FinTech: data and data collection challenges

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Abstract

Financial market statistics are a key source of information for central banks to perform their duties. It is therefore critical that, over time, the quality of the statistics remains high and that they are sufficiently complete. Changes in the financial sector, such as those observed as a result of digitalisation, might affect the usefulness and representativeness of the more traditional sources of information. Accordingly, the phenomenon needs to be measured and its implications assessed. However, in Spain there is currently no official register containing the total population of FinTech firms. Consequently, the Banco de España is demarcating this ecosystem for statistical purposes, identifying, by activity and by some of their basic characteristics, the various types of firm operating within it. From the findings it may be concluded that, for the time being, the FinTech sector is comparatively very small relative to the financial sector as a whole. However, the momentum and potential attendant data gaps make ongoing monitoring of this activity necessary. This will benefit from close cooperation with the industry, as well as with other authorities.

1 Introduction

Financial market statistics are one of the pillars upon which central banks rely to perform their functions. Therefore, the Law of Autonomy of the Banco de España[1] stipulates the collection of data relating to its sphere of competence as one of its responsibilities. Furthermore, the National Statistics Plan confers on the Banco de España the preparation of a set of statistics for State purposes.

Exercising these functions results in a wide range of reports, which aim to provide insight into the status of the financial system and of the wider economy. For example, the Banco de España regularly gathers statistics on transactions conducted using payment instruments and via the various infrastructures it oversees. To perform the supervisory function, substantial information on institutions is required to enable, inter alia, the identification of potential threats and weaknesses and possible contagion channels for risks to spread from one institution to others. Data on lending, such as those contained in the Central Credit Register (CCR), are also a key source of information for the Banco de España in the performance of its duties.

In the context of the powers conferred on the Banco de España in the institutional arrangements for the production of national statistics, mention should be made of,

1 Law 13/1994 of 1 June 1994 of Autonomy of the Banco de España.

inter alia, the contributions to the financial and non-financial sides of the financial sector's National Accounts and the dissemination of the database for the sectorisation of the Spanish economy.[2] While the latter database is available to the general public, it is mainly of use to any undertaking that, one way or another, is required to provide detailed information on its activity, since they can thus sectorise their counterparties. The dissemination of the sectorisation database thereby improves the quality of the Spanish accounts, by making available a reliable source of information on counterparty sectorisation.

The usefulness of the statistics gathered by the Banco de España will depend mainly on how accurately they reflect the real world. It is therefore necessary to assess regularly whether the method for collecting the data used to produce statistics is suitable in respect of the changes, or whether, on the contrary, a review of the methodology or the population of reporting institutions is necessary. This assessment becomes particularly important when significant changes are identified in the market, such as those observed in recent years as a result of the digitalisation of the financial sector.

The following sections first reflect upon the impact that the sector's transformation could have on the quality of the statistics produced by the Banco de España (Section 2). This is followed by a description of two exercises conducted in response to this new context: a statistical exercise, designed to lay the foundations for obtaining regular information on FinTech activity (Section 3), and another exercise aimed at monitoring the financial innovation process in Spain (Section 4). The conclusions are presented in Section 5.

2 Implications of the FinTech phenomenon

The increasing digitalisation of society is transforming all economic sectors. In the case of the financial sector, it has led to the so-called "FinTech phenomenon". There is not, however, an official definition of FinTech. The term is, in practice, somewhat confusing because of the various meanings given to it. For instance, we could take it to mean a new type of undertaking that, in contrast to a traditional bank, provides innovative financial services using more modern technologies [see Observatorio de la Digitalización Financiera Funcas-KPMG (2017)]. However, there are also broader definitions that include any type of undertaking whose activity involves using technological developments and innovation in relation to the financial sector [see Asociación Española de FinTech e InsurTech (2017)]. This means that the umbrella term 'FinTech' includes not only new financial service providers, but also other technology companies providing support services to both the former and to traditional financial institutions.

2 For further information, see https://www.bde.es/bde/en/areas/estadis/otras-clasificac/clasificacion-de/Clasificacion_de_entidades.html.

The definition generally accepted by the authorities is that coined by the Financial Stability Board (FSB). The FSB defines FinTech as "technology-enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on financial markets, institutions and the provision of financial services" [see Financial Stability Board (2017)]. In practice, this broad definition reflects the set of changes taking place in the sector. Of such changes, the three with the greatest potential to impact the quality of the statistics gathered by the Banco de España are:

— *The use of new technologies:* the new context is characterised by the emergence or bolstering of technologies that are changing how financial services are offered. These changes are visible both externally (e.g. new customer interaction channels, such as mobile banking) and in institutions' internal infrastructure (e.g. use of distributed ledgers[3] or artificial intelligence models).

— *The development of new services or solutions:* the proliferation of internet access, especially on smartphones,[4] is enabling the roll out of new solutions or ways of offering financial services. Some of these new developments are taking place within the regulated sector (e.g. instant payments or digital wallets[5]), whereas others have led to the drawing up of ad hoc legislation (e.g. crowdlending[6] or payment initiation services[7]). Elsewhere, they are not subject to specific regulations (e.g. cryptocurrencies or virtual currencies[8]).

— *The emergence of new players:* digitalisation has also reduced the barriers to entry into the financial services market. This has facilitated the arrival of new providers [see Fernández de Lis and Urbiola Ortún (2018)]. Broadly speaking, these firms have been characterised by specialising in a limited

3 A distributed ledger refers to a database of which there are multiple identical copies distributed among several participants and which are updated in a synchronised manner by consensus of the parties [see Romero Ugarte (2018)].

