Taxonomy of the Spanish FinTech ecosystem and the drivers of FinTechs' performance

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TAXONOMY OF THE SPANISH FINTECH ECOSYSTEM AND THE DRIVERS OF FINTECHS' PERFORMANCE

Abstract

The main aim of the paper is to examine the current situation and evolution of the Spanish FinTech ecosystem and the driving forces of the performance of these firms. After examining the current situation of the Spanish FinTech ecosystem at an international level, we show that Spain has a solid and dynamic FinTech sector in terms of FinTech firms per capita (5 firms per million inhabitants) but with relatively low levels of investments and FinTech credit (3.4€ per capita). We also show that most of the Spanish FinTechs are focused on offering B2B solutions, obtain revenues via charging fees or commissions and have not matured enough. Moreover, most of these firms were founded by entrepreneurs and are located in large cities such as Madrid and Barcelona. We also document a positive evolution of the funds invested – mainly through venture capital funds – on the whole Spanish FinTech sector since 2014. In terms of performance, FinTechs founded by a few number of entrepreneurs perform better. We also find that being located in Madrid or Barcelona does not have an effect on performance while those FinTech receiving external financing via seed capital exhibit lower returns.

1 Introduction

After the global financial crisis, the adoption of new digital technologies in the financial sector to provide the new and improved financial services has led to a technological transformation of financial services. The Financial Stability Board (2017) defines the FinTech phenomenon as a "technologically enabled financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions, and the provision of financial services." The FinTech phenomenon involves a change of paradigm that is revolutionizing the financial sector [Stiglitz (2017); Arner et al. (2017)]. On the demand side, technological and digital customers demand a different way of managing their finances. On the supply side, while the incumbent financial institutions have gradually undergone through its own digitalization process [Carbó-Valverde et al. (2020a)], new players have also emerged as consequence of the technological transformation of the financial sector, the so-called FinTech firms. These newcomers have developed alternative models based on the micro-segmentation of the products offered and have focused on improving customers' experience [Marjanovic and Vijaya (2016); Pousttchi and Dehnert (2018); Puschmann and Alt (2016)].

While the FinTech phenomenon was initially geographically concentrated in the most technologically advanced regions (e.g. United States or United Kingdom) and characterized by the presence of small start-ups, the phenomenon has become global and these FinTech firms have scaled. The growth of the FinTech ecosystem is being relevant in several dimensions: the global population of FinTech firms, the volume invested on the sector and number of customers. As in other countries and regions, the Spanish FinTech ecosystem has experienced a significant growth, transforming itself during the last decade.

At the same time, the global FinTech phenomenon is currently facing two main challenges. First of all, FinTech firms are also facing the competition from large technology (BigTech) firms. In this sense, while Fintech companies are set up to operate primarily in financial services, BigTech offer financial services as part of a much wider range of activities [Bank for International Settlements (2019)]. Secondly, the recent health emergency due to Covid-19 is likely to have an impact on the future of FinTech. The dramatic social change caused by the coronavirus could be seen as an opportunity but also as threat to these firms. On the one hand, the use of digital apps to manage personal finances may increase. Then, FinTech firms could be able attract more customers by offering digital and personalized financial services. On the other hand, the economic crisis caused by the virus may threat the whole FinTech sector if as the economic slowdown increases the default rates on FinTech loans as reduces investor's appetite for risky (startup) firms.

The aim of the paper is to examine the current situation and evolution of the Spanish FinTech ecosystem and the driving forces of the performance of these FinTech firms. In doing so, we firstly revise the academic literature in order to frame the current knowledge on the FinTech phenomenon and FinTech firms. Then, this paper contextualizes the role of the Spanish FinTech ecosystem at an international level. Moreover, by examining a number of dimensions – types of financial services offered, business and revenue models, foundation characteristics and financing – we are able to characterize the Spanish FinTech ecosystem and the level of maturity of the FinTech sector. Finally, the paper examines what drives the performance of these firms in the Spanish market. For this purpose, we run a regression on FinTech performance using a panel of FinTech firms registered and operating in Spain from 2009 to 2017.

By way of preview, we show that Spain has a solid and dynamic FinTech sector which is becoming one of the most important in terms of number of FinTech firms per capita. However, compared to other European ecosystems, there seems to be lower investors' appetite for Spanish FinTechs firms. In terms of FinTech credit, despite the FinTech phenomenon, banks continue to have a prominent role as credit providers in Spain. In this sense, even though the majority of the Spanish FinTechs are categorized into the lending segment, the percentage of FinTech firms focused on lending is relatively smaller compared to other European economies.

Furthermore, we document that typically Spanish FinTechs are focused on offering their financial solutions to other firms (B2B, Business-to-Business), obtain revenues via charging fees or commissions and they are currently on a seed stage of growth. Moreover, most of these firms were founded by entrepreneurs and are located in large cities such as Madrid and Barcelona. In terms of external financing, we observe a positive evolution of the funds received by the whole Spanish FinTech sector since 2014, mainly through venture capital funds.

Finally, we also find that FinTechs founded by entrepreneurs seem to perform better but as the number of founding partners increases the performance decreases. We also find that being located in Madrid or Barcelona does not have an effect on performance while those FinTechs that have received external financing via seed capital seem to perform worse.

The remainder of the paper is organized as follows: section 2 reviews the related literature on FinTech firms; section 3 provides an overview of the Spanish ecosystem in the global FinTech phenomenon; section 4 analyzes the main characteristics of the Spanish FinTech ecosystem; section 5 examines empirically the drivers of FinTech firms' performance; and section 6 concludes.

2 A review of FinTech firms

The International Organization of Securities Commissions (2017) defines FinTech as "a variety of innovative business models and emerging technologies that have the potential to transform the financial services industry." Then, those firms that emerge as result of these innovative business models are the so-called FinTech. Gimpel et al. (2018) define FinTech firms as newly established businesses that offer financial services. Gomber et al. (2017) argues that FinTech refers to innovators and disruptors in the financial sector that make use of the availability of ubiquitous communication, specifically via the Internet and automated information processing. However, as it has already being argued, a constitutive characteristic of those firms is that, unlike other firms offering financial services, they are born to be customer-centric [Marjanovic and Vijaya (2016); Pousttchi and Dehnert (2018); Puschmann and Alt (2016)].

