

FINANCIAL STABILITY REVIEW

Issue 38

Spring

2020

BANCO DE **ESPAÑA**
Eurosistema



FINANCIAL STABILITY REVIEW SPRING 2020

Issue 38

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BigTech “banks”, financial stability and regulation

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Abstract

This paper considers the financial stability risks caused by BigTech’s entry into retail banking and discusses alternative policy responses aimed at allaying those concerns. The entry of BigTech platforms may transform the retail banking industry in radical ways: while it may spur much-needed competition in the short term, it may also increase financial instability and lead to even more concentrated credit markets in the long-term. Importantly, traditional banks may be forced to transform into “narrow banks”, limited to funding the loans originated and distributed by the BigTechs. The separation between origination and funding has proved problematic once and again, from the savings and loans (S&L) crisis of the 80s and 90s to the financial collapse of the Great Recession. This time need not be different. Whether this grim prospect materialises, though, will depend on several factors, including how regulators respond to the new challenges posed by the entry of BigTech “banks”.

1 Introduction

In a previous paper,¹ written with Miguel de la Mano in 2018, we discussed the logic and likely effects of the entry of BigTech players – such as Google, Facebook and Amazon – into retail banking. We found that such entry may spur competition in the short term, which will be celebrated given that lack of competition has been a long-standing concern in the industry. However, it may also increase financial instability in the short term and even lead to more concentrated credit markets in the long-term. Whether this grim prospect materialises, though, will depend on several factors, including how competition authorities, privacy and financial regulators respond to the entry of BigTech into banking.

In this paper I consider in further detail the risks posed by BigTech banking on financial stability and, in particular, discuss some alternative policy responses. As discussed in De la Mano and Padilla (2018), the moral hazard and adverse selection problems that are common in retail banking markets are both more likely, and likely more costly, when the origination of loans and their funding are in different hands. This is precisely the market scenario that is likely to emerge after the entry of the BigTech platforms into retail banking, as they are likely to be in a position to leverage their customer relationships, unlimited funds, superior data and AI capabilities, and extant regulatory asymmetries to monopolise the origination and distribution of loans to households and small and medium enterprises (SMEs). In that scenario,

1 De la Mano and Padilla (2018), Stultz (2019) and Frost et al. (2019).

traditional banks may simply fund loans originated by the BigTechs, and default rates are likely to increase, as too much capital gets allocated to dubious projects, overconfident entrepreneurs and big spending families.

Banning BigTech entry cannot be the right policy response to this. BigTechs' entry may facilitate financial inclusion and access to capital to households and firms that would be out of the market otherwise, and may extend cheaper credit to all those that were already in. Their entry will force traditional banks to compete to the ultimate benefit of their customers: lowering commissions, offering better terms and conditions, and launching new products and services. Traditional banks have been protected against entry for years, always in the name of prudential regulation. Such a protectionist policy is harder to justify today.

So, what can be done? One option is to empower traditional banks to compete with the BigTechs by (a) eliminating regulatory asymmetries, so that firms are regulated based on the activities they perform rather than according to their charter; (b) creating a level playing field with respect to data by requesting BigTechs to provide data to banks, as the latter are already asked to do; etc. A second option is to regulate the BigTech's activities in the credit market so that they stay away from predatory lending tactics and are requested to comply with the same fiduciary and investor protection obligations than traditional banks and other financial intermediaries. Last but not least, the solution may be to replace the private money created by traditional banks by public money created by central banks (i.e. sovereign money), so that loans are no longer funded by "run-prone" contracts, such as deposits and, hence, the separation between origination/distribution and funding no longer has systemic implications.

The paper is organised as follows. In Section 2 I explain why BigTech companies have the ability and incentive to enter successfully into retail banking, and discuss their many competitive advantages, especially those originating from the accumulation of soft information about potential borrowers. In Section 3 I consider the implications of their entry for traditional banks and competition and, in particular, I review the reasons why they may end up monopolising the origination and distribution of credit to households and SMEs. I move to discuss the potential effects of these likely market developments for financial stability in Section 4. I assess alternative policy solutions in Section 5. Section 6 concludes.

2 Barbarians at the gate

Unlike FinTech companies, which have attracted so much attention over the last few years, but which have made little dent in the profits of traditional banks, BigTech platforms possess significant competitive advantages that can be successfully leveraged onto the retail banking markets. Among other advantages, they have large

installed customer bases, established reputations, powerful brands, considerable earnings and unfettered access to capital markets. They can leverage superior information about consumer preferences, habits and conduct. They control the shopping experiences of many consumers and, recently, the distribution and commercialization of many suppliers. Furthermore, these platforms can take advantage of the explosion of big data on individuals and firms, as well as of the rapid advances in artificial intelligence, computing power, cryptography and the reach of the Internet. Their users may thus benefit through better functionality and quality as well as innovative financial products and services.

The likely impact of BigTech on retail banking is not speculative; their presence has already been felt in Asia. For example, China's most prominent online commerce company, Alibaba, launched in 1999, started Taobao in 2003 as a consumer e-commerce platform and added Alipay to Taobao in 2004 as a third-party online payment platform. Since then, Alipay (renamed Ant Financial in 2014) has played a vital role in Alibaba's success and has successfully built its standalone presence with a wide range of financial offerings, including: payments, wealth management, lending, insurance, and credit scoring. It is now one of the largest financial institutions in the world.

In the short term, the entry of these platforms into retail banking will likely increase competition to the benefit of consumers. This positive impact may take longer in Europe and the United States than in China and the rest of Asia. The different speed of entry may be explained by profound differences between Asian and Western retail banking markets, including in relation to supply side factors, demand side factors and regulatory frameworks. First, the lower level of banking penetration, coupled with the rise of an affluent class, has facilitated the entry of new financial institutions in Asia.² Second, socio-demographic factors may also have played a role in promoting BigTech banking in Asia, where the population is younger than in Europe. Younger generations are more likely to acquire banking services from BigTech companies than older generations. Finally, banking regulation is much more favourable to entrants and financial innovation in Asia.³

Padilla and Trento (2019) explained why none of these factors will prevent the entry of BigTech firms into the retail banking markets of Europe and the United States.⁴ To start with, BigTech firms have already entered in those markets by providing payment systems. This is what happened in China: they first entered with payments and then expanded to other segments. Moreover, recent regulatory policies, such as Open

2 See World Bank (2015). See also McKinsey & Co. (2017a) and World Bank (2018). This last edition of the World Bank Findex shows that penetration of BigTech financing in Asia has not only resulted in more competition, but also in the transition of many citizens from the informal to the formal financing mechanisms, which may also have implications for financial stability.

3 Bilotta and Romano (2019).

4 Padilla and Trento (2019).

Banking in the UK⁵ and the Payment Services Directive (PSD2)⁶ in the EU, will facilitate their entry into consumer and SME lending.

Whether they enter on a stand-alone basis or through cooperation agreements with established banks may vary from country to country and/or from one product market to another. But the experience from other industries – from online advertising to software; from travel distribution to retailing – shows that when BigTech firms enter a new market they move fast. BigTech scale up their businesses very quickly, because they are able to leverage on their proven ability to tailor their services around customers' needs, to exploit economies of scope and data advantages, and to cross-subsidise their services with the services they offer in other markets.