4 According to a survey conducted by the Association for Media Research (Asociación para la Investigación de Medios de Comunicación, AIMC) on internet users, in 2018 smartphones were the most commonly used device by Spaniards to access the internet (90% of the respondents said they used their mobile to connect to the internet [see Asociación para la Investigación de Medios de Comunicación (2019)]).

5 A service accessed through an internet-connected device, such as a computer or a mobile phone, which allows the wallet holder to access, manage and use a variety of payments, identification and non-payment applications and services [see European Payments Council (2017)].

6 See Section 4 for more information.

7 Under Directive (EU) 2015/2366 on payment services in the internal market, 'payment initiation service' means a service to initiate a payment order at the request of the payment service user with respect to a payment account held at another payment service provider.

8 Under Directive (EU) 2018/843 (5th Anti-Money Laundering Directive), "virtual currencies" means a digital representation of value that is not issued or guaranteed by a central bank or a public authority, is not necessarily attached to a legally established currency and does not possess a legal status of currency or money, but is accepted by natural or legal persons as a means of exchange and which can be transferred, stored and traded electronically.

number of financial products or services, either offering them as an alternative to the traditional products or services (e.g. crowdlending platforms) or providing a value-added layer over the bank offering in order to improve the customer experience (e.g. digital wallet providers) [see Financial Stability Board (2019a)]. The new players include small start-ups but also BigTech firms, who harness their strengths (inter alia, high market cap and large customer base) to surge into the financial market. Also, digitalisation and intensive technology use have contributed to the emergence of specialised companies offering their services to financial institutions (e.g. cloud service providers).

While there is no doubt that financial innovation entails numerous benefits [see Association of Supervisors of Banks of the Americas (2017)], it is not risk-free. As regards the aim of this article, the changes observed in the sector may affect the quality and usefulness of the statistics the Banco de España gathers. In principle, the impact will be smaller in reserved activities, i.e. activities only authorised institutions can pursue (e.g. payments), or, in the case of unreserved activities, if the providers are supervised institutions. Thus, from a statistics standpoint the implications of the FinTech phenomenon are, in theory, limited in respect of regulated financial institutions and the services they offer, since all the relevant statistical frameworks apply to them. However, even in this case the quality and timeliness of the data could be affected and, therefore, its usefulness for the functions conferred on the Banco de España (see Box 1). Specifically, by way of example, in the area of financial and payment statistics, the new developments could:

Hinder data collection: the existence of a greater number of intermediaries in the chain means that payment service providers (PSPs) might find it difficult to obtain full information on each transaction (e.g. in a payment involving a digital wallet in which the payer's PSP is not the provider of that digital wallet). This could lead to delays in the reporting of information or even a not entirely accurate classification of domestic and cross-border payments.

Result in double reporting: by increasing the number of intermediaries in the chain of a payment transaction, there is a risk of the same transaction being reported by each link in that chain (e.g. in transactions performed through a payment initiation service). The actual impact on the statistics will hinge on the ease with which these duplicate entries can be identified.

Affect the representativeness of the statistics: there is one distinguishing feature of digitalisation that, if it became widespread, could significantly limit the ability of the statistics reported by Spanish financial institutions to give a comprehensive picture of the domestic market. And this is the fact that users have easy access to services offered by financial institutions located abroad that are not required to report in Spain. While this has been a reality since the birth of online banking, its potential

Box 1

LENDING STATISTICS

The Banco de España uses lending statistics in various ways when performing its functions. First, the Bank uses them to exercise its microprudential and macroprudential supervisory powers, since they enable it to ascertain financial institutions' individual and overall exposure to credit risk. Such data are also useful for monetary policy purposes, allowing an understanding, for example, of how credit is channelled to the various economic agents. The data can also show the economic sectors to which credit is extended. Furthermore, they are useful for cross-checking the information that the Banco de España receives from other sources, such as the information on firms' indebtedness reported to the Central Balance Sheet Data Office.

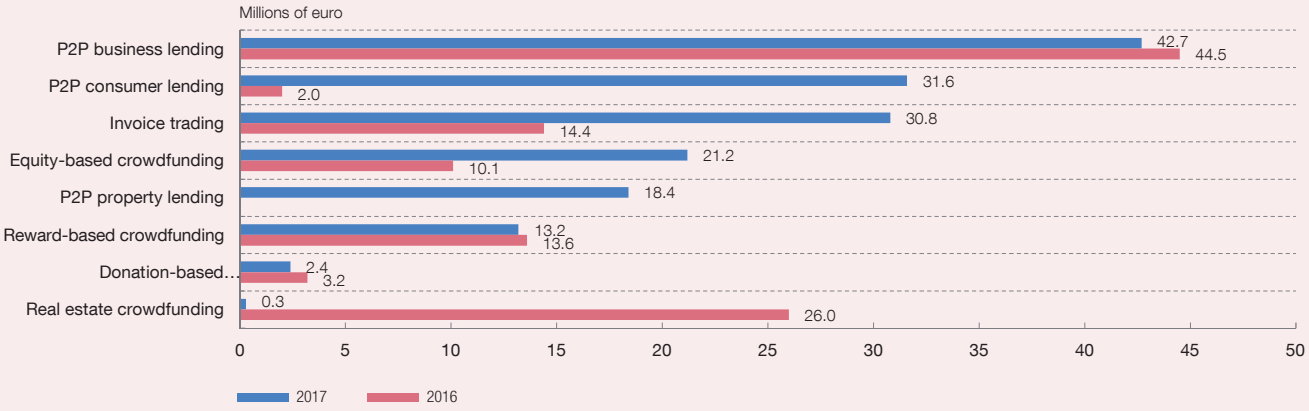
The Banco de España's Central Credit Register (CCR) is the main source of data on this activity. The CCR contains information reported by financial institutions on the loans, credit, guarantees and collateral held with their customers. Specifically, Banco de España Circular 1/2013 of 24 May 2013 on the Central Credit Register recognises the following as reporting institutions: credit institutions; specialised lending institutions (SLIs); mutual guarantee and reguarantee companies; Sociedad de Gestión de Activos Procedentes de la Reestructuración Bancaria, S.A. (Sareb); the Banco de España; the Deposit Guarantee Scheme for Credit Institutions; and Sociedad Anónima Estatal de Caución Agraria (SAECA). Following Law 5/2019 of 15 March 2019 regulating real estate credit agreements, it also includes credit institutions operating under the freedom to provide services and mortgage lenders.