While also incumbents have undergone through a technological transformation [Carbó-Valverde et al. (2020a)], the emergence of FinTech firms seems to be valuable for the financial sector as a whole [Chen et al. (2019)]. In this sense, these companies, which are mostly entrepreneurial, have driven major innovations in several areas (e.g. payment, wealth management, lending, and crowdfunding) by incurring lower operating costs, targeting more niche markets, and providing more personalized services than traditional financial firm. In this sense, FinTechs are playing a role in expanding financial inclusion [Gabor and Brooks (2017)]. Fintech credit offers an
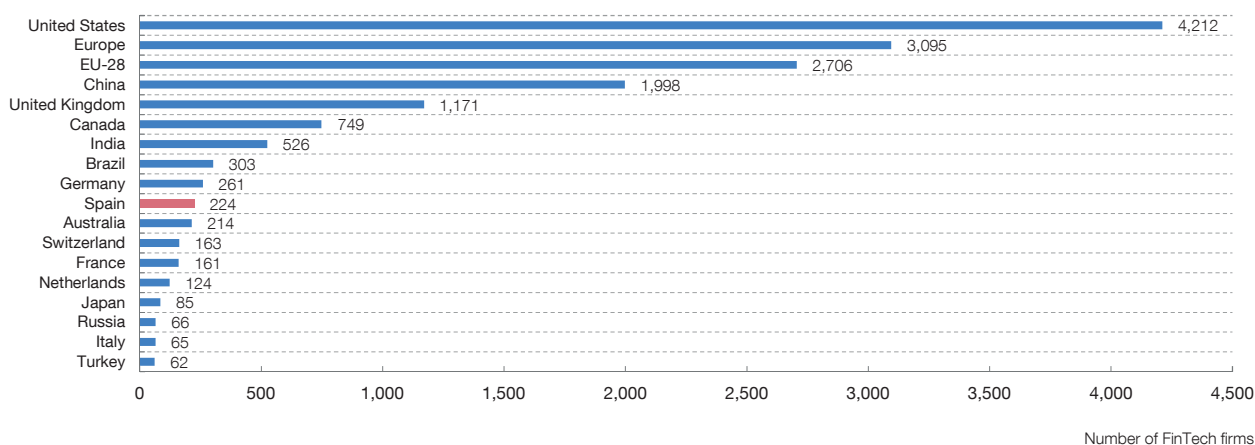
alternative funding source for businesses and consumers, and may improve access to credit for underserved segments [Claessens et al. (2018)]. In those countries with a large proportion of unbanked population, FinTechs exhibit higher adoption rates of FinTech services [Ernst and Young (2017)]. For example in China, where FinTech solutions have become very popular, Chen (2016) find that that Fintech companies can improve financial inclusion given supportive flexibility. FinTechs firms are also improving the financial inclusion in advanced economies. Underbanked consumers from developed economies are increasingly adopting digital financial services provided by FinTechs firms. Using U.S. data, Jagtiani and Lemieux (2018) find that lending activities have penetrated areas that may be underserved by traditional banks, such as in highly concentrated markets and areas that have fewer bank branches per capita. Furthermore, the emergence of these non-bank lenders have an impact on credit supply. Elliott et al. (2019) find that nonbanks expand lending to U.S. corporate borrowers after a monetary contraction relative to their bank peers. Similarly, FinTech lenders are better able to respond to local demand shocks by expanding lending without tightening lending standards or taking excessive-risk [Shan (2018)]. Using lending data from China, Hau et al. (2017) find that FinTech credit mitigates local credit supply frictions in segmented credit market and extends the frontier of credit availability to firms with a low credit score.

Regarding the drivers of FinTechs' emergence, Haddad and Hornuf (2018) examine the economic and technological determinants inducing entrepreneurs to create FinTech firms to conclude that the level of technological development of the country – the number of secure Internet servers and mobile telephone subscriptions – as well as an easy access to financing (via venture capital) foster FinTech formation. However, as Brandl and Hornuf (2017) highlight, entrepreneurial dynamics in the FinTech sector such as the educational and business background of the founders also drive the emergence of new FinTech startups. In this sense, some industry report have shown that many founders of FinTech companies are often former bank employees who left their jobs since the onset of the 2007-2008 financial crisis. Their expertise and knowledge of the financial sector has led them to relate their financial knowledge with new technologies in order to create new and products and services oriented towards clients. Moreover, Carbó-Valverde et al. (2020b) also find that FinTech profitability and survival are positively affected by some of the foundational characteristics.

Finally, prior literature has also examined FinTechs' relationships with the incumbents' players (banks). While initially FinTech and banks were seen as competitors, the relationship has evolved towards establishing some collaborations. FinTechs have started to interact with banks through alliances [Klus et al. (2018)]. However, as it is shown by prior literature, banks and FinTechs establish collaborations pursuing different objectives [Drasch et al. (2018); Holotiuk et al. (2018)]. Drasch et al. (2018) examine cooperation between banks and Fintechs to conclude that Fintechs are unwilling to sell their innovation, and banks lack the opportunity to fully integrate a

Chart 1
FINTECH POPULATION (2019)

Country	Number of FinTech firms
United States	4,212
Europe	3,095
EU-28	2,706
China	1,998
United Kingdom	1,171
Canada	749
India	526
Brazil	303
Germany	261
Spain	224
Australia	214
Switzerland	163
France	161
Netherlands	124
Japan	85
Russia	66
Italy	65
Turkey	62

Number of FinTech firms

SOURCES: Crunchbase and own elaboration.

product or process into their organization. In this sense, banks prefer to interact with FinTechs as service providers, avoiding expensive and sophisticated integration effort.

3   Spain in the Global FinTech phenomenon

The FinTech phenomenon that emerged after the 2007-2008 global financial crisis was strongly geographically located in technological (i.e. Silicon Valley) and financial hubs (i.e. New York and the "City" of London). However, the phenomenon has evolved and it has expanded globally to other developed and developing areas. Then, in order to understand better the Spanish ecosystem, it is important to compare internationally the degree of development and maturity of the whole sector. In doing so, we focus mainly on three dimensions: FinTech population, volume of funds invested on the sector and FinTech credit per capita.

Figure 1 shows the number of FinTech firms actively operating on some selected countries. This figures shows that United States has the largest FinTech population, with 4,212 FinTech firms. The U.S. FinTech sector is considered the largest in the world with many of those FinTech based on some clusters areas such as Silicon Valley, San Francisco or New York. In this sense, some of the more popular FinTech companies in terms of customers and valuation are based on these U.S. cities. Then, we can also observe that the European FinTech sector is also relevant more, with 3,095 FinTech firms. However, most of these European FinTech are based on United Kingdom. UK FinTech firms represent around 37% of the European ecosystem and 43% of the FinTech of the European Union. In this sense, the "City"

FINTECH FOUNDED YEARLY (SPAIN VS EUROPE) (2009-2018)

|	Europe	Europe (excl. UK)	Spain	Spain/Europe (%)	Spain/Europe (excl. UK) (%)
2009	355	224	14	3.94	6.25
2010	435	298	26	5.98	8.72
2011	498	361	37	7.43	10.25
2012	659	449	35	5.31	7.80
2013	776	535	36	4.64	6.73
2014	917	649	49	5.34	7.55
2015	936	653	41	4.38	6.28
2016	898	635	48	5.35	7.56
2017	981	737	47	4.79	6.38
2018	872	614	48	5.50	7.82

SOURCES: Dealroom.co and own elaboration.