So, within a few years, BigTech companies may succeed in monopolizing some segments of the retail banking industry. In particular, they are expected to conquer a significant share of the origination and distribution of loans to consumers and SMEs. According to Moody's, banks will likely "cede a portion of their distribution of retail financial services despite efforts to increase their presence in digital platforms".⁷ This will be particularly troublesome for established banks, since these are their most profitable lines of business. According to a recent McKinsey report, the distribution business of banks represents 47% of their revenues but 65% of their profits and has a return on equity (ROE) of 20% (compared with an average ROE of 7-8%).⁸

BigTech platforms may enter as "intermediaries", in direct competition with incumbents, raising funds and lending them to consumers and firms, or as "marketplaces", offering customers the ability to engage with many financial institutions (banks and non-banks) using a single distribution channel.⁹ As intermediaries, they may be able to offer new services by bundling their existing offerings (e.g. online advertising, e-commerce, etc.) with traditional banking products; e.g. offering cheap credit to customers who subscribe to their online services or purchases in their e-commerce sites. They may thus outbid incumbents, unable to replicate those bundles and benefit from associated demand and supply economies of scope due to their narrower product portfolios.¹⁰

As marketplaces, they may benefit from network effects by bringing together banks and borrowers. Banks may need join these platforms in order to reach out to borrowers. Borrowers will patronize them to obtain cheaper credit. Each of these

5 See UK Competition & Markets Authority (2016).

6 Directive (EU) 2015/2366 of The European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No. 1093/2010, and repealing Directive 2007/64/EC.

7 See Moody's (2018).

8 See McKinsey & Co. (2017a).

9 See Hagi and Wright (2015a).

10 See Klemperer and Padilla (1997).

marketplaces likely will auction the loans it originates amongst all, or at very least a significant fraction, of the banks participating in its platform. Banks, having received soft and hard information about borrowers from the platform, will bid aggressively to succeed in these auctions. Relative to the *status quo*, where each borrower is *de facto* locked into the bank with which it has a relationship, borrowers joining a marketplace that is participated by many banks likely will benefit from increased banking competition.

BigTech platforms will benefit from a *regulatory asymmetry* when competing with established banks, especially in Europe. The European Union's PSD2 requires banks to allow authorized Third-Party Providers (TPPs) access to their customers' account information and make payments from customers' accounts. Banks are obliged to provide access to customer data to all authorized competitors in digital form and free of charge. Likewise, the UK Open Banking initiative requires the nine largest banks in the UK to allow their customers to provide access to their own bank data securely with third parties, using an open banking standard. The Competition and Markets Authority (CMA) requires banks to adopt and maintain a common and open Application Programming Interface (API)¹¹ standard that permits authorized intermediaries to access information about banks services, prices and service quality. In sharp contrast, under the General Data Protection Regulation (GDPR),¹² TPPs, including BigTech platforms, are obliged to facilitate data portability *only where it is technically feasible*.¹³ As stated in a recent EY report, under GDPR BigTech platforms will *de facto* retain economic sovereignty over the data of their customers.¹⁴ Instead, EU banks, due to PSD2, and UK banks, because of Open Banking, likely will not.

3 Implications for competition in retail banking

Whether BigTech platforms act as intermediaries or marketplaces, traditional banks will have to compete fiercely for the demand for credit of their hitherto most loyal and valuable customers: households and SMEs. They will also have to compete for talent, which will drive up the cost of recruiting the needed financial and technological skills.

Banks may find it difficult to offer differentiated services given that extant open data regulations limit, if not eliminate, any informational advantage they might have

11 APIs are methods of standardised data exchange that are widely used both within and between firms.

12 Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data and repealing Directive 95/46/EC (General Data Protection Regulation).

13 Strictly speaking, data portability requires direct transmission between companies (i.e. controllers) and such transmission is only compelled where technically feasible.

14 See EY (2018).

enjoyed regarding their customers. While their extensive experience and established customer relationships may protect them for a while, allowing them to offer better products at a more reasonable cost, BigTech competitors will have the incentive and ability to recruit financial talent and thus we expect them to bridge that gap relatively soon.

Crucially, some incumbent banks may be unable to compete technologically unless they partner with FinTech companies or even perhaps with the BigTech platforms that cloud their future. Banks may thus have to choose between Scylla, falling behind technologically by giving up collaboration with the tech companies, and Charybdis, losing control over costs and customer data if they choose to partner with them.

Traditional banks are thus likely to lose a significant portion of the market for the origination and distribution of loans to households and SMEs. In fact, they may end up transforming into “low cost manufacturers” or “narrow banks”, accepting deposits from the public and investing them in products originated and distributed by others, including the BigTechs.

Of course, such narrow banks will see a decline in profit margins due to the commoditization of their businesses and may be forced to repurpose their distribution businesses to address the needs of special customer niches. Because most rents associated to lending are appropriated by those who originate and distribute, the negative impact on the traditional banks’ profitability will be especially significant if, as it is likely, households and SMEs choose to concentrate their banking activity with a single tech platform (i.e. if they “single home” within a given ecosystem). In that case, some customers will bank with, say, Facebook, while others will conduct their business with Apple’s, Google’s or Amazon’s banking branches. Each of those platforms will become a “gatekeeper” to a fraction of the borrowers’ population,¹⁵ and thus traditional banks will be forced to deal with each and every of the BigTech platforms (i.e. “multi home”). Banks will have to pay significant membership fees and/or transaction fees to do business with each of these “pivotal” platforms if they want to have a broad reach. Some banks, the most efficient ones, may be able to afford operating with very thin margins, but many others may be forced to exit. Recall that in Europe banks’ ROEs are still insufficient to cover their cost of capital.¹⁶

Whether BigTech entry ends up fostering competition in retail banking in the medium and long term is at best uncertain. It will depend, among other things, on the ability of traditional banks to ring fence their loyal and highly profitable customer bases, exploit their informational advantages and reputation regarding data

15 See Armstrong (2006), Hagiu and Wright (2015b), Belleflamme and Peitz (2015) and Belleflamme and Peitz (2017).

16 See McKinsey & Co. (2017b).

protection, and/or bundle products with the current accounts of their customers. If they manage to do so, they might be able to stop people from shifting away to the BigTechs. The competitive effect of the entry of BigTech firms will also depend on how regulation treats these new entities in absolute terms but also in relation to existing banks.

4 Potential implications on financial stability

Those with a memory of the S&L crisis of the 80s and 90s¹⁷ or the subprime crisis of the last decade¹⁸ will be concerned about the developments described above. BigTech's unbundling of banking services may damage the charter value of traditional banks if they end up being limited to offering an essential, basic facility, very much like the utility industries of water supply, gas and electricity, while the more profitable segments and customers instead go to the BigTech firms with few or no layers of intermediation.¹⁹

As explained in De la Mano and Padilla (2018),²⁰ in a market scenario where BigTech platforms originate and distribute loans and banks simply fund the loans originated elsewhere, the proportion of bad projects, including those based on overly optimistic expectations of commercial success,²¹ being funded may increase. Default rates may also increase in that scenario. This is because a retail banking market where the origination of loans and their funding are in different hands can be subject to significant moral hazard and adverse selection problems.