The emergence of new lenders, such as BigTech firms or alternative finance[1] through crowdlending platforms, could mean that the data collected by the CCR would not be sufficient to tell the whole story on lending in Spain. For the time being, the largest impact may be from crowdlending platforms, since BigTech firms appear to be channelling the majority of their lending through alliances with financial institutions that do report such data to the CCR. In this setting, the Banco de España has analysed the aforementioned platforms' level of activity in order to determine whether they account for a significant percentage of the entire market.

From this analysis it can be inferred that these platforms have grown significantly in Spain, but at a far slower rate than in other neighbouring countries. According to a University of Cambridge Judge Business School report [see Ziegler et al. (2019)], in 2017 Spain was ranked ninth in terms of alternative finance volumes in Europe (€160 million), while it was in sixth place in 2016 (see Chart 1).

1 For more information on the various types of alternative finance, see Section 4.

Chart 1
TOTAL ALTERNATIVE FINANCE VOLUME BY MODEL IN SPAIN 2016-2017



SOURCE: "Shifting Paradigms - The 4th European Alternative Finance Benchmarking Report", University of Cambridge, May 2019

Box 1
LENDING STATISTICS (cont.)

According to data from the Spanish Crowdlending Association (ACLE, by its Spanish initials)[2] crowdlending platforms financed more than €127 million in 2018 [see Asociación de Crowdlending Española (2019)], a negligible percentage in proportion to the volume of finance granted by credit institutions and SLIs reported to the CCR (€1,808,252 million).

From the foregoing it can be concluded that, given the negligible size of the crowdlending platforms' activity, the FinTech phenomenon has not affected the representativeness of lending statistics. However, in light of the sector's momentum and the ability of BigTech firms to swiftly enter new markets and grow exponentially, developments in this market should be monitored closely.

2 The Spanish Crowdlending Association (Asociación de Crowdlending Española, ACLE) comprises 12 platforms, the majority of which are crowdfunding platforms.

impact increases as more fully digital banks emerge. These banks tend to be far more active than traditional banks when offering services beyond national borders.

Should any of these issues become widespread, the current statistics would be less capable of painting a reliable picture of the Spanish market. For example, it would not be possible to gain knowledge of Spanish citizens' and firms' actual credit status or the total of their payment activity (which would by distorted, both by default and by excess). This could hinder proper risk identification and measurement and, consequently, have implications for the supervisory function and the promotion of the stability of both the payment system and the financial system as a whole.

Furthermore, data gaps in the statistics could affect the proper monitoring of the economy's performance, the estimation of macroeconomic indicators or the preparation of other statistics. For instance, if the geographical breakdown of payment card transactions were incorrect, these statistics could become less useful for quantifying cross-border economic activity.

A second scenario would be financial activities performed by players who, despite being regulated, are not subject to the same reporting requirements as credit institutions or other supervised financial institutions. At present, this would mainly be the case of crowdlending platforms. These platforms are explicitly regulated by Law 5/2015 on the promotion of business financing. However, reporting obligations comparable to those of supervised financial institutions are not included among the requirements foreseen by this law. Crowdlending platform managers are not, for example, required to report information on the loans arranged through the platforms to any financial supervisor. Consequently, if the activity of channelling lending through these institutions were significant in Spain, the current statistics could be insufficient for measuring credit risk or as an indicator of the country's level of indebtedness.

Lastly, there are financial (or comparable) activities that, since they are not considered a reserved activity, do not require authorisation and are pursued by non-regulated entities. Given that there are usually no reporting obligations, financial authorities do not generally have statistics on these services, beyond those that they might gather from public sources or, potentially, ad hoc requests for information. Continuing with the lending example, these activities could include lending by non-financial corporations using own funds. This activity is not per se an innovation, of course, and reporting it has not, until now, been considered necessary. Nevertheless, the fact that BigTech firms, which have financial muscle and a large customer base, are penetrating this market, means that this segment's relative importance could grow. Cryptocurrencies could also be included under this category. Information on their level of activity could be relevant for the performance of a central bank's functions if they were used as an alternative channel for making payments.

In light of the potential data gaps identified, it is necessary to assess whether measures should be implemented in order to make sure that the current statistical frameworks reflect the new reality, or whether new reports should be required. To do so, we must first ascertain the size of the phenomenon. In the absence of official public sources, cooperation with sector actors and other authorities is of particular importance. The following two sections detail the initiatives being implemented at the Banco de España in this sense.