of London plays an important role in attracting the creation of FinTechs. Also the Chinese FinTech ecosystem is vibrant, with around two thousands FinTech firms. While the FinTech phenomenon arrived later to China, the Chinese FinTech ecosystem is achieving scale and innovation rapidly. However, the evolution of the Chinese seems to be different, while U.S. and European Fintech firms have tried to succeed via specialization in a core field followed by geographic expansion, most of the Chinese Fintech have typically focused on their domestic market by offering high-engagement consumer platforms. Figure 1 also shows that FinTech have found a niche on emergent countries such as India and Brazil. In those countries, the FinTech sector is playing a role on improving financial inclusion by building inclusive, consumer-centric products. The large percentage on unbanked population in those emergent countries is perceived as an opportunity for those FinTech born in those countries. Regarding Spain, Figure 1 reveals that the Spanish FinTech ecosystem is similar in size to the German but larger than the French, Swiss, Dutch or Italian. In this sense, in terms of number of FinTech firms per capita, it is the country with one of the largest ratio of FinTech per habitant in Europe. In Spain there are approximately 5 firms per million inhabitants while in the whole continent there are 3.4 firms per million inhabitants. These figures reveals that Spain has a solid and dynamic FinTech sector which is becoming one of the most important in Europe.

In order to compare the dynamics of the Spanish FinTech market compared to the European market, we look at the number of newly FinTech firms created annually. Table 1 shows that the share of newly created FinTech companies in Spain over the total in Europe has remained stable around 4% to 6%. Only in 2011 the percentage grew a bit more (7.4%). We also exclude United Kingdom from the comparison as it is quite sizeable (Column 6 of Table 1). The fraction of FinTech firms founded in Spain

Chart 2
INVESTMENTS ON FINTECH FIRMS (2014-2019)
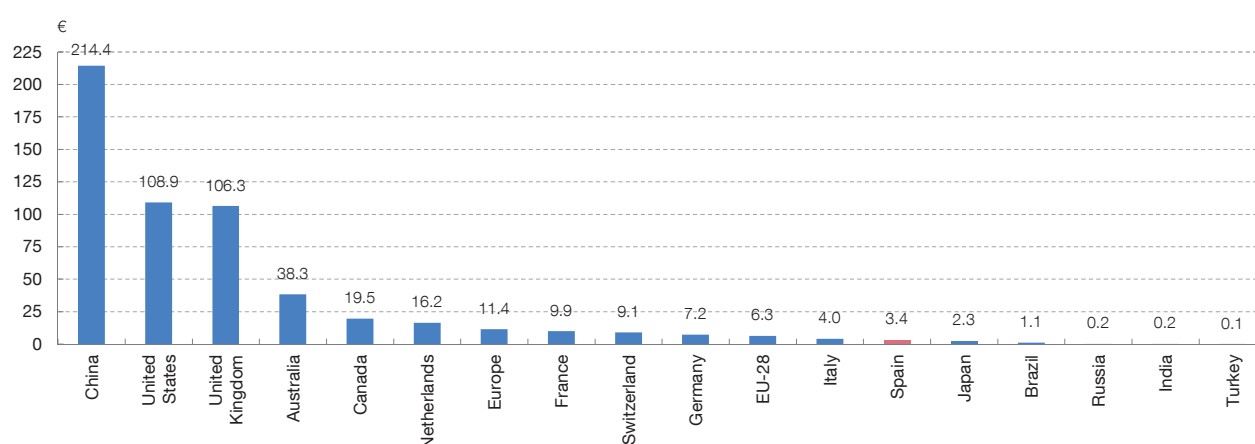
Thousands millions €
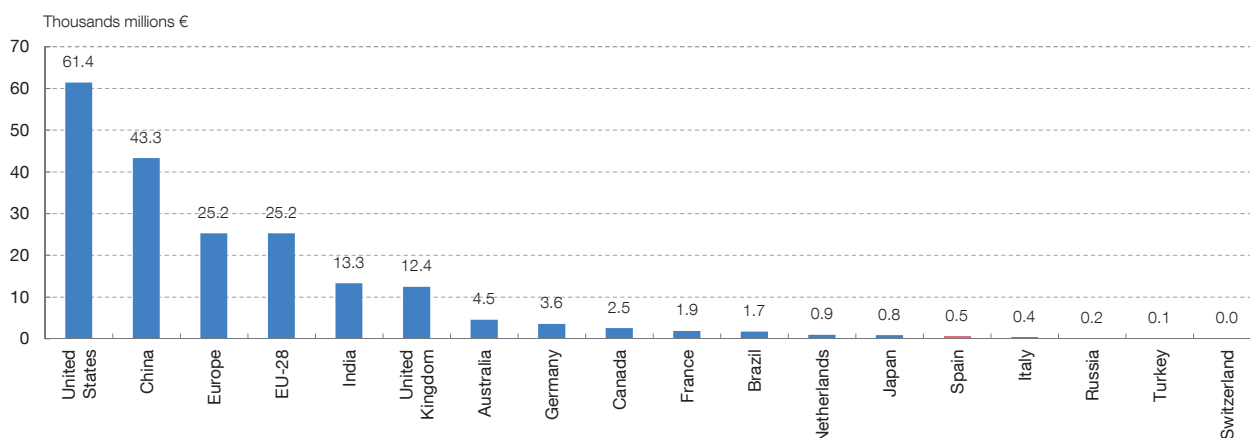
SOURCES: Dealroom.co and own elaboration.

over the total number of them founded in Europe (UK excluded) has remained stable around 6%-8% annually.

Furthermore, the importance of the FinTech sector could also be observed by the funds that the FinTech are able to raise from worldwide investors. In this sense, the level of investments received by FinTechs is likely to reveal the potential of the company. Figure 2 shows the total funds raised by FinTech firms in some selected countries from 2014 to 2019. These figures do not consider internal funding (i.e. reinvestment of profits) but the whole of external funds raised by FinTech (e.g. venture capital, seed capital, debt, equity crowdfunding, etc.). This figure confirms the global relevance of the U.S. FinTech sector, one out of three euros invested on FinTech in the world since 2014 have been invested on U.S. FinTech firms. Then, Chinese (21.85%) and European (12.78%) FinTech firms also account for a large proportion of the funds invested on this type of financial companies. In what regards to the Spanish FinTech sector, the data shows that Spanish Fintechs tend to receive lower investments than other European FinTechs. In this sense, since 2014 the Spanish FinTech sectors has just raised 500 million of euros, which is just 1.92% of the total funds raised by the European FinTechs (3.79% excluding United Kingdom). These data could reflect a lower investors' appetite for Spanish FinTechs firms compared to other European FinTechs. Most of the Spanish FinTech tend to be internally financed. Traditionally only those mature FinTechs in late growth stages ask for external funding to scale and grow.