Moral hazard concerns. BigTech platforms may have little or no stake in the loans they help to originate and distribute and may, therefore, have incentives to reduce the quality of the loan pool to maximize loan origination volume and, in parallel, the volume of other products or services sold to borrowers through their (bundled) platforms.²² They may also invest less in screening projects and borrowers.²³ Limited screening results in the origination of loans with poor soft information and high default rates.²⁴ For these reasons, the risks faced by banks after the entry of the BigTech platforms into their traditional origination and distribution markets will increase relative to the current scenario where they are active in loan evaluation and

17 See Curry and Shibus (2000).

18 See Bernanke et al. (2019).

19 Note, in particular, that banks' most basic service (current accounts) is nowadays provided (almost) for free due to fierce competition amongst banks and because regulation obliges banks to offer a "basic account" to those that do not have one for free.

20 See supra note 2.

21 See Manove and Padilla (1999).

22 See Vallee and Zeng (2018).

23 See Purnanandam (2011), who shows evidence that the screening incentives of lenders to collect soft information decrease under an originate-to-distribute model.

24 See Balyuk and Davydenko (2018). These authors show that default rates on loans handled by FinTech firms are higher than on other credits to consumers with similar credit scores.

fund only high-quality loans. Moral hazard may also increase even when the platforms fund the loans they originate, since they will have incentives to expand credit in order to bolster their other platform businesses – i.e. to sell additional products or services on their e-commerce platforms or to acquire complementary data to monetize through their advertising platforms.

Adverse selection concerns. BigTech platforms will typically enter retail banking adopting an “agency model”, whereby they do not retain the risk of the loan they originate. Digital platforms make money on fees, charging both lenders and borrowers. Since they need both sides on board, profit maximizing fees must factor in the elasticity of demand for their intermediation services of each side. This requires charging comparatively more on the less elastic side of the market – typically borrowers – and even subsidizing the most elastic side – typically lenders. The combination of fee-based profitability, the need for a stable and possibly increasing source of lending, and network externalities, likely will push lending platforms to broker as many deals as possible. But this is bound to result in adverse selection on both sides of the market, lenders and borrowers.

Even if the entry of the BigTechs into retail banking fails to produce the change in banks’ business model above, the *increased competition* resulting from their entry “may also intensify risk taking by eroding the franchise value of the bank and diminishing incentives to monitor loans and maintain long-term relationships with clients.”²⁵

The Financial Stability Board (FSB), which comprises ministries of finance, central banks, supervisory and regulatory authorities from 25 jurisdictions, expressed concern that entry of BigTechs in competition with traditional banks may generate financial instability as “heightened competition could [...] put pressure on financial institutions’ profitability. This could lead to additional risk taking among incumbents in order to maintain margins”.²⁶ The FSB also noted that BigTechs’ entry may also limit traditional banks’ ability to cross-subsidize products.²⁷

5 Policy alternatives

Banning BigTechs from retail banking is not a solution. Many economists, policymakers and industry commentators remain seriously concerned about the poor state of competition in the banking industry.²⁸ This state of affairs, it is argued, explains why the cost of financial intermediation remains high and has only declined

25 See Vives (2016).

26 Financial Stability Board (2019).

27 Id.

28 See note 26 and references therein.

marginally since the 2008 crisis. The negative implications for consumer welfare and economic growth are said to be significant.²⁹

Entry by traditional players is unlikely to strengthen competition because incumbent banks enjoy considerable competitive advantages *vis-à-vis* new entrants using the same business model: a large and partly captive customer base, proven experience and reputation, superior knowledge of existing regulations, and access to cheaper capital funding due to their “too big to fail” (or TBTF) status.

FinTech companies are also unlikely to change the *status quo*. While they operate leaner businesses, benefit from state-of-the-art technologies, focus on those banking businesses (payments, advice and distribution) with higher ROEs, and, being funded with much more equity than traditional banks, possess a regulatory advantage, they also face some non-trivial competitive disadvantages *vis-à-vis* incumbent banks. Among others, the absence of an installed, loyal customer base; limited access to *soft* information³⁰ about potential customers, lack of reputation and brand recognition, and a relatively high cost of capital.³¹ FinTech firms may play a significant role in payments and in the provision of advisory services in capital markets. But their ability to effectively compete in other retail banking markets, in particular in the origination and distribution of consumer and SME lending, is unclear, to say the least. Not surprisingly, the impact of FinTech firms has mainly materialised through collaboration and cooperation agreements with established retail banks.³²

Given that banning entry by BigTechs is not an appropriate public policy, how could society take advantage of the benefits of BigTech entry while limiting the risks to financial instability mentioned in Section 4 above? We discuss three options: (i) levelling the playing field between BigTechs and traditional banks; (ii) a second option is to regulate closely the BigTech’s activities in the credit market; and (iii) moving to a run-free banking system.

5.1 Levelling the playing field

It may be in society’s interest that traditional banks find a way to compete with their digital-based competitors, but that may prove hard given the data advantages enjoyed by the BigTech companies which in addition can, and are likely to, cross-

29 See Bazot (2014) and Philippon (2015 and 2018).

30 As noted by Liberti and Petersen (2018), “hard information is quantitative, easy to store and transmit in impersonal ways, and its information content is independent of the collection process.” Instead, “information that is difficult to completely summarise in a numeric score is what we call soft information.” See also Thakor and Merton (2019).

31 See Buchak et al. (2018).

32 For a more optimistic view of the impact of FinTech companies, see Philippon (2020).

subsidize their banking operations with the high profits obtained in the adjacent platforms where they exert market power.

5.1.1 Dealing with BigTechs' data superiority

A necessary (though, as discussed below, not sufficient) condition for a levelled playing field is to limit the data superiority of BigTech platforms. This could be achieved in different ways: mandating data sharing, regulating privacy to prevent the bundling of multiple sources of data, etc.

Data sharing. Platforms above a certain size would have to grant access to others, including traditional banks, to a subset of their data. Any mandated data sharing scheme ought to respect the following principles.³³ Firstly, customers should be able to exercise control over the data about them and their transactions that is shared with third parties. Secondly, the nature and scope of the data exchange should be transparent to customers. Thirdly, the information exchange must happen through secure methods. Fourthly, the data should be accessible through standardized APIs, so that the exchange takes place efficiently and without undue delay. Finally, the sharing scheme must provide incentives so that the party in control of the data does share the data and the party which receives it builds value added propositions with such data.

Data banks. These would act as data repositories controlled by end users. The user would grant various access rights to her data depending on products or services sought. However, this model may not provide the right incentives for initial data collection and certification. By separating data ownership and control this policy option may give rise to agency problems and other inefficiencies. Finally, users may not be able to exercise their control rights over their own personal data in practice, since the option of not sharing their data may make them *de facto* second-class digital citizens: the best financial investments, credit opportunities or insurance premiums will only be available to users consenting to share their data with the predictive algorithms of the BigTech platforms.

Data unbundling. Another alternative would be to enhance privacy protection, limiting the ability of large tech platforms to gather and combine personal and transaction data and, therefore, setting a limit to their data superiority. This would require explicit regulation. Self-regulation is bound to fail. Firstly, while consumers do care about privacy,³⁴ they seem to be resigned about having to surrender their personal data in order to be able to make use of the largest and most popular tech platforms.³⁵ As a

33 World Economic Forum (2018).

34 See e.g. Jai and King (2016), Grossklags and Acquisti (2007), Acquisti et al. (2013) and Regner and Riener (2017).

35 See Turow et al. (2015).

result, they spend little or no time checking the privacy policies of online platforms and, even when they do so, they seem unable to understand their implications. Secondly, data on a user can be used not only to tailor the platform's products and services to satisfy the needs of that user, but also to adjust the service, including its price, to other users who are related. Hence, individual consent by a user may generate (positive or negative) externalities on other users. In other words, data have a social value.³⁶ As noted by Choi et al. (2019),³⁷ because this externality may be negative in many circumstances, "excessive loss of privacy emerges even with costless reading and perfect understanding of all privacy policies". In other words, informed consent may prove insufficient.