3 Identification of the FinTech ecosystem for statistical purposes

First we must ascertain the breadth and importance of the FinTech sector in Spain for the purpose of producing statistics on the Spanish economy. To do so, an initiative has been designed that aims to lay the foundations for obtaining regular data on this segment of the financial sector, thus enabling its performance to be measured and monitored.

As in other countries, Spain does not have an official register of FinTech firms, since some of their activities do not need to be registered by a supervisory authority. This, together with the ongoing innovations in this area, has hindered the preparation of an exhaustive census of FinTech firms. Therefore, the methodology used to identify FinTech firms in Spain in this initial analysis consisted of preparing a database using information available on various public and private sources: the Spanish National Securities Market Commission[9] (CNMV), business associations (the Spanish FinTech & InsurTech Association[10] and the Spanish Crowdlending Association[11]) and private consulting firms (Finnovating[12]).

9 List of crowdfunding platforms: https://www.cnmv.es/Portal/Consultas/Plataforma/Financiacion-Participativa-Listado.aspx?lang=en.

10 http://www.asociacionFinTech.es.

11 http://www.acle.es.

12 http://www.finnovating.comhttp://www.finnovating.com.

Table 1
FINTECH FIRMS OPERATING IN SPAIN. BREAKDOWN BY ACTIVITY

	Number of firms (a)
1 Crowdfunding/crowdlending and loans	131
2 Payment and foreign exchange services	81
3 Investment services	67
4 Other activities	120
Total	**399**

SOURCES: CNMV, AEFI, Finnovating. Banco de España calculations.

a Data at October 2019.

While the results are preliminary, since the project to identify FinTech firms is still under way, they can be used to obtain an initial characterisation of the population of FinTech firms in Spain.

Using the aforementioned methodology, almost 400 FinTech firms operating in the Spanish market were identified. Table 1 breaks these firms down into four large categories of activity: a) crowdlending/crowdfunding[13] and loans; b) payment and foreign exchange services; c) investment services; and d) other activities.

The first category, the biggest in the sample, includes around 130 firms whose core business consists of lending to firms and households and obtaining finance through electronic platforms (crowdlending and crowdfunding). There are around 80 firms providing payment and foreign exchange services and approximately 70 providing investment services (financial consultancy). There are 120 firms in the fourth category (Other activities), the majority of which provide technology and insurance intermediation services.

While this dataset may furnish important information for providing an initial description of the FinTech phenomenon, it must be taken into account that, in the initial phase of the work to identify firms, this preliminary list is a mere aggregation of trade names and links to websites. Indeed, the primary sources used do not generally provide the companies' names. This hinders their identification. Neither does this initial database contain information enabling a distinction to be drawn between entities resident in Spain and those non-resident entities providing services in Spain remotely either through internet portals or mobile applications. This is not the case, however, for the crowdfunding platforms, which are registered with the CNMV under their company name, or other institutions pursuing FinTech activities recorded in the official registers of the financial supervisors.

13 See Section 4 for more information.

To fill in these primary sources' data gaps, the FinTech firm identification exercise was organised in three stages.

In the first stage, all these firms' websites were consulted for references enabling their formal identification. As a result, 250 resident and 30 non-resident entities in Spain were found. It was not possible to find information enabling the identification of the remaining 120 entities; the issue in many cases was that the websites corresponding to the trade names were inactive.

In the second stage, the annual financial statements filed with the Mercantile Register were obtained for those entities resident in Spain for which tax identification numbers were available.[14] Using the financial statements, it was possible to gather qualitative and quantitative information on these entities. This enabled an initial assessment of the population of businesses engaging in FinTech activities and of the importance of this new segment of the financial sector in the Spanish market.

Accessing these firms' financial statements facilitated the obtainment of particulars such as their registered office, corporate purpose, CNAE[15] code and shareholder structure. Initial use of this information made it possible to geographically locate these firms (see Figure 1). While they are located throughout Spain, the highest concentration is in Madrid and Catalonia, with 100 and 55 FinTech firms, respectively.

Accessing their balance sheets, income statements and notes to their financial statements enabled an improved description of this segment. In balance-sheet terms, the total volume for the identified firms amounted to approximately €1 billion at end-2018. This is a negligible amount in comparison with the total of the Spanish financial sector (in excess of €4.5 trillion).

Net turnover stood at €410 million. However, we should be mindful that, in many cases, financial intermediation performed by FinTech firms does not directly affect their financial statements, given that their activity consists solely of connecting lenders and borrowers, which is how they earn their revenue. Consequently, the significance of this segment in terms of channelled financial flows may be underestimated.