Finally, in order to contextualize the FinTech phenomenon and specially the role played by the Spanish FinTech ecosystem, we examine the volume of FinTech credit. In this sense, a large volume of credit provided by FinTech companies

Chart 3
FINTECH CREDIT PER CAPITA (2017)

€

225	214.4 (China)
200	
175	
150	
125	
100	108.9 (United States), 106.3 (United Kingdom)
75	
50	38.3 (Australia)
25	19.5, 16.2, 11.4, 9.9, 9.1, 7.2, 6.3, 4.0, 3.4, 2.3, 1.1, 0.2, 0.2, 0.1
0	

China 214.4 · United States 108.9 · United Kingdom 106.3 · Australia 38.3 · Canada 19.5 · Netherlands 16.2 · Europe 11.4 · France 9.9 · Switzerland 9.1 · Germany 7.2 · EU-28 6.3 · Italy 4.0 · Spain 3.4 · Japan 2.3 · Brazil 1.1 · Russia 0.2 · India 0.2 · Turkey 0.1

SOURCES: Cambridge Centre for Alternative Finance and own elaboration.
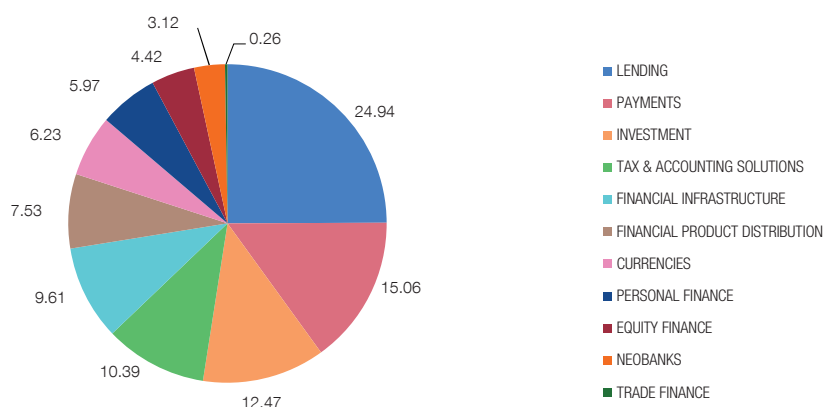
would reflect that those companies are playing a relevant role in the economy financing consumers and businesses. Figure 3 shows the FinTech credit per capita for some selected countries. In line with research, China exhibits the largest ratio of FinTech credit per capita. On average a Chinese consumer has received annually 214€ by FinTech companies. This figure reveals the penetration of those FinTech companies as credit providers in China. Online lenders (including mobile lenders) and peer-to-peer platforms have become quite popular in China. Moreover, the penetration of the FinTechs could also be observed in United Stated and United Kingdom, in both countries the volume of FinTech credit per capita exceeds the 100 euros. However, except for United Kingdom, the penetration of FinTech credit is scarce in Europe (a European just receives annually around 11 euros from FinTech firms). This figure suggests that despite the FinTech phenomenon, banks continue to have a prominent role as credit providers in Europe. Regarding the FinTech credit per ratio in Spain, it could be observed that it is below the five euros threshold (and the European average). This findings could be explained by the segmentation of the Spanish FinTech industry. Although the majority of the Spanish FinTechs are categorized into the lending segment the percentage of FinTech firms focused on lending is relatively smaller compared to other European countries. Moreover, the most popular Spanish FinTechs (by number of customers and size) are focused on providing payments or personal finance solutions.

4 The Spanish FinTech ecosystem

In order to offer a detailed picture of a typical Spanish FinTech as well as the level of maturity of the FinTech sector, we examine a number of firm characteristics. Firstly,

LENDING
PAYMENTS
INVESTMENT
TAX & ACCOUNTING SOLUTIONS
FINANCIAL INFRASTRUCTURE
FINANCIAL PRODUCT DISTRIBUTION
CURRENCIES
PERSONAL FINANCE
EQUITY FINANCE
NEOBANKS
TRADE FINANCE

SOURCES: Finnovating and own elaboration.

we examine on what kind of financial services tend to focus these firms. Then, we examine their business orientation (consumers vs. businesses) and the most common revenue models. The foundation characteristics, type of founder and location, are also examined. And finally, since the FinTechs' access to external funds is key in order to be able to scale and growth, we also examine what these firms are funded.

4.1 Types of financial services

Figure 4 shows the breakdown of FinTech firms by activity. Following the classification used by the Spanish Association of FinTech and Insurtech (AEFI), Spanish FinTechs could be classified into 11 different categories. Other FinTech related activities such as InsurTech, RegTech and LegalTech are not considered since the solutions offered by those firms are not strictly financial. As Figure 4 shows, the majority of the Spanish FinTechs are classified as credit providers. Almost one out of every four, are active in this segment, which includes FinTechs that provide crowdfunding, crowdlending, microcredit, online lending and factoring solutions. Moreover, a high percentage of FinTech firms (15.06%) are providing payments solutions. This category comprises all these firms that provide new and innovative payment solutions, such as online or mobile payment systems. In this sense, most of these companies are strongly oriented towards businesses (B2B, Business-to-Business) in order to provide to small and medium firms (SMEs, Small and Medium Enterprises) payments solutions to foster them selling online. As payment providers, many of these FinTechs have already been certified as electronic money and payments institutions by the National Securities Market Commission (CNMV). Then, it could be observed than

MODEL OF BUSINESS, REVENUE MODELS AND GROWTH STAGE (%)

Business model	
B2B	56.48
B2C	33.55
B2B and B2C	9.97
Revenue model	
Commission	58.72
Subscription	19.93
Marketplace	10.32
SaaS	8.90
Freemium	1.78
Pay per result	0.36
Growth stage	
Seed	48.70
Early growth	32.39
Late growth	18.91

SOURCES: Dealroom.co and own elaboration.

the investment segment is also quite popular (12.47% of the FinTech are providing investments solutions). This category includes FinTech firms providing services such as social trading networks, financial advisory based on robo-advisory, trading platforms and financial advisory on real estate assets. The adoption of new technologies such as Big Data Analytics and Artificial Intelligence on the investment field are fostering the growth of this segment with the appearance of invest-tech FinTechs, which are FinTech specialized on providing the technology to invest more efficiently.

It is also relevant to point out that these three categories– lending, payments, investment– concentrate the majority of the Spanish FinTechs (52.47%), which suggest that the activity of the Spanish FinTech is highly concentrated. Then, the rest of the sector is strongly equilibrated among FinTech offering tax and accounting solutions (10.39%), financial infrastructure (9.61%), financial product distribution (7.53%), currencies (6.23%) and personal finance (4.42%). Furthermore, Figure 4 also reveals the emergence of neobanks, which are FinTech firms (or 100% digital banks) providing a number of digital banking services (checking accounts, savings accounts and debit cards) via digital channels without any physical bank branches.