5.1.2 Mind the (regulatory) gap

The interventions above will likely prove insufficient to prevent the monopolization of the most profitable banking markets because, the BigTech platforms, free from capital requirements and the many other regulations constraining the ability of traditional banks to experiment with new products and business models, may out-invest and thence out-compete banks.

BigTech platforms enter retail banking remaining outside the scope of the existing regulatory framework. By functioning as intermediaries between clients and financial institutions, they may not be subject to the investor protection rules that ensure market integrity nor subject to measures that limit the level of interdependence between financial intermediaries in order to prevent the build-up of systemic risk.

According to the Institute of International Finance, this "asymmetry [in regulation] or lack of reciprocity [concerning data sharing] means that a regulation intended to facilitate the entrance of new players and promote competition and end-user choice in the payments market has created a competitive disadvantage for banks and other financial services firms *vis-à-vis* players from other industries. This risks contributing to the existing trend in digital markets towards the concentration of power in the hands of a few big technological players."³⁸

For this and other related reasons, competition between traditional banks and BigTech entrants will not be levelled by simply eliminating or mitigating the latter's data advantages. It may require closing the "regulatory gap" that separates them at present. For example, if a BigTech platform has discretion in selecting potential borrowers or portfolios of borrowers for their clients, then it should be regulated as a portfolio manager. If it develops a secondary market for its products, and issues

36 See Bergemann and Bonatti (2019).

37 See Choi et al. (2019).

38 Institute of International Finance (2018).

tradable and non-tradable securities, it should be subject to security regulations. BigTech platforms should also be subject to the same sort of mandatory disclosure obligations and outright bans that apply to banks in Europe and the United States: e.g. being required to disclose whether their preselection of financial products is independent and neutral, and to act honestly, fairly and professionally in accordance with the best interests of its clients.

5.2 Regulating BigTech's tightly

The policy alternative just discussed may be criticised for three reasons. Firstly, data sharing may be considered deeply problematic from the viewpoint of privacy protection. Arguably, such a remedy could hurt users of BigTech platforms, whose data would be used and, possibly, misused by a greater number of firms. Of course, this need not be the case if the sharing is initiated by the customer. Secondly, data sharing may limit efficiency by preventing or disincentivising the creation of large and rich databases that could be mined in the interest of consumers and business users. Data unbundling may, in addition, prevent the efficient combination of data to provide new products and services. Finally, it may be argued that measures aimed at reducing the competitive advantages of BigTechs will deter or even block their entry, since traditional banks enjoy all sort of incumbency advantages, such as ownership of a large and partly captive customer base, proven experience and reputation, superior knowledge of existing regulations, and TBTF status.

An alternative is to limit intervention to the regulation of the BigTech's activities in the credit market, so that they stay away from predatory lending tactics and are requested to comply with the same fiduciary and investor protection obligations than traditional banks and other financial intermediaries. They would thus be able to retain all competitive advantages, including their data superiority, that are the result of their superior business foresight and/or skills, and would only be restricted in their ability to exploit the existing regulatory gap. Exploiting such a gap at the expense of their ultimate customers cannot be justified in any circumstance.

5.3 Moving to run-free banking

Now, it may well be the case that levelling the regulatory field proves insufficient to ensure that traditional banks can effectively compete with the BigTechs in the origination and distribution of loans to households and SMEs. By forcing the latter to behave in the best interests of their customers and adopt sound lending policies, financial regulators may restrict excessive risk taking, limit instability, and protect market integrity. However, the separation between origination/distribution and funding caused by the BigTech's entry may still result problematic from a prudential viewpoint. The reason being that traditional banks, transformed into narrow banks

funded with “run-prone” contracts, such as sight deposits and overnight debt, may prove too weak, and such vulnerability can pose a serious threat to financial stability and the whole economy.

Paradoxically, the solution to this problem may be to accelerate the process by which the economy becomes less dependent on traditional banks. To be more precise, one may consider replacing the private money created by traditional banks by public money created by central banks (i.e. sovereign money). This is a well-known proposal, first introduced in the 1930s by economists such as Irving Fisher,³⁹ and defended now by many economists,⁴⁰ policymakers,⁴¹ and pundits.⁴² The idea is to introduce a “reform to the banking system that would remove the ability of banks to create money, in the form of bank deposits, when they make loans. It would transfer the ability to create new money exclusively to the state...”⁴³

A possible implementation of this idea is to require the (gradual or immediate) exchange of households’ and firms’ deposits in banks for central bank money, while the central bank passes its new funding sources to banks and other financial intermediaries, including the BigTechs, which will originate and distribute loans. The difference with the current situation is that the funding of those loans would no longer be made with run-prone contracts, but rather with run-free money. In this world, the cost of the poor loan screening decisions of a financial intermediary would be borne by its investors rather than taxpayers and the economy at large. Risky financial intermediaries would go bust, but their collapse would not cause a credit crunch. Investors, being exposed to the risk of default, as they would no longer be protected by deposit insurance or TBTF bailouts would have to pay extra attention to the riskiness of their investments. And, finally, the banking market would be subject to less controls and policymakers would no longer be justified in restricting competition between banks and other intermediaries in the name of prudential regulation.

Of course, the devil is in the details and, like any other drastic reform, this policy change may give rise to unintended consequences. This proposal, whatever its theoretical appeal, may indeed prove difficult to apply in practice. On the one hand, the transition from private to public digital money may be long and involve significant risks for financial stability. On the other, it will require reconsidering the scope and instrumentation of monetary policy interventions. Finally, in the context of the European Union, it is unclear to me whether a run-free banking system is feasible before a “banking union” is adopted. But the appeal of this somewhat radical reform

39 See Fisher (1936). *Curiosum*: I was given a first edition copy of the book signed by Irving Fisher in 1937 for my birthday last December, for which I thank my wife.

40 See e.g. Cochrane (2014). See also Brunnermeier and Niepelt (2019).

41 See Fernández-Ordóñez (2020).

42 Dyson et al. (2016).

43 See Positive Money, available at <https://positivemoney.org/our-proposals/sovereign-money-introduction/>.

may be increased as a result of the entry of the BigTechs into banking, given its impact on the ability and incentive of traditional banks to play safe.

6 Concluding remarks

A full cost-benefit analysis of the policy proposals presented above is outside of the scope of this paper. They differ in terms of the way the balance competition and financial stability risks. The first proposal – levelling the playing field – may dominate the other two in terms of its procompetitive effects, but it may not be able to deal with the financial stability concerns described in Section 4. The second proposal – eliminating the regulatory gap – may be more successful from the viewpoint of financial stability, but it may not allow BigTechs to compete head-to-head with the established banks. The last proposal is possibly superior to the other two along both dimensions. However, I reckon that it is likely to be fiendishly difficult to implement.

