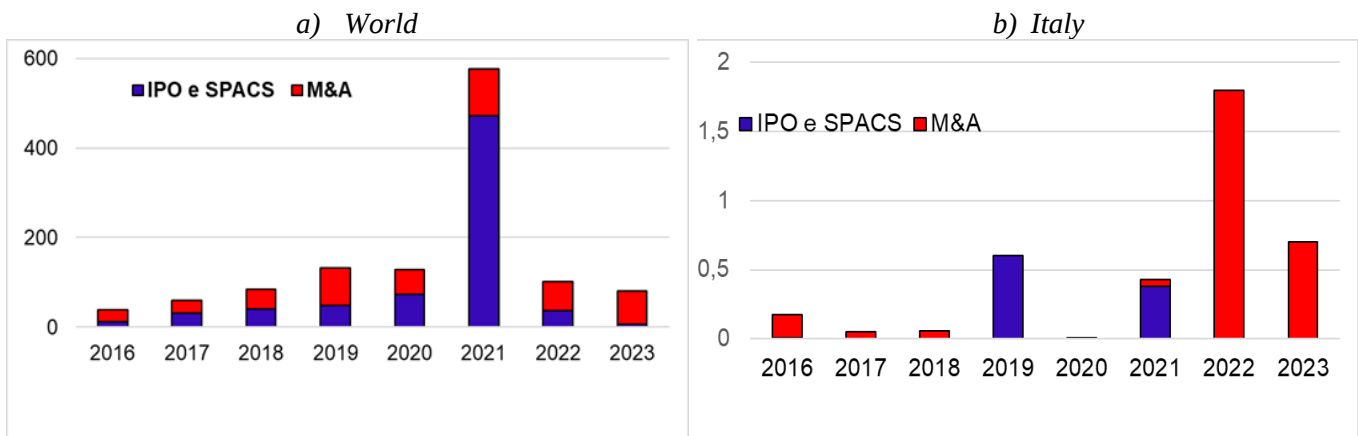


Source: Based on Dealroom data. Shares of 2015-2023 totals.

A more developed venture capital market therefore appears to support both the creation and scaling of innovative financial firms, including the emergence of internationally competitive 'champions'²⁰. One possible interpretation is that, in countries where unicorns are relatively rare, fintech firms follow a more gradual growth path centred on collaboration and integration with traditional finance, locating in financial centres and supplying B2B services to incumbent intermediaries.

Private markets have become increasingly important as exit channels for fintech VC investments, particularly through mergers and acquisitions (M&A²¹), while public-market exits through IPOs²² and SPACs²³ almost disappeared globally in 2022-23 (Figure 16). Most divestments therefore take the form of sales - generally at a later stage of the investment cycle - to incumbent intermediaries seeking to acquire technological capabilities, accelerate process digitalization and broaden their range of digital services (Dealroom, 2024). A similar pattern is observed in Italy: with few exceptions, private-market transactions are the dominant fintech VC exit route, and sales to other firms have represented the only observed exits in the most recent two years²⁴.

Figure 16: Fintech VC exits
(Billions of dollars)



Source: Based on Dealroom data.

Taken together, this evidence supports the view that venture capital plays a central role in financing fintech innovation and shaping firms' growth trajectories. At the end of the investment

²⁰ Draghi (2024).

²¹ Private market transactions (M&A, mergers and acquisitions) include mergers, acquisitions, reverse mergers, joint ventures, share swaps, etc.

²² IPO, Initial Public Offering, refers to listing on regulated markets.

²³ SPACs, Special Purpose Acquisition Companies, are listed corporate vehicles on regulated markets used to raise capital to be invested, within a given period, in companies to be merged into the SPAC itself.

²⁴ Nexi was listed in 2019, the largest IPO by value in the European Union at the time.

cycle, it also facilitates the integration of a significant share of innovative firms into larger incumbent organizations.

Recent research provides international evidence that, for a growing share of VC-backed fintech firms, the ultimate outcome is acquisition by an incumbent intermediary rather than a public listing. Using data on M&A transactions, Zheng and Mao (2024) show that traditional financial institutions have become major acquirers of fintech firms and that the frequency of such transactions has increased over time. In the United States, a growing number of banks invest directly in fintech firms in response to the competitive pressures generated by financial innovation²⁵. In Europe, although transaction values are smaller, the number of banks acquiring VC-backed fintech firms has also increased, with the United Kingdom, France and Italy among the most active markets²⁶. Venture capital can thus act as a catalyst for trust formation and subsequent integration between fintech firms and incumbent intermediaries.