4.2 Model of business, revenue models and growth stage

Table 2 illustrates some of the key characteristics of Spain's FinTech players in terms of their business models. Table 2 reveals that 56.48% of the Spanish

FinTech firms are offering their financial products and services to firms (B2B, Business-to-Business) while just 33.55% are focused on consumers (B2C, Business-to-Consumer). This pattern, which has also been observed in other jurisdictions, suggest that FinTech firms are not targeting mainly consumers as it is often thought. The focus will depend largely on the type of activity conducted. In this sense, FinTech offering personal finance or the online distribution of financial products target mainly consumers while those FinTech providing a technological financial infrastructure (e.g. cloud computing services, biometric identification, user authentication or transaction/document signing) are focused on other businesses' needs.

Moreover, Table 2 also shows the distribution of FinTech firms based on their revenue model, which is key since as it has been argued in the industry it is important to translate customers into revenues. FinTech firms are classified into either of the categories considering what it is the main source of revenues for the company. In this sense, most of the FinTech (58.72%) are obtaining revenues via charging fees and commissions for the services offered. While this source of revenues it is the most popular, it reveals the importance of FinTech firms to scale and gain customers rapidly in order to obtain revenues to pay back the initial technological investments that they face when launching. There are other FinTechs, for example those on personal finance, which are obtaining revenues on a regular basis via subscriptions (19.93%). Moreover, we also observe other revenues models such as marketplaces (10.32%) and SaaS, Software as service (8.90%). This SaaS is a software licencing and delivery model in which software is licensed on a subscription basis and is centrally hosted. Most of the FinTechs offering tax and accounting solutions obtain revenues with this SaaS model. Moreover, we also observe new revenue models brought by some FinTech companies such as the freemium model. In this case, a product or service is provided free of charge, but money is charged for additional features or services.

Finally, Table 2 also reveals the growth stage of the current Spanish FinTechs. As could be observe a large fraction of FinTech are on a seed stage (48.70%), which is the period just after the company has launch and is working on improving their current services or products. Typically, those FinTech in this initial stage are gaining feedback from early adopters so they can refine what they offer before moving into the growth stage. In addition, around one out of three firms are currently on an early growth stage (32.39%) while just 18.91% of them are on a late growth stage. This feature of the Spanish FinTech ecosystem reveals that the sector is not mature enough and it is polarized. While there some FinTech launched in the recent years still trying working on their proof of concepts, there are many others which have matured and gone under a growth stage.

Chart 5

FOUNDATIONAL CHARACTERISTICS AND LOCATION (AS OF DECEMBER 2019)

% of FinTech firms
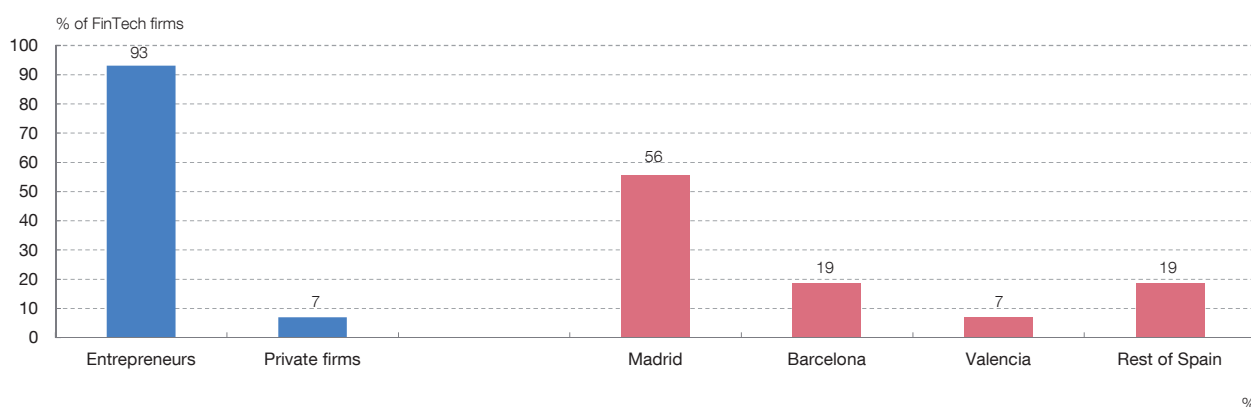
SOURCES: Dealroom.co and own elaboration.

4.3   Foundation and location

Figure 5 depicts some of the key characteristics of the Spanish FinTechs in terms of their foundation. It is remarkable that the majority of the FinTechs (93%) are founded by entrepreneurs. This result is not surprising since most of the FinTech are born as start-ups companies based on financial innovations. In many cases, they are founded by a group of them with different professional backgrounds (financial or technological). Only a small percentage of FinTech are born as result of an innovation created within an existing company. Most of the traditional financial entities -instead of developing new companies to offer new technological innovations for their customers– they have opted for establishing alliances with FinTech firms or even to acquire them. That would explain why just 7% of the Spanish FinTech are not under the umbrella of an already established company.

We also explore whether FinTech firms tend to be founded in areas/provinces where bank restructuring and branch closing has been more acute. After computing the number of provinces in which at least a FinTech was created from 2008 – 2018 (20 out of the 50 Spanish provinces), we did not find evidence of a relationship of that nature.

Furthermore, in terms of where these FinTechs are located, Figure 5 shows that there is a large geographical concentration of those companies in the most important cities of the country. Three out of four FinTech are established either in Madrid (56%) or Barcelona (19%). Even if those companies are operating at the national level (and some of them have gone abroad), the FinTech phenomenon seems to be strongly concentrated on the regions in with the higher economic activity. In this sense, large

Chart 6
EVOLUTION OF INVESTMENTS ON FINTECH FIRMS (2014-2019)
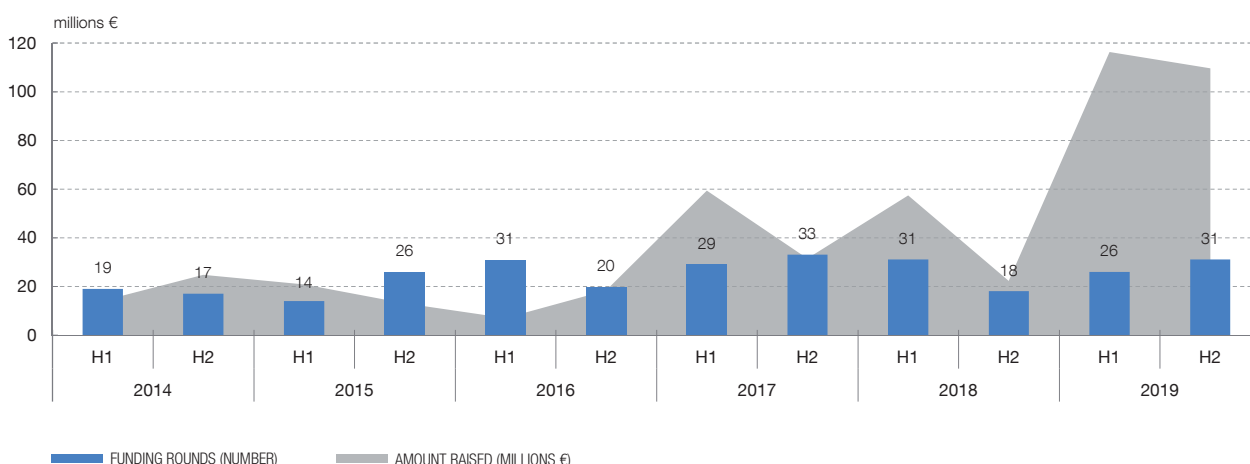
SOURCES: Dealroom.co and own elaboration.

cities such as Madrid, Barcelona and Valencia are becoming FinTech hubs where new startups decide to be established in order to be closer to the largest FinTechs' investors and the remaining financial sector.