Post scriptum: This paper has been written while confined at home due to the Covid-19 crisis. It is of course difficult to forecast the future. It may be too early to anticipate with any degree of accuracy the implications of this crisis for the issues considered in this paper. Yet, it is hard to deny that the crisis is accelerating the role of financial digitization of the economy and, in particular, of the retail banking industry. BigTech companies, which are playing a crucial role in a context in which many consumers are purchasing online and a significant proportion of people are working from home, are bound to grow their share of the payment system and may play a bigger role in financing households and SMEs. The Covid-19 crisis may, therefore, bring forward some of the developments, opportunities and risks discussed above. Thus, policymakers and financial regulators may have to react quickly to avoid the risk of joining the queue of those requiring a mechanical ventilator.

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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 to attract more customers by offering digital and personalized financial services. On the other hand, the economic crisis caused by the virus may threaten the whole FinTech sector if as the economic slowdown increases the default rates on FinTech loans as it 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 been 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

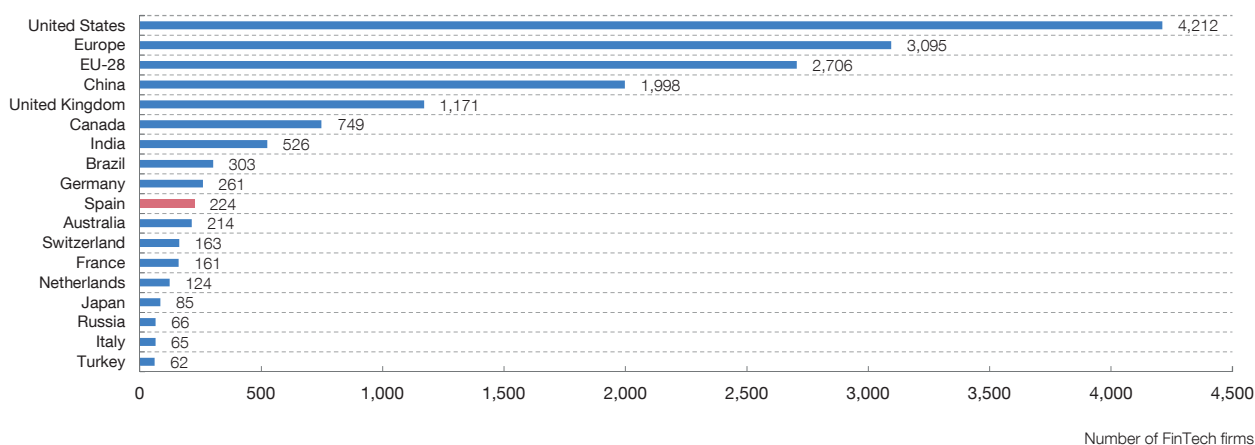
alternative funding source for businesses and consumers, and may improve access to credit for underserved segments [Claessens et al. (2018)]. In those countries with a large proportion of unbanked population, FinTechs exhibit higher adoption rates of FinTech services [Ernst and Young (2017)]. For example 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)



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”

Table 1

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

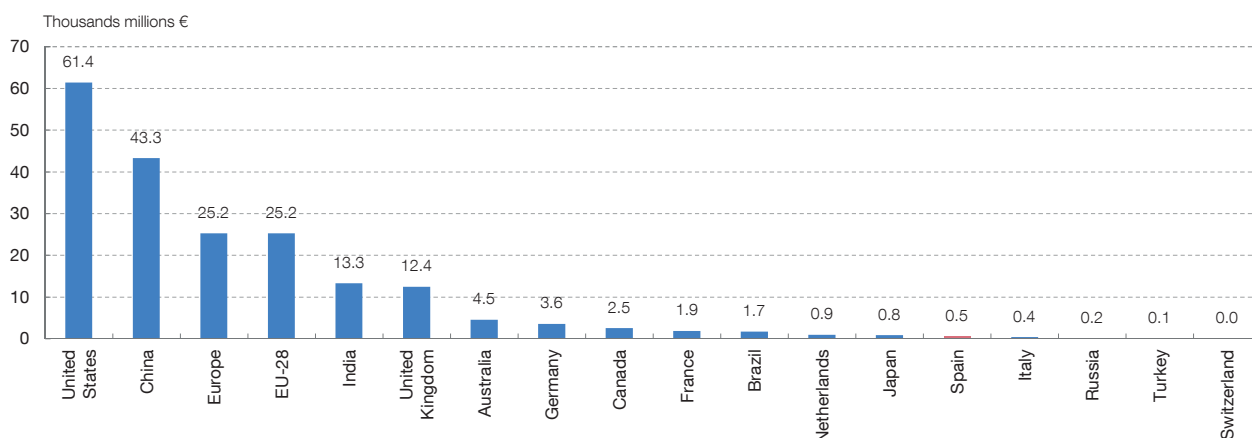
SOURCES: Dealroom.co and own elaboration.

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)



SOURCES: Dealroom.co and own elaboration.

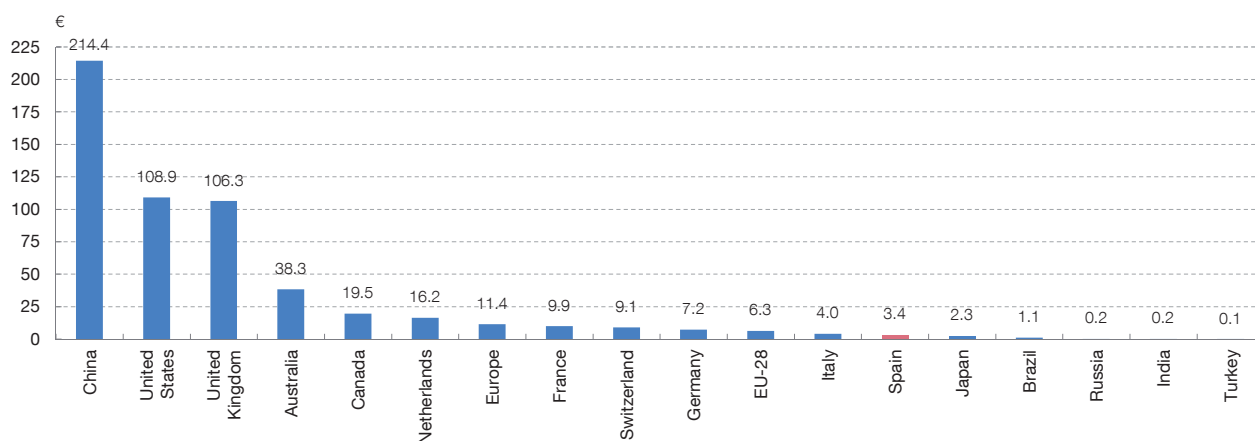
over the total number of them founded in Europe (UK excluded) has remained stable around 6%-8% annually.

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)



SOURCES: Cambridge Centre for Alternative Finance and own elaboration.