Gigante et al. (2023) find that acquisitions of fintech firms by incumbent intermediaries are associated, on average, with positive stock-market reactions, suggesting that investors perceive such transactions as strategic investments in technological capital. Schwienbacher (2010) shows more generally that acquisitions provide venture capital investors with a more likely and less risky exit route than public listings, while allowing incumbent firms to appropriate innovations developed by start-ups. In the fintech context, these mechanisms are consistent with an increasingly collaborative and integrative model of digital innovation: start-ups function as laboratories for experimentation, whereas scaling often occurs through integration into established financial groups.

5. CONCLUSIONS

The evidence presented in this paper can be summarized in three stylized facts concerning the evolution of the fintech sector.

The first stylized fact concerns the geographical distribution of firms. Fintech activity is highly concentrated both across and within countries. Almost half of fintech firms worldwide are located in the Americas, predominantly in the United States. Within individual jurisdictions,

²⁵ In Puri, Qian and Zheng (2024), data for the United States from Crunchbase for the period 2001-2022 are analysed; the paper shows how the number of banks investing in fintech firms' capital rose over the period from 5 per cent to 24 per cent. Banks' interest in intervening in the exit of fintech VC investments rose from 20 per cent to 70 per cent of the total number of banks over the period considered. The number of transactions in which banks participated rose from 4 per cent of the total in 2001 to 35 per cent in 2022. American banks intervened in the final stages of the venture capital investment cycle (from the later stage onwards), with transactions of relatively larger size than non-bank investors, targeting segments complementary to their own, such as Wealth Management, Trading/Capital Markets and other technology segments supporting banking activity

²⁶ See BNP Paribas, 2024.

fintech firms - which are generally small - tend to cluster around the main national financial centres. Centres characterized by a higher density of banks and financial intermediaries attract a larger share of fintech firms, reflecting easier access to risk capital and greater opportunities to establish operational and strategic partnerships with incumbents. Proximity to financial intermediaries, institutional investors and specialized human capital therefore reinforces agglomeration economies and the complementarity between technological innovation and traditional financial intermediation.

The second stylized fact concerns the financing of innovation. Venture capital plays a central role throughout the fintech life cycle: it finances market entry, facilitates matching between start-ups and incumbent intermediaries, supports the diffusion of innovative technologies and contributes to the emergence of unicorns. The relationship between venture capital and the creation of firms valued at more than 1 billion US Dollars is strong across sectors, but fintech generates fewer unicorns than other industries for a given amount invested. This suggests that many fintech firms pursue development paths other than stand-alone scaling. Consistent with this interpretation, private markets dominate the final stages of the fintech VC cycle, with banks and other financial intermediaries playing an increasingly important role as investors and acquirers.

The third stylized fact concerns the evolving relationship between fintech firms and the traditional financial industry. The structure of VC exits, together with the progressive shift from B2C to B2B business models, suggests that fintech has evolved from a potential source of disruption for incumbent intermediaries into a structural component of the financial ecosystem. Innovation is increasingly diffused through collaboration, acquisition and industrial integration.

Overall, the results help narrow an information gap in a rapidly evolving sector and provide an empirical basis for assessing the development of fintech and its implications for authorities responsible for regulation, supervision and, more broadly, the governance of innovation in the financial system.

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STATISTICAL APPENDIX

Table A1 – Ranking of countries by number of fintech firms in the three databases

	Dealroom	Crunchbase	CCAF²⁷
1	United States	United States	United States
2	United Kingdom	United Kingdom	United Kingdom
3	Germany	Canada	Singapore
4	France	Singapore	Germany
5	Canada	Germany	Spain
6	Singapore	China	France
7	China	France	Netherlands
8	Netherlands	Switzerland	Canada
9	Switzerland	Spain	China
10	Spain	Netherlands	Italy
11	Italy	Italy	Japan
12	Sweden	Sweden	Switzerland
13	Ireland	Japan	Ireland
14	Denmark	Ireland	Denmark
15	Poland	Poland	Poland
16	Belgium	Denmark	Sweden
17	Austria	Belgium	Austria
18	Finland	Finland	Belgium
19	Japan	Austria	Portugal
20	Portugal	Portugal	Finland

Source: Based on Dealroom, Crunchbase and CCAF data.