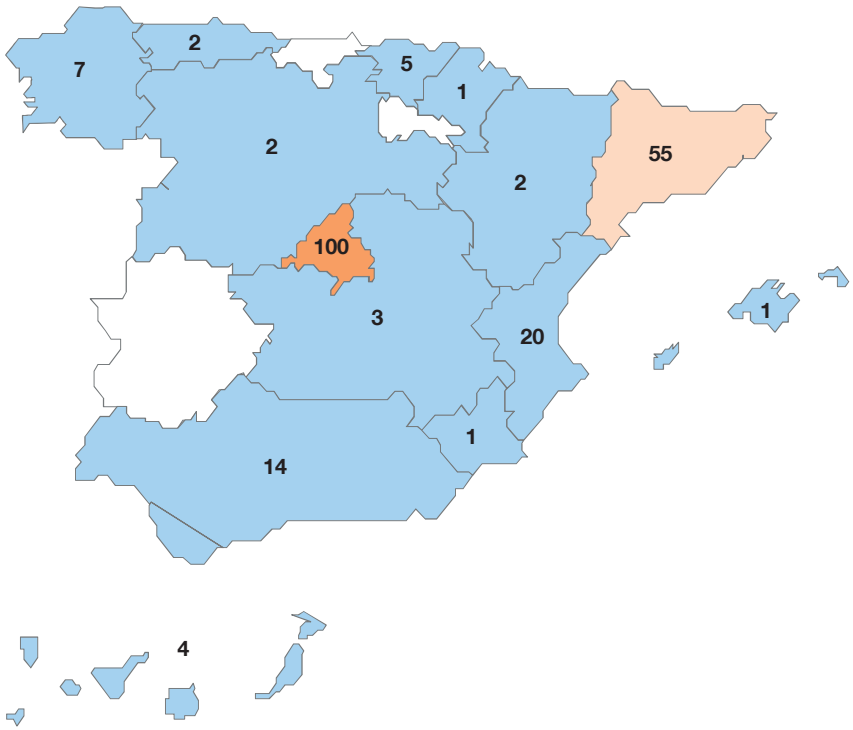
In terms of employment, it can be estimated that at end-2018 the FinTech firms identified in the sample had close to 2,700 employees.

The database also includes information on the shareholder structure of FinTech firms, which allows them to be characterised in terms of corporate structure or

14 The most recent information obtained in this way corresponds to 2018. It should be borne in mind that the statutory deadlines for preparing, approving and filing financial statements are relatively long.

15 Spanish National Classification of Economic Activities.

Figure 1
GEOGRAPHIC LOCATION OF FIRMS IN THE CENSUS



SOURCE: Banco de España calculations.

qualifying holdings. Most firms do not report a parent company and may therefore be considered as not belonging to corporate groups. This is consistent with the fact that they are small and medium sized-firms, resulting from relatively recent business ventures. However, 15 companies were owned by non-resident companies and five belonged to large Spanish financial conglomerates, which signals the interest among traditional operators in the development of this new market segment.[16]

Accessing the identified firms' financial statements also provides their CNAE codes. This code is declared by each entity when filing accounts with the Mercantile Register and should coincide with its core business during the year to which the accounts relate. According to that data, these firms predominantly operate in sectors relating to information technology, computer programming and online portals.

However, from a statistical standpoint, the information drawn from CNAE codes plays an important but not decisive role when categorising an entity. This is because the specifics of an entity's different activities must be taken into account in order to

16 Other banks aside from those five will undoubtedly also be integrating FinTech activity into their operations, i.e. not via a separate company.

correctly categorise an institutional unit. The usual difficulty of ensuring a consistent statistical classification is compounded in the case of FinTech firms by the shortcomings of the methodological manuals and the absence of any definition for this activity, given that the manuals are yet to be updated to include the situation arising from the use of new technologies. A case in point is the lack of any guidelines on the treatment of crypto-assets[17] and the firms that create them in the National Accounts and Balance of Payments manuals.

The final stage in this statistical analysis is to complete the institutional classification of FinTech firms in the National Accounts and, specifically, to correctly assign them to the various financial and non-financial sectors of the economy. To this end, an action protocol has been established to perform an in-depth analysis of the selected companies, focusing on their core business in terms of net turnover, corporate purpose and the nature and structure of their assets. The companies may thus be systematically and correctly classified under the relevant institutional[18] sectors: a) financial institutions, b) non-financial corporations.

The initial results identified some 50 firms as belonging to the financial sector, specifically as financial auxiliaries (a category that mainly includes crowdlending/crowdfinancing platforms), electronic money institutions, payment institutions, and securities dealers and brokers. Going forward, classification work will focus on the remaining 200 firms, seeking to identify those that actually provide financial services and should therefore be included in the financial sector, and those that strictly provide technology services, thus remaining categorised under the non-financial corporate sector.

4 Analysis of the activities carried out by FinTech companies for monitoring financial innovation

In addition to identifying FinTech firms for statistical purposes, their activities must also be analysed to provide a fuller understanding of the scale of use of new technologies and the associated implications for the financial sector. Specifically, the analysis of financial innovation processes pursues two key goals.

1 Understanding the extent of the changes taking place in the provision of financial services, both those brought about by the adoption of new technologies and those associated with the emergence of new operators or solutions. Not only financial innovation is attracting new providers and fostering the development of innovative solutions, but it is also leading

17 A type of private asset that depends primarily on cryptography and distributed ledger or similar technologies as part of their perceived or inherent value [see Financial Stability Board (2019b)].

18 http://app.bde.es/sew_www/faces/sew_wwwias/jsp/op/InicioSesion/PantallaInicioSesion.jsp.

traditional intermediaries, and banks in particular, to adjust their business models and change how they offer their services.

2 Analysing the likely consequences of new developments and their potential to transform the financial industry. This means determining: i) what risks the new ecosystem poses; ii) the extent to which financial institutions will be able to continue providing their services as before; and iii) what market failures might arise.