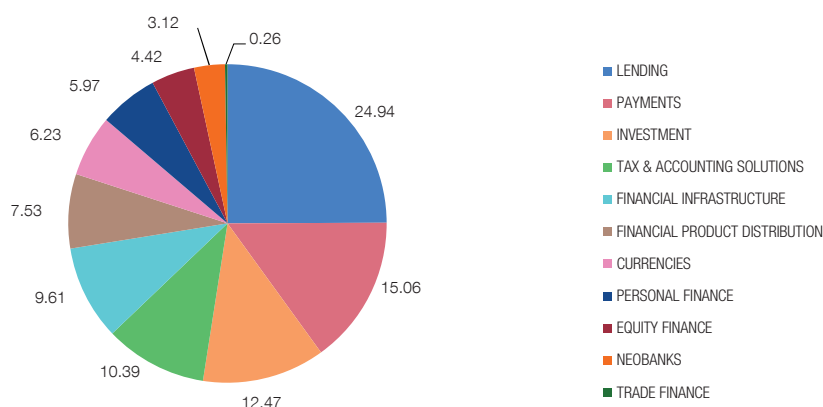
would reflect that those companies are playing a relevant role in the economy financing consumers and businesses. Figure 3 shows the FinTech credit per capita for some selected countries. In line with research, China exhibits the largest ratio of FinTech credit per capita. On average a Chinese consumer 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 States 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,

Chart 4

DISTRIBUTION OF SPANISH FINTECH FIRMS BY ACTIVITY SEGMENTATION (AS OF DECEMBER 2019) (%)



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 that

Table 2

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

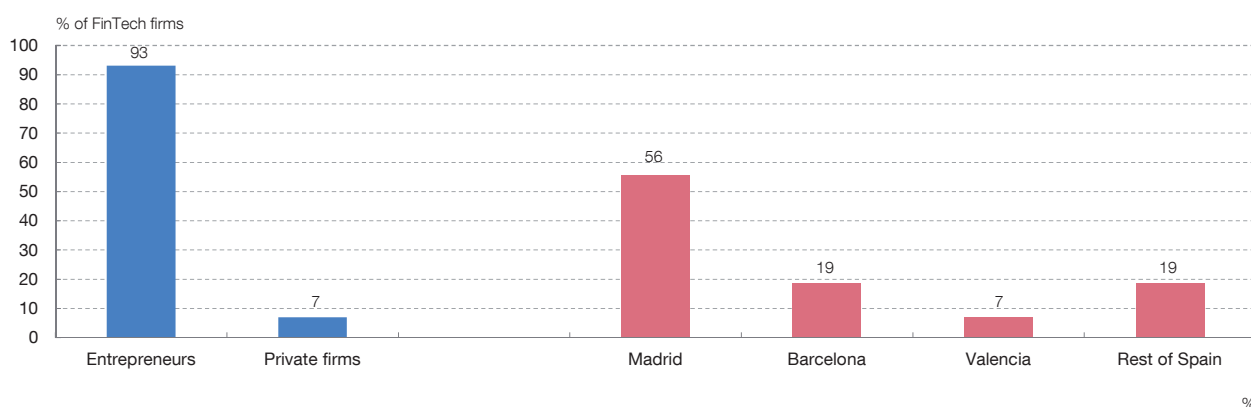
FinTech firms are offering their financial products and services to firms (B2B, Business-to-Business) while just 33.55% are focused on consumers (B2C, Business-to-Consumer). This pattern, which has also been observed in other jurisdictions, suggest that FinTech firms are not targeting mainly consumers 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)



SOURCES: Dealroom.co and own elaboration.

4.3 Foundation and location

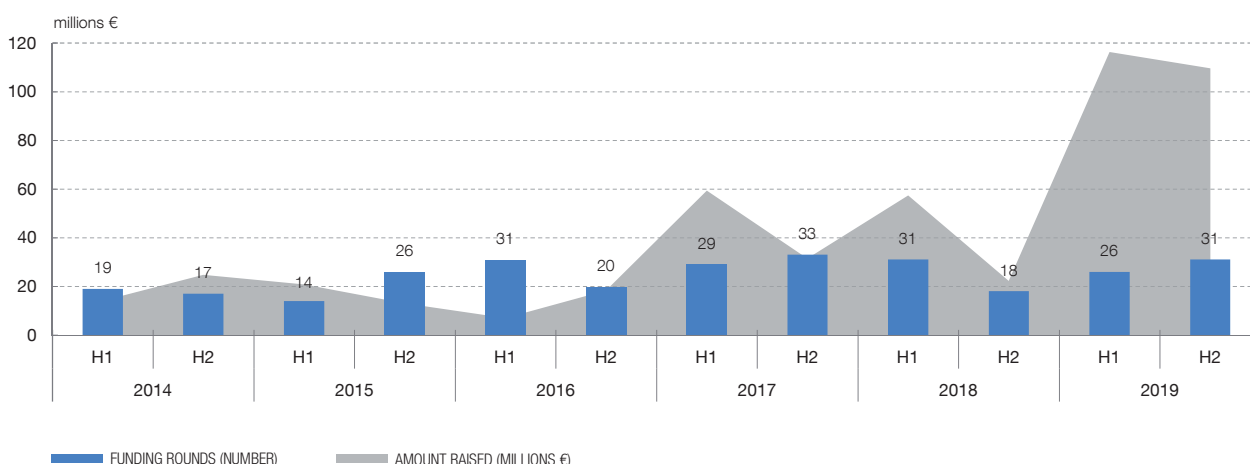
Figure 5 depicts some of the key characteristics of the Spanish FinTechs in terms of their foundation. It is remarkable that the majority of the FinTechs (93%) are founded by entrepreneurs. This result is not surprising since most of the FinTech are born as start-ups companies based on financial innovations. 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 been argued, FinTechs’ access to funds is key in order to be able to scale and grow. 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.

Table 3

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

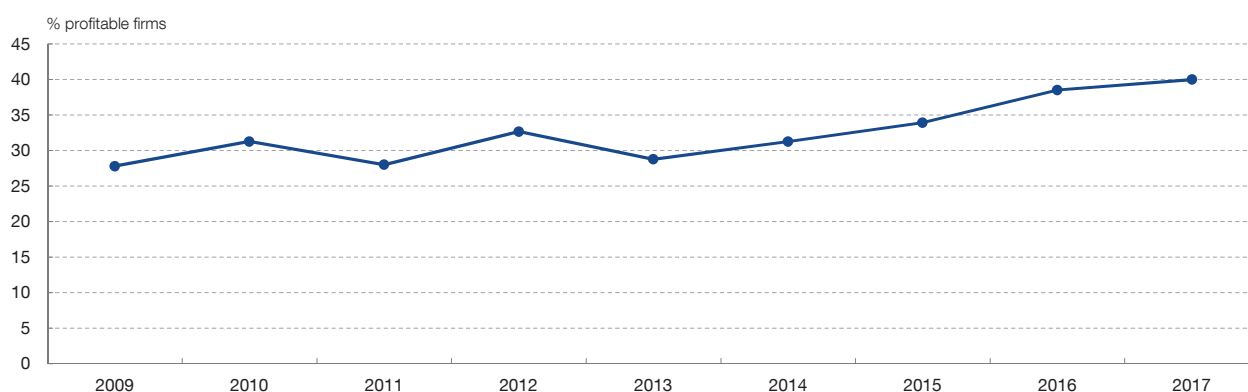
SOURCE: Own elaboration.

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 ($X_{\text{FinTech Location}_{i,t}}$), 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:

$$\begin{aligned}
 \text{Performance}_{i,t} = & \beta_0 + \beta_1 X_{\text{FinTech Foundation}_{i,t}} + \beta_2 X_{\text{FinTech Location}_{i,t}} + \\
 & \beta_3 X_{\text{FinTech Financing}_{i,t}} + \beta_4 X_{\text{accounting Information}_{i,t}} + \sum_{h=1}^h \beta_h \text{Year}_h + \\
 & + \sum_{k=1}^k \beta_k \text{Business Activity}_k + e_i
 \end{aligned} \quad [1]$$

Chart 7

PERFORMANCE OVER TIME

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 entrepreneurship 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 assets² 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 indebtedness 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.