²⁷ Note that the CCAF's Cambridge Fintech Ecosystem Atlas tends to underestimate the number of firms for Anglo-Saxon countries, including Canada, and for some Asian economies, partly owing to the data collection mechanism (see Methodological Notes).

Table A2 – Amounts of fintech VC investment
(billions of dollars)

	Dealroom	Pitchbook
1	United States (73.9)	United States (63.1)
2	United Kingdom (15.7)	United Kingdom (19.7)
3	Canada (4.7)	Canada (4.9)
4	Germany (3.7)	Germany (3.6)
5	Singapore (3.6)	Singapore (3.5)
6	France (2.8)	Sweden (3.3)
7	Sweden (2.2)	France (2.5)
8	China (1.9)	China (2.4)
9	Netherlands (1.8)	Spain (1.6)
10	Ireland (1.1)	Ireland (1.3)
11	Japan (0.9)	Netherlands (1.1)
12	Switzerland (0.7)	Japan (0.8)
13	Denmark (0.7)	Switzerland (0.5)
14	Austria (0.5)	Austria (0.4)
15	Portugal (0.3)	Finland (0.1)
16	Spain (0.2)	Belgium (0.1)
17	Italy (0.1)	Italy (0.1)
18	Belgium (0.1)	Denmark (0.1)
19	Finland (0.1)	Portugal (0.01)
20	Poland (0.03)	Poland (0.01)

Source: Dealroom and Pitchbook. 2021 data, latest available year for comparison

Table A3 – Number of fintech VC deals

	Dealroom	Pitchbook
1	United States (2,062)	United States (2,344)
2	United Kingdom (869)	United Kingdom (837)
3	Germany (254)	Singapore (210)
4	Canada (250)	Canada (270)
5	Singapore (207)	Germany (156)
6	France (165)	France (144)
7	Spain (129)	Spain (130)
8	Switzerland (114)	Switzerland (112)
9	Sweden (79)	China (204)
10	Italy (76)	Japan (66)
11	Netherlands (71)	Sweden (58)
12	Japan (69)	Netherlands (54)
13	China (56)	Ireland (42)
14	Ireland (44)	Denmark (40)
15	Denmark (38)	Belgium (38)
16	Belgium (32)	Italy (26)
17	Poland (23)	Poland (14)
18	Austria (21)	Portugal (12)
19	Finland (17)	Austria (10)
20	Portugal (14)	Finland (6)

Source: Dealroom and Pitchbook. 2021 data, latest available year for comparison

METHODOLOGICAL NOTES

SURVEY AND CONSISTENCY CHECK OF THE DATABASES USED

Databases on the number of fintech firms. The main databases used to estimate the number of operators in the fintech sector internationally are the Cambridge Fintech Ecosystem Atlas, developed by the Cambridge Center for Alternative Finance (CCAF), Dealroom and Crunchbase, compiled by private data providers. Statista and Pitchbook were also used for specific information needs²⁸.

The definition of “fintech firm” generally proposed by the various data providers refers to entities that make intensive use of technology to provide or enable the provision of innovative banking, financial and insurance services; this definition is in line with the broader concept of “fintech” outlined in 2017 by the Financial Stability Board²⁹.

In this paper, fintech operators are referred to as “fintech firms” or “fintech business initiatives”, denoting innovative companies united by their intensive use of technology applied to finance.

These firms may be of different ages. Alongside recently established operators, there are also more mature ones that have wholly or partly reconfigured their business model, and others facing a start-up phase that is more drawn out over time owing to technological and business uncertainties that blur the typical boundaries of innovative firms' initial development. For this reason, the terms “start-up” or “scale-up” are not used. Confirming the soundness of this approach, the various data providers used in this paper generally include in their fintech firm counts initiatives established since 2005 and still active at the end of 2023³⁰.

As for the scope of the fintech sector, the different information sources may capture partly different sets of entities depending on whether they include incumbent intermediaries and/or providers of technology services not exclusively directed at finance (tech providers).

The main characteristics of the databases used are summarized below.