4.4 Financing

As it has already being argued, FinTechs' access to funds is key in order to be able to scale and growth. In many cases, the added value of these companies lies on technological advances that require large investments. Then, the funding structure of FinTechs is key for their growth and survival. Figure 6 illustrates the evolution of the funds received by the whole Spanish FinTech sector since 2014. In aggregate terms, during the last six years FinTech firms have protagonized 295 funding rounds allowing them to raise 494 million euros. As Figure 6 reveals, the annual amount raised on those rounds have increased over time, reaching a record of 225.81 million euros in 2019. This positive tendency in terms of money raised by the Spanish FinTech sector is consistent with a growing sector which is maturing. In this sense, although the number of financing rounds has not varied significantly annually, the total amount raised has been increasing gradually. Consequently, this means that the rounds have been more successful. On average, on each of the rounds taking place in the first half of 2019 around 4.47 million euros were raised. While during the previous five years (from 2014 to 2018) the average was around 1.12 million euros. These figures evidence that the sector is being able to attract a greater attention from private investors.

FINANCING OF FINTECH FIRMS

Financing (2014-2019)	
VC-backed	96.64
Not VC-backed	3.36
Investors (2014- 2019)	Average = 1.92
1 investor	60.56
2 investors	17.78
3 investors	13.33
4 investors	6.11
> 4 investors	2.22
Type	
Seed	61.37
Early VC	14.44
Grant	10.47
Series A	8.30
Series B	3.25
Late VC	1.08
Series C	0.72
Growth equity	0.36

SOURCES: Dealroom.co and own elaboration.

Table 3 shows the structure of the investments on the Spanish FinTech ecosystem. Most of those investments are backed by venture capital (96.64%). This feature is not surprising, as prior industry reports have shown, most of the FinTech investments around the world are venture capital backed. Moreover, as Table 3 shows around 60% of these investments are conducted by a single investors, which is typically a venture capital. On average, there are on average there 1.92 investors on each round. In those cases in which more than one investors could be found, there is a mix of venture capital and individual private investors. Finally, Table 3 also distinguishes by the different types of investments received. Most of these investments (61.37%) are through seed money. This seed money typically includes seed venture capital funds, angel funding and crowdfunding. Since seed stage capital is typically invested during the earliest stage of the company formation, the large percentage of this type of funding rounds suggests that a large proportion of the Spanish FinTech ecosystem has not sufficiently matured. The next level of investments such series A, which is the first significant round of venture capital, just account an 8.30% of the total number of funding rounds since 2014. While the most advanced investments by the development stage of the company– series B, late venture capital and series C – they just account for a 5.05%. It is also interesting that grants (public or private) they account a 10.47%, which also reflect that not only investors are putting their money on

the FinTech sector but also public and private institutions are fostering the growth of the sector through subsidies.

5 Empirical analysis: FinTechs' performance

5.1 Dataset

In order to examine the performance of the Spanish FinTech, we have built a panel of FinTech firms which are actively registered and operating in Spain. In order to build our dataset we have followed a two-stage procedure. First of all, in order to identify the population of the Spanish FinTechs, we rely on the Spanish FinTech map elaborated on a monthly basis by Finnovating. In order to ensure that all the companies that appear on the map are actually active, we track whether those firms are active online as well as whether there are members of the Spanish Association of FinTech and Insurtech (AEFI). For robustness purposes, we have also cross-checked that the active FinTech are covered by the two data major sources covering the FinTech phenomenon: Crunchbase and Dealroom. These databases, which have already being used in prior studies [Bernstein et al. (2017); Cumming and Schwienbacher (2018); Haddad and Hornuf (2018)], contain a very detailed information on Fintech startup formations and their financing. After this cleaning process, a total of 212 FinTech firms remain on the sample.

Then, in a second stage in order to obtain information on the financial performance of these firms we use Sabi, which is the largest source of financial information for Spanish firms (more than 2 million Spanish firms are covered in this database). After matching our initial dataset with Sabi, there are a total of 135 FinTech companies for which we have information about their financial performance. Then, using this firm-level data we are able to build an unbalance panel data from 2009 (the year after the financial crisis breakout as the triggering event for the irruption of the FinTech phenomenon) to 2017 (the latest period since we have reliable information).

Panel A of Table 4 presents some summary statistics of the sample. The distribution of FinTech across types of financial services is similar to that reported in Figure 4. In this sense, these figures confirm that our sample is not biased towards some FinTechs.

As for the dynamics of FinTech performance, Figure 7 plots the percentage of FinTech firms exhibiting profits during our sample period. In 2009 around 28% of the FinTech companies in our sample were profitable while in 2017 40% of FinTech had profits.

Table 4
SUMMARY STATISTICS OF THE SAMPLE

	n	%
1 Sample distribution by activity		
Lending	37	27.41
Payments	24	17.78
Investment	17	12.59
Tax & accounting solutions	15	11.11
Financial infrastructure	14	10.37
Currencies	8	5.93
Financial product distribution	4	2.96
Personal finance	4	2.96
Neobanks	2	1.48
Total	**135**	

|	mean	median	sd	p25	p75
2 FinTech features					
Performance (ROA)	-0.25	-0.11	0.63	-0.40	0.03
Total assets (mil €)	744.97	264.01	1,228.92	84.15	804.45
Asset structure	0.61	0.63	0.31	0.33	0.91
Liquidity ratio	18.6	2	105.41	0.93	5.54
Indebtedness ratio	66.91	53.77	67.19	23.35	89.74
No. of founding partners	2.05	2	1.22	1	3
Entrepreneur	0.93	1	0.06	1	1
Seed capital	0.19	0	0.39	0	0
Madrid_Barcelona	0.57	1	0.50	0	1

SOURCE: Own elaboration.