Table 6

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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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 España¹ 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 ledgers³ 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 wallets⁵), whereas others have led to the drawing up of ad hoc legislation (e.g. crowdlending⁶ or payment initiation services⁷). Elsewhere, they are not subject to specific regulations (e.g. cryptocurrencies or virtual currencies⁸).
- *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

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

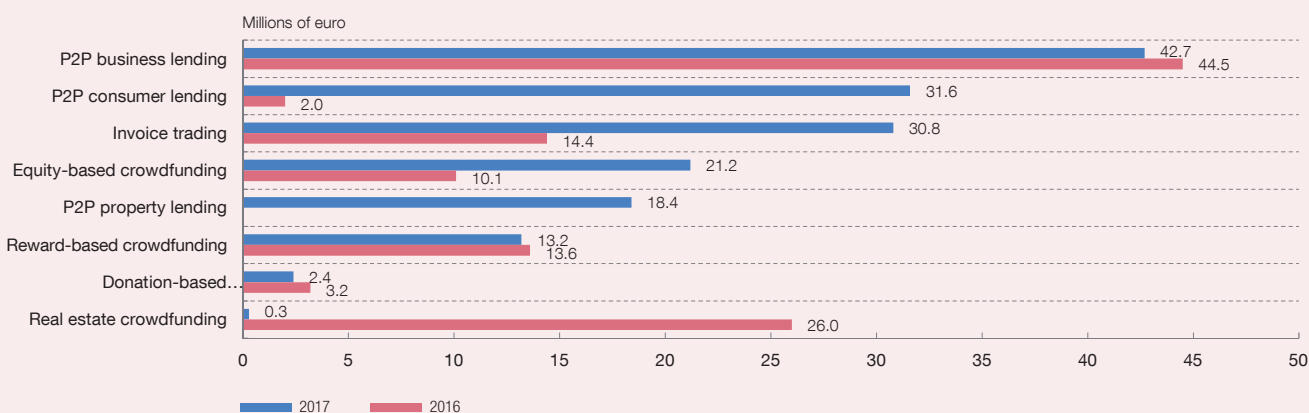
Estatal de Caución Agraria (SAECA). Following Law 5/2019 of 15 March 2019 regulating real estate credit agreements, it also includes credit institutions operating under the freedom to provide services and mortgage lenders.

The emergence of new lenders, such as BigTech firms or alternative finance¹ 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

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 be 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 Commission⁹ (CNMV), business associations (the Spanish FinTech & InsurTech Association¹⁰ and the Spanish Crowdfunding Association¹¹) and private consulting firms (Finnovating¹²).

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.com><http://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/crowdfunding¹³ 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, CNAE¹⁵ 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.

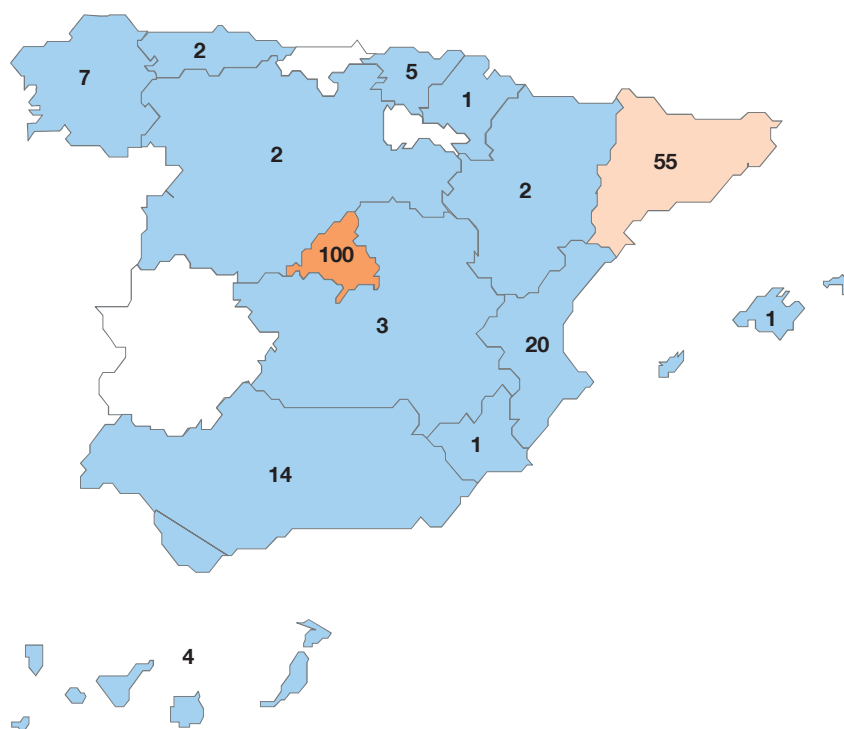
The database also includes information on the shareholder structure of FinTech firms, which allows them to be characterised in terms of corporate structure or

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-assets¹⁷ 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 institutional¹⁸ 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/crowdfunding 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_wwwvias/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.

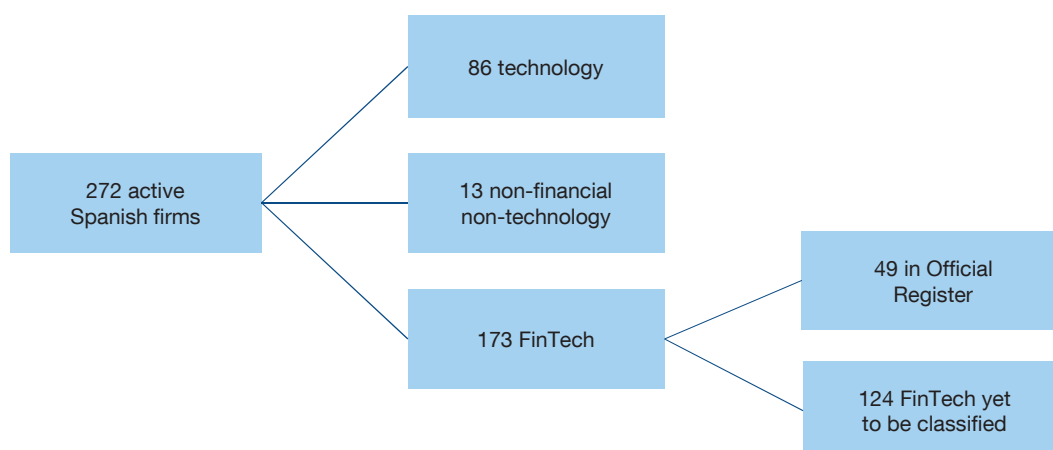
The activities of the 272 active Spanish firms were then subject to in-depth analysis to ascertain whether they engage in a FinTech activity in the strict sense, regardless of whether or not it is their core business (see Figure 2). The aim was to identify those firms that provide financial services 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
		Insurance 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.

Crowdfunding¹⁹ 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:

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 list²¹ 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.

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The outlook for the digitalisation of Spanish banks: risks and opportunities

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Acknowledgements: To the members of the IT Risk Division who have kindly collaborated in drafting this article.

Abstract

The rapid developments in technology, the expectations of digital customers and the emergence of new competitors have driven banks¹ to reconsider their business models and improve their internal processes. In an environment of low interest rates and reduction in margins, banks are looking for new sources of income and focus their strategy on customers, providing products and services that enhance the customer experience and customise their offer. At the same time, banks are launching digital transformation plans to make their internal processes more effective and efficient.