The Cambridge Fintech Ecosystem Atlas, produced by the Cambridge Center for Alternative Finance, records around 4,200 fintech entities present in around one hundred jurisdictions, reporting certain characteristics such as sector of activity, geography of operations and year of foundation. The main way the dataset is populated is through self-reporting by trade

²⁸ Statista was used to check macro-area aggregates and Pitchbook for a further check of the global and Italian totals.

²⁹ See FSB (2017). Fintech refers to “technology-enabled innovation in financial services that could result in new business models, applications, processes or products with a material effect on the provision of financial services”.

³⁰ The Polytech University of Milan Fintech & Insurtech Observatory also records firms established in the last 15 years.

associations or public institutions. The data collected are verified through web scraping, analysis of company documents, press reports, statements by company representatives and interviews.

Dealroom is one of the leading private databases, founded in Amsterdam and active worldwide in providing statistical information on the diffusion of firms and on the funding cycle for many countries and sectors. Data are collected and aggregated from public and private sources, thanks to partnerships with financial institutions, through interfaces and machine-learning algorithms. The information is verified by Dealroom analysts.

Crunchbase is a California-based platform that collects registry information, balance-sheet and financial metrics for over three million firms at various stages of maturity across a wide range of countries and economic sectors, including fintech. Data is obtained through web scraping and crawling techniques³¹ to extract information from publicly accessible online sources or through interfaces with other data sources (financial databases, investment platforms, etc.), machine-learning algorithms and collaborations with entities that provide specific company data.

Statista is a German digital dashboard offering access to a wide range of data, reports and charts from other data providers, official, corporate and academic sources, and sector studies, on economic, financial and technological topics. The database reports the aggregate number of fintech operators for the main geographical macro-areas of reference: Americas (North, Central and South America), EMEA (Europe, Africa and the Middle East) and APAC (Asia and Pacific)³². Country-level breakdowns are not available except in occasional reports on individual economies.

Pitchbook is a US data provider offering corporate information on equity markets, mergers and acquisitions, and venture capital. The provider offers registry details, economic and financial indicators (data supplied by Morningstar), and data on firms' venture capital investments. Information on new companies is collected daily through software that performs automated searches of documents or websites.

Table N1 summarizes the survey criteria adopted by each provider for defining the scope of the fintech sector and the geographical location of firms.

Consistency analysis of the data on the number of fintech firms and choice of information source. At the end of 2023, the overall number of fintech business initiatives recorded worldwide by the various information sources range from around 28,000 for Crunchbase to around 40,000 for Dealroom³³. Statista's figures (around 30,000) fall to an intermediate level.

³¹ Crawling refers to the process of accessing a website and retrieving data obtained through a computer program or software.

³² For a more precise definition of the above macro-areas, see Table N2.

³³ Pitchbook data as of October 2024 are also available, recording around 39,000 firms worldwide.

To conduct a statistical consistency analysis between the databases, a sample of 20 European and non-European countries was selected for which data availability allows an adequate comparison.

The countries in the sample are ranked in Table N3 according to their GDP in current US dollars in 2023; other structural data relevant to the analysis are also reported.

As for the representativeness of the sample, the selected countries hold an overall share of almost 70 per cent of world GDP and, in 2023, attracted almost 90 per cent of the global amount of fintech VC investment. The sample is therefore representative of the size of the global economy and of the fintech VC market.

As can be seen in Table A1 in the Statistical Appendix, the three databases used produce very similar rankings of countries in terms of the number of fintech firms. The country ranking is therefore consistent across the three databases, and the use of any of the three is not distortionary. Correlation analysis and standard statistical tests confirm the consistency of the databases and the equality of average values across the different information sources.

Consequently, for the analyses carried out, Dealroom was chosen as the reference source, as it offers granular and up-to-date data on the main economies.

Databases on fintech VC investment. The databases compared for fintech VC investment are Dealroom, Pitchbook and Statista (for the definition of fintech VC in the various databases, see Table N4). The latter source does not report granular country-level data but aggregates information by macro-area.

The variables of interest for analyzing the trend and distribution of venture capital investment directed at fintech in the 20 countries in the sample are: the amount of investment and the number of fintech VC transactions carried out (rounds or deals)³⁴.