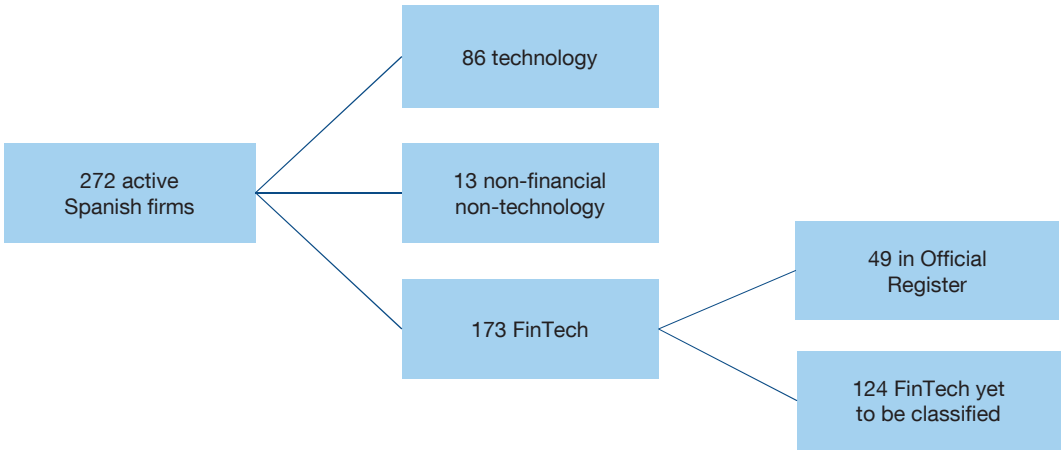
Performing these tasks requires an overview of Spanish FinTech firms and a granular breakdown of their activities. The timely identification of potential trends in a market in constant change demands a specific statistical framework that is duly flexible and easily updated. The database of Spanish FinTech firms described in the preceding section has therefore been cleansed further with a view to providing a census of Spanish FinTech firms that addresses the needs attendant to the monitoring of financial innovation processes. Given the long timescales covered by some of the sources used to date, the analysis of information included in press reports and databases of Spanish companies and the self-employed was considered appropriate for monitoring innovation, with a view to determining the current status of each of these firms. This work found that 127 of the 399 firms identified may either be considered currently inactive or do not publish information on the services they provide.

The activities of the 272 active Spanish firms were then subject to in-depth analysis to ascertain whether they engage in a FinTech activity in the strict sense, regardless of whether or not it is their core business (see Figure 2). The aim was to identify those firms that provide financial services by harnessing technology with the potential to create new business models, applications, processes or products. A functional approach was taken to this analysis, focused on each firm's activities as detailed on its website, irrespective of the type of company or its reported CNAE code.

The analysis concluded that 86 of the FinTech firms featured in the census may be exclusively considered technology firms that are engaged in the marketing of technology solutions not specific to the financial sector. Such companies may also offer their products and solutions to other sectors. Therefore, strictly speaking, they may be considered not to fit under the FinTech umbrella term. These tend to be firms that provide products and services to financial institutions or other FinTech entities, but do not have a direct relationship with end users. The companies who use their technology services and provide the corresponding financial services to end customers will be the ones subject to the oversight of supervisors with regard to how a technology is used. However, when the service entails the outsourcing of critical or important operating functions, the technology provider must cooperate with the relevant authority to allow for the supervision of those functions.

In addition, it was found that 13 of the active firms may not be considered either financial or technology operators, with these being blogs or social networks on

Figure 2
ACTIVITY OF THE 272 ACTIVE SPANISH FIRMS IN THE CENSUS



SOURCE: Banco de España calculations.

start-ups, entrepreneurs and finance; online business advisers and consultants; or mobile applications that track healthy practices, which are considered InsurTech.

Meanwhile, as mentioned in Section 3, it is important to note that not all activity pursued by FinTech firms falls outside the regulator's purview. For example, if a FinTech firm markets products that are considered financial instruments, its activity will be subject to Royal Legislative Decree 4/2015 of 23 October 2015, approving the consolidated text of the Securities Market Law, and supervision and authorisation by the CNMV. This would be the case of a FinTech firm that markets investment strategies of other investors or other successful investment managers, which may then be imitated or replicated by customers to configure investment strategies and build portfolios ("social trading"). These must be authorised and registered by the CNMV and subject to its supervision.

Consequently, in an initial effort to refine the activity classification of the 173 FinTech firms, work was performed to distinguish all those entities that are included in the registers of the Banco de España, CNMV, Directorate General of Insurance and Pension Funds (DGSFP, by its Spanish acronym) and the European Securities and Markets Authority (ESMA). This work identified the activities of 49 companies (see Table 2) that, in line with Section 3, are classified under the financial sector.

Lastly, the activities of the 124 FinTech firms not included in official registers were subject to in-depth analysis, thus distinguishing five major groups of relevant activities and services for the purposes of monitoring financial innovation (see Table 3).

Table 2
FINTECH CENSUS FIRMS IN OFFICIAL REGISTERS

CNMV	
Crowdfunding platform	24
Securities broker	5
Financial consultancy firm	3
Securities dealer	2
Fund manager	1
Total	**35**
Banco de España	
Payment institution	5
Electronic money institution	4
Specialised lending institution	2
Account information service provider	1
Total	**12**
ESMA	
SME rating agency	1
DGSFP	
Insurance broker	1

SOURCE: Banco de España calculations.