5.2 Empirical modelling and variables

In order to examine what drives the performance of the Spanish FinTech companies we estimate a model in which the financial performance, which is measured as the return on assets based on the net income and total assets at the end of the year. As prior studies examining the performance of startups, we consider a set of variables that might affect FinTechs' performance: FinTechs' foundation characteristics ($X_{\text{FinTech Foundation}_{i,t}}$), FinTechs' location ($X_{\text{FinTech Location}_{it}}$), and FinTechs' financing ($X_{\text{FinTech Financing}_{i,t}}$) and FinTechs' accounting information ($X_{\text{accounting Information}_{i,t}}$). Then, we estimate the following model:

$$\text{Performance}_{i,t} \ X = \beta_0 + \beta_1 X_{\text{FinTech Foundation}_{i,t}} + \beta_2 X_{\text{FinTech Location}_{it}} +$$

$$\beta_3 X_{\text{FinTech Financing}_{i,t}} + \beta_4 X_{\text{accounting Information}_{i,t}} + \sum_{h=1}^{h} \beta_h \text{Year}_h + \qquad [1]$$

$$+ \sum_{k=1}^{k} \beta_k \ \text{Business Activity}_k + e_i$$

Chart 7
PERFORMANCE OVER TIME

% profitable firms
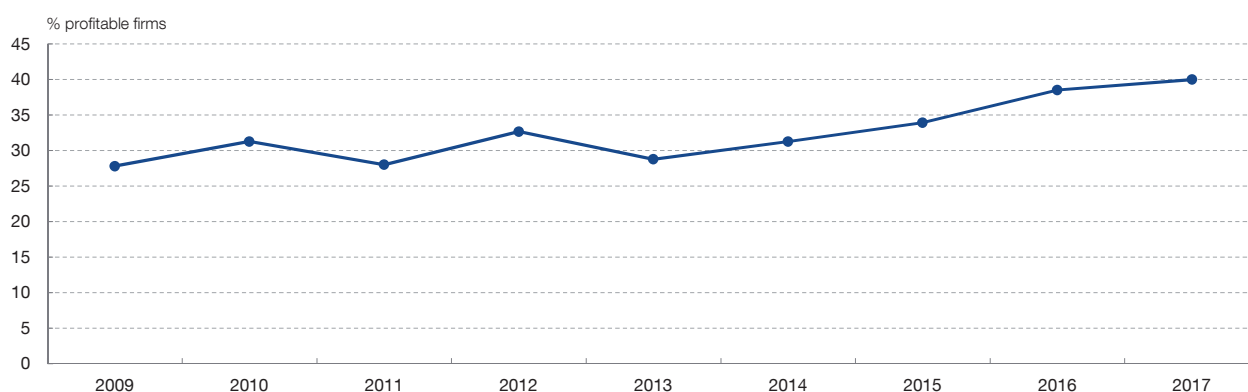
SOURCE: Own elaboration.

The coefficients of equation [1] are estimated using a random-effects regression and the standards errors are robust errors clustered at the activity level.

In order to explore the robustness of our results we also report the results without some fixed effects such as business activity and time effects.

In line with prior studies on start-ups performance, we measure performance as the returns on assets before taxes at the end of year t. As prior studies examining the performance of startups, we consider the impact of the founders on the ability to be profitable. First of all, we include a dummy variable *(Entrepreneurship)* taking the value 1 if the FinTech is founded by a single entrepreneur or by a group of entrepreneurs, but not by an already established company. The success of the project could depend on the degree of enthusiasm that entrepreneurs put into developing a new project. Moreover, since some FinTech are created by several people we also account for this fact include *the number of partner founders* as an explanatory variable. As literature on entrepreneurships discuss, it is arguable whether a single founder developing its own idea might outperform a team of people. Furthermore, since most of the FinTech tend to be located in the most important cities of the country, we consider whether being located in those cities have a positive effect on their performance. Then, we include a variable *(Madrid_Barcelona)* which takes the value 1 if the FinTech is based on Madrid or Barcelona. Moreover, since those FinTech that have access to external financing are do typically seed capital funds, we account for the impact of receiving these type of founding. Then, *Seed capital* takes the value 1 for those firms that have ever received seed capital. Finally, as prior literature has found, performance is typically related to other financial information, so

we include the main accounting ratios that might play explain FinTechs' performance. We consider FinTech size measured by *total assets.* As prior literature, we also account for a non-linear relationship between size and performance by including the square of total assets as explanatory variable *(total assets[2]).* We have also considered the *asset structure,* computed with the ratio of current assets to total assets, in order to control for the structure of FinTech assets. Similarly, we also consider firms' liquidity by including the *liquidity* ratio, which is measured as current assets to current liabilities. And finally, we also account for the level of FinTech *indebtedness* with the ratio of total internal funds to total equity.

Panel B of Table 3 provides the summary statistics of the variables used in the analysis. As we can observe, that on average FinTechs' ROA is negative (which means that FinTech have had losses). This finding, which has also confirmed in some industry reports, shows the difficulties that FinTech firms as technological startups face in order to be profitable during their first years of life.

5.3   Baseline results

Table 5 reports the coefficients and z-statistics based on FinTech-clustered standard errors for the drivers of FinTech performance. Regarding those characteristics linked to a Fintech's foundation, we find that FinTechs founded by entrepreneurs seem to perform better. However, as the number of partner founders increases, we find that these particular FinTechs perform worse. Altogether, these results suggest that entrepreneurship has a positive effect on performance only if there are few founding partners. In those cases where a group of entrepreneurs decide to join forces to create a FinTech, number of founders does not seem to be quite effective in terms of profitability.

We also find that those FinTechs located in Madrid or Barcelona (close to the financial industry and to the largest investors) do not exhibit larger profits. This result suggest that FinTechs are not likely to locate in these large cities because being located in these areas determines its profitability. Other reasons might explain why most of the Spanish FinTech are located in these large urban areas.

As for financing characteristics, we find that having received external financing via seed capital have a negative impact on FinTechs' performance. In this sense, this result suggests that being open to external investors by a seed investments does not directly imply being profitable. It could be the case that these FinTech funded with seed capital are typically focused on growing rapidly by expanding abroad, then this costly growing strategy could explain why these companies have more difficulties to perform.