Dealroom and Pitchbook data (drawn from the research paper by Cornelli et al. (2021)) report the amounts invested and the number of fintech transactions for the countries in the sample, with the geographical attribution criterion for fintech VC investment being the location of the target firm. The period covered by both databases and used for the consistency analysis is 2010-2021.

³⁴ In venture capital parlance, transactions are often referred to as “rounds”, since investors disburse capital in successive instalments of increasing amount, conditional on the funded firm reaching predetermined performance targets (milestones). In private equity, transactions are generally larger and carried out in a single tranche and are more often referred to as “deals”. In both sectors, the term “mega deals” is used to denote very large transactions. (See Glossary).

Data are included on the stages characterizing the financial life cycle of firms receiving venture capital funding (staged financing). For the analysis that follows, the stage classification offered by Dealroom is adopted, which distinguishes venture capital investment phases into: early stage, break-out stage, later stage³⁵.

In addition to the sources cited, data from national and European trade associations were also consulted to make comparisons between the Italian and European venture capital markets for the economy as a whole³⁶.

Consistency analysis of the data on fintech VC investment and choice of information source. As can be seen from Figure 10, for the 20 countries in the sample, according to Dealroom and Pitchbook, the trends in fintech VC investment and in the number of transactions are entirely consistent. Correlation analysis between the two sources' series confirms these results.

Dealroom and Pitchbook offer geographical distributions of fintech VC investment and transaction numbers that allow country rankings to be built (see Tables A2 and A3 in the Statistical Appendix). The analysis shows that the country ranking is very similar in the two databases and that the dispersion of individual country data around their respective sample means is of the same order of magnitude in both databases.

Therefore, in line with the choice made for the number of fintech firms, Dealroom is also chosen as the reference source for studying fintech VC trends.

Table N1 – Survey criteria in the databases

Fornitore di dati	Possibile inclusione di incumbent e tech provider generici	Localizzazione delle imprese censite per sede legale	Disponibilità di dati granulari per singoli Paesi
CCAF (Atlas)			✓
Dealroom	✓	✓	✓
Crunchbase		✓	✓
Statista	✓	✓	
Pitchbook	✓	✓	✓

³⁵ Each stage is associated with progressively larger transaction amounts, corresponding to increasing valuations of the target firm and generally decreasing levels of risk. The size thresholds used to classify stages are not rigid but derive from market practice and may vary from one information source to another according to information needs. Dealroom adopts the following: early stage for transactions under 15 million dollars; break-out stage for transactions between 15 and 100 million dollars; later stage for transactions over 100 million dollars; mega deals for transactions over 300 million dollars. See also the Glossary.

³⁶ Respectively: AIFI, the Italian Private Equity, Venture Capital and Private Debt association, and Invest Europe, the European Private Capital association.

Table N2 – Definition of macro-areas

Macro-area	Geographical areas included	Countries included
Americas	North America, Caribbean and Central America, South America	Anguilla, Argentina, Aruba, Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, Bolivia, Brazil, Cayman, Canada, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Cuba, Curacao, Dominica, Dominican Republic, Guyana, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay, USA, Venezuela.
EMEA	Europe, Middle East and Africa	Albania, Algeria, Andorra, Angola, Austria, Bahrain, Belarus, Belgium, Benin, Bosnia/Herzegovina, Botswana, Bouvet Island, British Indian Ocean Territory, Bulgaria, Burkina, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Cote D'Ivoire, Croatia, Cyprus, Czech Republic, Democratic Republic of Congo, Denmark, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Faroe Islands, Finland, France, Gabon, Gambia, Germany, Ghana, Gibraltar, Greece, Guinea, Guinea Bissau, Hungary, Iceland, Iran, Iraq, Ireland, Israel, Italy, Jordan, Kenya, Kuwait, Latvia, Lebanon, Lesotho, Libya, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Mali, Malta, Mauritania, Mauritius, Mayotte, Moldova, Monaco, Morocco, Mozambique, Namibia, Netherlands, Niger, Nigeria, Norway, Oman, Poland, Portugal, Qatar, Reunion, Russia, Rwanda, Romania, San Marino, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Slovakia, Slovenia, Somalia, South Africa, Spain, St Helena, Sudan, Svalbard, Swaziland, Sweden, Switzerland, Syria, Tanzania, Togo, Tunisia, Turkey, Uganda, United Arab Emirates, United Kingdom, Vatican City, Western Sahara, Yemen, Yugoslavia, Zambia, Zimbabwe.
APAC	Asia, Australia, Pacific	Afghanistan, Australia, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Hong Kong, Cook Islands, Democratic People's Republic of Korea, Fiji, India, Indonesia, Japan, Kiribati, Lao People's Democratic Republic, Malaysia, Maldives, Marshall Islands, Micronesia (Federated States of), Mongolia, Myanmar, Nauru, Nepal, New Zealand, Pakistan, Palau, Papua New Guinea, Philippines, Republic of Korea, Samoa, Singapore, Solomon Islands, Sri Lanka, Thailand, Timor Leste, Tonga, Tuvalu, Vanuatu, Vietnam.