Table 3
MAIN ACTIVITIES AND SERVICES PROVIDED BY THE 124 FINTECH FIRMS NOT INCLUDED IN OFFICIAL REGISTERS

1 Finance: crowdlending and loans		Consumer finance	20
		Corporate finance	11
		Real estate crowdfunding	8
		Crowdfunding	6
		Crowdlending	5
		Loan recovery	1
2 Payment and foreign exchange services		Payments	14
		Cryptocurrencies	5
3 Investment	Personal finance	Product comparison platform	17
		Savings	6
		Insurence advisory	6
		Information	4
		Mortgage advisory	3
	Investment	Investment	7
		Investment analysis	3
4 Other activities	Digital identity	Digital identity	5
		Digital certification	3

SOURCE: Banco de España calculations.

4.1 Finance: crowdlending and loans

The segment where the largest group of FinTech firms compete with traditional financial institutions is in the provision of financing in the form of: i) small-sized loans or fast microcredit, typically via the online channel; ii) trade finance for businesses and self-employed via notes discount, invoice factoring or credit facilities (where provided by numerous lenders through a platform, this is known as crowdfactoring); iii) FinTech firms that engage in raising funds for business projects and start-ups (P2B, peer-to-business, crowdlending and equity crowdfunding) and peer-to-peer finance platforms (P2P crowdlending). This group likewise includes companies that provide services associated with the credit cycle, such as in customer acquisition, loyalty and retention; risk assessment and loan recovery.

Crowdfunding[19] is an alternative and emergent means of raising funds for a specific cultural, research or business project (as well as consumer project), which uses a platform to directly connect parties that are willing to donate, lend or invest money (backers) with those looking to fund a given project (creators).

There are normally three actors involved: i) the initiator, a person (natural or legal) with a business project that needs funding; ii) prospective backers who may opt to pledge money to the business project; iii) a platform that provides communication services via its website, where the initiator can, if applicable, post a project and raise funding.

This is therefore non-brokered investment conducted through an IT platform that allows third parties to fund a project in exchange, where applicable, for some kind of consideration.[20] A funding goal and a time limit for meeting it are typically set. If a project fails to meet its funding goal, the pledges are returned to the respective backers. These platforms usually charge the project initiators if they meet the funding goal.

Crowdfunding for financial returns is a direct alternative to bank loans, thus increasing the finance options available to businesses and individuals. The difference is that instead of borrowing from a single source, companies can borrow from tens, sometimes hundreds, of investors who are ready to lend. The lenders usually offer an interest rate at which they would be willing to lend. Borrowers then accept the loan offers at the lowest interest rate. Two types of crowdfunding for financial return can be distinguished:

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19 For more information, see European Commission (2015).

20 In crowdfunding for non-financial returns, which is broadly used for cultural and research projects, backers contribute capital to a project and either receive nothing in return (donation-based crowdfunding) or receive some kind of reward, typically a product or perk (reward-based crowdfunding). Both types lie outside the scope of Law 5/2015, as specified in the preamble and Article 46 of the Law, "Companies that engage in the activity envisaged in the preceding paragraph shall not be considered crowdfunding platforms when the initiators exclusively raise funding through: a) donations; b) the sale of goods and services; and c) interest-free loans".

a) Equity crowdfunding: a model aimed at new projects and start-ups, where money is invested in a project in return for an equity interest (debt securities, ordinary or preference shares, or other shares representing equity and holdings in private limited companies).

b) Lending-based crowdfunding or crowdlending, where loans are extended to a company or project that is already generating cash through its ordinary activities, with an agreement established for scheduled repayments of the principal and interest. These may be loans between individuals (P2P, peer-to-peer crowdlending) or between individuals and businesses (P2B, peer-to-business crowdlending).

The second group includes platforms that raise funding for projects from investors by other means outside the scope of the activities reserved for crowdfunding platforms, which therefore do not need to be authorised by and registered with the CNMV (Article 48 of Law 5/2015). However, because these are unregulated platforms and outside the purview of CNMV supervision, investors using them do not benefit from the safeguards established under Law 5/2015. The CNMV publishes a list[21] of companies that may be engaged in capital raising activities or the provision of services of a financial nature but that lack any kind of authorisation and are not registered for any purpose with the CNMV.

4.2 Payment and foreign exchange services

Included in this category are companies that streamline physical and online payments through a payment gateway or virtual point of sale (POS) terminal. These companies provide remote payment services to the general public via the internet, i.e. digital wallets, where users can store their card and account information and make online payments, thus bypassing the need to fill out payment forms. Also included are some neobanks that, for the time being, are focused on digital wallets and currencies. This is among the FinTech areas where innovation is strongest and competition is fiercest, probably because digital payments are a source of big data.

This group also encompasses services for virtual currencies or cryptocurrencies as a digital medium of exchange. However, no law on cryptocurrencies has yet been ratified in Spain, meaning companies and platforms that exchange cryptocurrencies are not regulated under Spanish law. Nor are they subject to any supervision or protected by deposit guarantee schemes, as the CNMV and the Banco de España

21 The list can be found via the following link: http://www.cnmv.es/docportal/aldia/Advertencias_CNMV_Otras.pdf.

warned in their joint statement on cryptocurrencies and initial coin offerings (ICO) published in February 2018.[22]

The Fifth Anti-Money Laundering Directive (5AMLD), in force since January 2020, specifically extends its scope to include providers engaged in exchange services between virtual currencies and fiat currencies (exchanges) and custodian wallet providers.

4.3 Investment services

Personal finance encompasses financial product comparison platforms and distributors, along with companies that provide personal finance optimisation services by recommending products based on the user's risk profile and saving and spending habits. Also under this category are mortgage advisory firms that compare, arrange and manage mortgages via platforms, combining technological development with support from mortgage specialists. Personal finance may also be associated with companies that provide stock trading simulators, rankings of financial advisers and investment experts, and online delinquency records.