We find that size have an effect on FinTech performance. Large FinTechs perform better. However, since the coefficient of Total assets[2] is negative and

Chart 5

EMPIRICAL ANALYSIS ON FINTECH PERFORMANCE

Variables	FinTech performance			
Total assets	8.64e-05***	9.52e-05***	0.000111***	0.000117***
	-2.23E-05	-2.26E-05	-2.05E-05	-2.14E-05
Total assets^2	-8.82e-09***	-9.41e-09***	-1.08e-08***	-1.13e-08***
	-1.26E-09	-1.46E-09	-2.60E-09	-2.70E-09
Asset structure	0.151	0.164*	0.129	0.145
	-0.0929	-0.0866	-0.0988	-0.0917
Liquidity ratio	-0.000286***	-0.000286***	-0.000273***	-0.000272***
	-5.67E-05	-6.06E-05	-5.59E-05	-5.38E-05
Indebtedness	-0.00571***	-0.00563***	-0.00558***	-0.00549***
	-0.00132	-0.00133	-0.00131	-0.00132
No. of founding partners	-0.0512**	-0.0516*	-0.0523*	-0.0525*
	-0.0285	-0.0269	-0.0284	-0.0268
Entrepreneurship	0.594***	0.631***	0.656***	0.719***
	-0.0896	-0.103	-0.0812	-0.0804
Seed capital	-0.202***	-0.159*	-0.195***	-0.154**
	-0.0677	-0.0823	-0.064	-0.0778
Madrid_Barcelona	-0.0731	-0.05	-0.0745	-0.0562
	-0.1	-0.108	-0.0945	-0.1
Constant	-0.858***	-1.204***	-0.925***	-1.319***
	-0.174	-0.179	-0.147	-0.152
Year FE	Yes	Yes	No	No
Business of activity FE	Yes	No	Yes	No
Clustered errors	Business of activity-level	Robust	Robust	Robust
Observations	501	501	501	501
No. of FinTech firms	135	135	135	135
R-squared	0.3764	0.3143	0.3692	0.3069

SOURCE: Own elaboration.

statistically significant the effect of size on performance seems to be non-linear (inverted U-shaped). This result could explain FinTechs' need for scalability. FinTechs that are able to scale are more likely to perform better up to a point where size has a negative effect. Furthermore, asset structure is not significant which suggests that FinTech does not need long-term investments such as properties, plants or equipment in order to be profitable. Regarding the impact of liquidity and indebtness on FinTechs' performance, both coefficients are negative – suggesting that more liquid FinTechs and highly indebted FinTech are performing worse.

Columns 2 to 4 report the results without fixed effects, which are robust and qualitative similar to the baseline findings.

NON-LINEAR EFFECTS OF FINTECH PERFORMANCE

Variables	FinTech performance
Total assets	0.000524***
	-0.000134
Total assets^2	-9.12e-08**
	-3.71E-08
Asset structure	1.825***
	-0.363
Liquidity ratio	-0.00151*
	-0.000912
Indebtedness	-0.00557***
	-0.00159
No. of founding partners	-0.410***
	-0.1
Entrepreneurship	-1.392***
	-0.377
Seed capital	-0.961***
	-0.293
Madrid_Barcelona	-0.757**
	-0.348
Constant	2.651**
	-1.203
Year FE	Yes
Business of activity FE	Yes
Clustered errors	Business of activity-level
Observations	501
No. of FinTech firms	135
Log Likelihood	-220.05

SOURCE: Own elaboration.

5.4   Non-linear effects on FinTech performance

We also explore the existence of potential non-linear effects on FinTech performance where the dependent variable is the return on assets of the FinTech firm. The results (Table 6) are qualitatively similar to those reported in the baseline regressions. However, we find that being an entrepreneur has a positive impact on the magnitude of the profits (while it had a negative impact on the likelihood of being profitable). This would argue in favor of the larger difficulties for entrepreneurs' to develop their own FinTech startups at initial stages (compared to those projects developed by already established firms).

5.5   Alternative performance measures

Two alternative measures of performance are also considered. Firstly, we examine whether the FinTech firm has been able to conduct a successful

Table 7
ALTERNATIVE PERFORMANCE MEASURES

Variables	Successful financing round=1	Digital Success (Google Trends)
Total assets	0.000439**	0.00658***
	-0.000214	-0.00223
Total assets^2	-5.99E-08	-5.25e-07**
	-3.91E-08	-0.000000223
Asset structure	-0.0181	5.873***
	-0.263	-2.081
Liquidity ratio	-0.0205*	-0.00876***
	-0.0111	-0.00305
Indebtedness	0.00177	0.023
	-0.00126	-0.0154
No. of founding partners	0.296***	-1.915**
	-0.0837	-0.879
Entrepreneurship	-1.251***	-2.645*
	-0.241	-1.539
Seed capital		7.256**
		-3.486
Madrid_Barcelona	0.0208	-4.321**
	-0.229	-2.072
Constant	-1.713**	-0.743***
	-0.781	-0.215
Year FE	Yes	Yes
Business of activity FE	Yes	Yes
Clustered errors	Business of activity-level	Business of activity-level
Observations	501	501
No. of FinTech firms	135	135
Log Likelihood / R^2	-158.75	0.2498

SOURCE: Own elaboration.

funding round. Secondly, we also consider Digital Impact as a measure of performance. This variable is estimated using the online search volume index provided by Google Trends. A large volume of online searches about the FinTech company would reveal its capacity to attract attention from potential clients. Table 7 reports the results. Size seems to have non-linear effects on both attracting investors and potential clients. Moreover, as already the inception location (mainly Madrid or Barcelona) is positively related to a larger digital impact.

6 Conclusions

Since the financial crisis of 2008, the landscape of the financial services sector has been changing gradually. New business models, applications, processes, products and financial services have arisen with the adoption of a number of technological innovations. While the traditional financial entities are doing their

best in order to compete in a digital context, the fact is that most of those technological innovations have been integrated by a set of new disruptive entrants. Those new technological financial players, known as FinTech firms, have started to compete with the incumbent banks developing alternative models based on the micro-segmentation of the products offered and focusing on improving customers' experience.

Therefore, examining the FinTech phenomenon and particularly these FinTech firm, has become relevant due to their implications. FinTechs have fostered the digitalization of developed and emerging societies. In this sense, FinTech firms play a role in expanding financial inclusion by providing financial services to underbanked population. Moreover, the evolution of the FinTech phenomenon reveals that it has become global issue that deserve attention.

In this paper, we examine the current situation and evolution of the Spanish FinTech ecosystem. We do so by comparing the relative importance of this sector in Spain with other jurisdictions and then by characterizing the main features a typical Spanish FinTech firm. Finally, the paper also examines empirically what drives the performance of these firms in the Spanish market. Consequently, this paper would contribute to the literature by offering a detailed taxonomy of the FinTech phenomenon in Spain.

As result of the analysis, we find that due to the relatively large number of active FinTech firms in Spain, the sector has become one of the most relevant in the world and especially in Europe. However, nowadays investors' appetite for Spanish FinTechs firms is relatively lower than in other countries. Furthermore, the FinTech credit remains quite reduced (3.4€ per capita). Furthermore, we also document that most of the Spanish FinTechs are oriented towards B2B, obtain revenues via fees/commissions and are on a seed stage. Moreover, most of these firms were founded by entrepreneurs and are located in large cities such as Madrid and Barcelona. In terms of external financing, we observe a positive evolution of the funds received by the whole Spanish FinTech sector since 2014 mainly through venture capital funds. In terms of FinTechs' performance we find that FinTechs founded by entrepreneurs seem to perform better but as the number of founding partner increases it does their performance. We also find that being located in Madrid or Barcelona does not have an effect on performance while those FinTech that have received external financing via seed capital tend to perform worse.

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