Table N3 – Main characteristics of the sample countries

Country	GDP*	% world GDP**	Population***	% world market cap****
United States	27,361	26	335	43
China	17,795	17	1,410	12
Germany	4,456	4	84	2
Japan	4,213	4	124	6
United Kingdom	3,340	3	68	3
France	3,031	3	68	3
Italy	2,255	2	59	1
Canada	2,140	2	40	3
Spain	1,581	2	48	-
Netherlands	1,118	1	18	1
Switzerland	885	0.8	9	2
Poland	811	0.8	37	0.2
Belgium	632	0.6	11	-
Sweden	593	0.6	11	-
Ireland	546	0.6	5	-
Austria	516	0.5	9	0.1
Singapore	501	0.5	6	0.7
Denmark	404	0.4	6	-
Finland	300	0.3	5	-
Portugal	287	0.3	11	0.1

Source: World Bank. Reference year 2023. *Billions of current dollars; **Ratio of the country's GDP to world GDP, both in current US dollars; ***Millions of people ****Ratio of the value of all shares listed in a country to the value of all shares listed worldwide.

Table N4 – Definition of fintech VC in the databases

Database	Definition of fintech VC
Dealroom, Pitchbook and Statista	Dealroom, Pitchbook and Statista provide venture capital data broken down by fintech, i.e. recording risk capital investments in firms (targets) belonging to the fintech sector, as defined in Table N1. Early Stage, Break Out Stage and Later Stage Capital transactions are included, as defined in the Glossary. Financing through debt funds or other non-equity financing and ICOs³⁷ are excluded. Extraordinary finance transactions such as acquisitions, mergers (M&A), secondary market transactions and IPOs³⁸ are considered exit routes and are excluded from the investment data. The value of transactions (rounds) is estimated based on the value published by the counterparties, supplemented by other specific checks. The geographical location criterion for transactions is the target firm's registered office.
AIFI	AIFI is the Italian private equity, venture capital and private debt association; its members are specialized funds and companies that invest in unlisted companies and that offer debt instruments. Other parties belonging to the association include associations, institutions, professional firms, consultants, universities and accelerators, venture capital and institutional investors. Market data are drawn from the European Data Cooperative (EDC) platform, developed with national European trade associations and with Invest Europe, the European private equity and venture capital association. Every six months, AIFI publishes, together with LIUC – Università Cattaneo, a study on the Italian market conducted by the VeM – Venture Capital Monitor Observatory, based on a broad sample of entities, generally AIFI members. There is no breakdown of investment in fintech, only the sectoral distribution of target firms (e.g. ICT is the leading sector, accounting for 40% of total investment in 2023). The analysis covers Italian target firms or foreign target firms with Italian founders.
GROWTH CAPITAL/ITALIAN TECH ALLIANCE	Growth Capital Srl is a Milan-based consultancy offering digital services for alternative finance to facilitate matches between investors and firms; Italian Tech Alliance is an association of venture capital investors (asset management companies, holding companies, industrial firms, business angels and family offices) active in Italy. The two bodies publish quarterly data on the Italian venture capital market (Venture Capital Observatory), recording transactions (rounds) involving firms based in Italy and firms based abroad but with Italian founders and a majority of employees in Italy. The dataset is private, based on Pitchbook data supplemented with information from press releases of the recipient firms, verified by industry-internal confidential sources. Excluded from the analysis are rounds that cannot be unambiguously classified as venture capital, those with an undisclosed size or a size below € 50 thousand, and those in the form of debt.

³⁷ Initial coin offering: cryptocurrency issuances.

³⁸ Initial public offering: listings on regulated markets.