There are also companies that provide automated investment advisory and management services, and trading platforms. Among the innovations to emerge in recent years, the so-called robo-advisors have gained particular traction. These are online advisors that manage asset portfolios with minimum human intervention.

Also included here are companies that provide investment analysis and stock tracking services: big data algorithmic trading systems built on artificial intelligence models that evaluate investor sentiment. In contrast with the traditional technical and fundamental analysis used by traders and fund managers, these offer a novel approach to investment based on behavioural finance.

4.4 Other activities: digital identity

Digital identity refers to any attributes that identify an individual in the online world, which are shaped by each person's actions on the internet. One of the main challenges here is to develop systems that can be used by anyone to prove their identity when making purchases or engaging services online.

This group includes FinTech firms that offer remote, paperless customer identification and authentication services (electronic Know Your Customer or eKYC services) for

22 The statement can be found via the following link: https://www.bde.es/f/webbde/GAP/Secciones/SalaPrensa/NotasInformativas/18/presbe2018_07en.pdf.

digital onboarding. These allow users to register as new customers in a fully digital process via a computer or mobile device.

The technology that underpins digital onboarding supports the biometric identification of customers for iris and facial recognition, and the scanning of official identity documents required to comply, at the same time, with various regulations, such as the Fifth Anti-Money Laundering Directive (5AMLD) and eIDAS (electronic IDentification, Authentication and trust Services), an EU Regulation on electronic identification and trust services for electronic funds transfers in the European Single Market.

It is important to note that the revised European Payment Services Directive (PSD2) requires that banks operating in the euro area provide third parties with access to customer information, although explicit customer consent is required for a transaction to be executed. Article 98 of PSD2 compels payment service providers to apply strong customer authentication based on two or more elements categorised as knowledge (something only the user knows, e.g. a password), possession (something only the user possesses, e.g. a credit card) and inherence (something the user is, e.g. facial features, fingerprints or voice).

5 Conclusions

The financial industry has undergone a process of digital transformation in recent years, driven by new business models, the emergence of new players, the development of novel solutions, and the emergence of new technologies or bolstering of existing technologies. These developments, which as a whole are known as the FinTech phenomenon, could lead to data gaps or affect the quality of the statistics produced by the Banco de España, rendering that data hard to obtain, causing duplicate entries or undermining the data's representativeness. Any of these issues taking shape on a large scale could have implications for the usefulness of the current statistics in terms of supporting decision making on various fronts (promoting financial stability and the smooth functioning of payment systems, monetary policy design, supervision of financial institutions, etc.).

Mindful of these implications, the Banco de España has begun a process of statistical analysis for the FinTech phenomenon, geared at identifying the ecosystem in Spain. From the study of the collected data, it can be concluded that FinTech activity is at a low level for the time being and, if this remains the case, the impact on the representativeness of statistics will be limited. However, the momentum in the sector and the involvement of BigTech firms, with their potential to exponentially accelerate the pace of change, mean the market should be subject to ongoing monitoring to identify early on any aspect that might affect the dataset.

Consequently, the Banco de España is working to address the problem of identifying FinTech firms in Spain. The ultimate goal is to allow statistics on FinTech activity to

be gathered regularly going forward. This will serve as a basis for the appropriate monitoring by authorities of the financial innovation process and its potential impact on the country's financial sector and financial stability. In the absence of an official and complete census of FinTech firms, any work in this regard will need to draw on numerous sources, both in the industry and at other authorities, together with manual verification work. Therefore, since there are no obligations to report to the Banco de España, fostering cooperation with industry agents and other domestic and international authorities will be important.

REFERENCES

Asociación de Crowdlending Española (2019). *Situación del sector crowdlending en España,* November.

Asociación Española de FinTech e InsurTech (2017). *Libro blanco de la regulación fintech en España.*

Asociación para la Investigación de Medios de Comunicación (2019). *21.º navegantes en la red (encuesta AIMC a usuarios de Internet),* March.

Association of Supervisors of Banks of the Americas (2017). *An Overview of Fintechs: Their Benefits and Risks.*

Banco de España (2019). *Memoria de la Central de Información de Riesgos, 2018.*

European Commission (2015). *Crowdfunding explained. A guide for small and medium enterprises on crowdfunding and how to use it.*

European Payments Council (2017). *White Paper on Mobile payments,* March.

Fernández de Lis, S., and Urbiola P. Ortún (2018). "Transformación digital y competencia en el sector financiero", *Revista de Información Comercial Española (ICE),* December, pp. 73-82.

Financial Stability Board (2017). *Financial Stability Implications from FinTech, Supervisory and Regulatory Issues that Merit Authorities' Attention,* June.

— (2019a). *FinTech and market structure in financial services: market developments and potential financial stability implications,* February.

— (2019b). *Crypto-assets Work underway, regulatory approaches and potential gaps,* May.

Observatorio de la Digitalización Financiera Funcas-KPMG (2017). *Fintech, innovación al servicio del cliente,* November.

Romero Ugarte, J. L. (2018). "Distributed ledger technology (DLT): introduction", Analytical Articles, *Economic Bulletin,* Banco de España, October.

Ziegler, T., R. Shneor, K. Wenzlaff, A. Odorović, D. Johanson, R. Hao and L. Ryll (2019). *Shifting Paradigms - The 4th European Alternative Finance Benchmarking Report,* Cambridge Judge Business School, May.