This article describes the current situation regarding the digitalisation of Spanish banks. It also provides a non-exhaustive list of the potential risks and opportunities² arising therefrom. Furthermore, the article presents a number of supervisory challenges. In our experience, it is essential that supervisors keep an open and ongoing dialogue with the industry that enables us to get real knowledge of banks' actual digitalisation situation while at the same time facilitates the transmission of our supervisory expectations.

1 Introduction

Digitalisation is an unstoppable process in today's society. Individuals have integrated technologies into everyday life to socialise, to work, to buy goods and to gain access to services. Digital customers, with increasingly demanding expectations, want immediate access to products and services from any location and at any time. They demand agile, flexible and fully customised digital services.

In this context, many firms are moving from a product-centred strategy to a customer-centric business model. The study of the behaviour and needs of consumers along with the improvements in the usability of solutions have become key factors for the development of many companies. Companies are also transforming internally, modernising and digitalising their working processes and methods to achieve a cultural change within the organisation that allows innovation and collaborative work

1 Throughout the article the terms bank, credit institution and financial institution will be used to refer interchangeably to the entities described in Art. 4.1.1 of Regulation (EU) No. 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms.

2 It describes those risks and opportunities which, at the time the article was drafted, the authors considered most significant.

to become levers for their growth. We can therefore talk about two sides of digital transformation: that within the organisation itself and that focused on customers.

This article aims to describe the current situation of Spanish banks' digitalisation drawing on information obtained via the interaction with the industry, questionnaires on digital transformation sent by the Banco de España to a number of banks, participation of the authors in national and international working groups, and their supervisory experience.

2 Spanish banks' digitalisation: the current landscape

Most industries have set in train digitalisation initiatives; however, the status and pace of adoption of new technologies vary from one to another.

In the banking sector, the emergence of *FinTech*, *BigTech*, the entry into force of the second Payment Services Directive³ (PSD2) and the challenges posed by an environment of low interest rates and reduction in margins have been an incentive for the transformation of the industry and for the search for new business models.

There are also other factors behind the change, including: the possibility of gaining access to millions of potential customers via the Internet; the widespread use of mobile devices; the increase in computing power and storage at lower prices; new collaborative working environments; and, of course, the need to improve customers' experience.

While some banks tackle their digital transformation with in-house resources, it is common to find organisations that *collaborate with third parties*, namely external consultants, start-ups in which they invest or acquire, or other service or product providers (see Chart 1). Mixed scenarios in which several of the foregoing cases combine are also habitual.

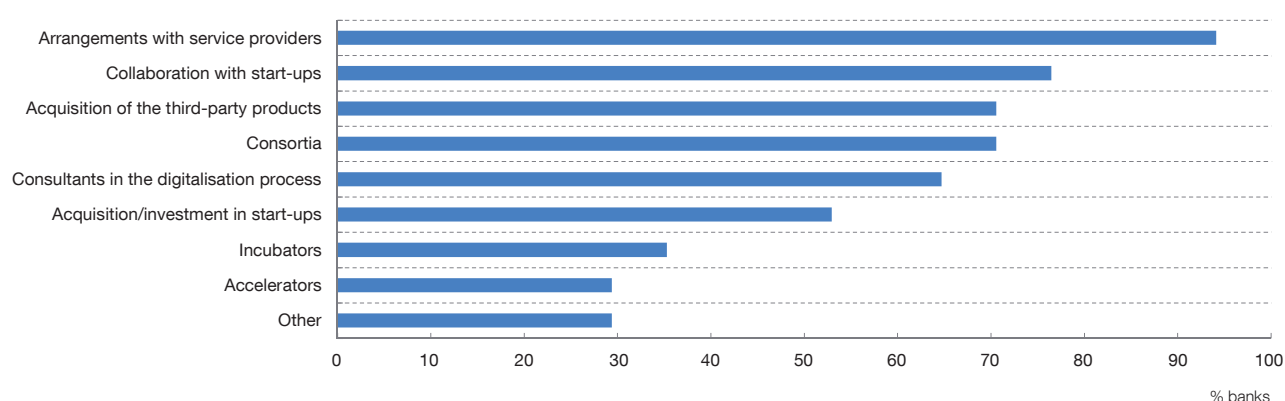
In some cases, banks have launched *accelerators*⁴ or *incubators*⁵ to help small companies with innovative ideas, or they have partnered with IT providers. The *participation in consortia* is another mechanism widely used to explore new technologies or to develop solutions, generally within the banking sector, although in some consortia we can find companies from different sectors.

3 Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No. 1093/2010, and repealing Directive 2007/64/EC (Text with EEA relevance).

4 Accelerators accompany start-ups already operating in order to accelerate their growth, acting as mentors in the definition of their business model, their commercial strategy and also in raising finance.

5 Incubators offer entrepreneurs and start-ups in their initial stages a physical space with basic services such as telecommunications where they can launch an innovative business idea. Generally, they provide access to a network of contacts and to teams of experts who advise them to materialise their idea.

Chart 1

COLLABORATION WITH THIRD PARTIES IN THE DIGITAL TRANSFORMATION PROCESS (END-2019 DATA)

SOURCE: Authors' own creation.

Most institutions in the Spanish banking system are the outcome of various mergers and acquisitions. This means they must make additional investments to integrate their *legacy systems* into the initiatives launched to achieve their digital transformation. Legacy systems have been characterised by their reliability for years, but they have a low level of flexibility to adapt to innovation; accordingly, intensive effort is needed to integrate them with new systems.

Data have become an increasingly valuable asset that needs to be properly protected and managed to be turned into intelligence, without compromising compliance with the regulations in force. A digital transformation strategy must be underpinned by quality data, with an appropriate governance framework that establishes their owners, the single source of consolidated information (*golden sources*) and levels of confidentiality, ensuring their integrity and security at all times.

Innovative developments normally begin with a proof of concept (PoC) or pilot testing phase. Here, a small number of customers or employees participate to assess whether the initiative is viable. These initiatives may originate, inter alia, to meet business needs, to improve existing processes or to extend the catalogue of products or services. Following satisfactory testing, the initiative is usually deployed into production, rolled out to all customers or employees, and extended in a staggered fashion to the different regions where the bank operates.

Credit institutions adopt different *strategies regarding innovation*. For some, digitalisation and the early adoption of innovative solutions is key to their business. Others, however, implement those ideas that have proven to be successful for competitors or develop some type of innovative product.

At present, the trend is clear. *Customers* prefer to interact with their bank in the quickest and most convenient way possible using digital channels instead of visiting

Table 1

MOVEMENT OF FUNDS IN SPANISH BANKS IN 2018

	Traditional means	Digital channels	
		Mobile banking	Online banking
Movement of funds in 2018			
Average amount/transaction (€)	1,282	640	2,055
Total annual average amount per bank (€)	86 billion	108 billion	
Average monthly accesses per bank		17 million	8 million

SOURCE: Authors' own creation.

their offices. Moreover, competition to offer the best solutions has increased and customers can change banks easily. Banks, aware of this, invest in improving their digital banking channels, trying to optimise the user experience and incorporating new products and services that make a difference. These may include financial account aggregation services, payment solutions and digital onboarding of customers, among others.

As to *user preference regarding digital channels*, at most institutions the number of active customers: in the bank website exceeds those that use the mobile app, but in spite of that, the number of accesses from the latter doubles those from the website. The conclusion is clear: customers make a bigger number of requests from the mobile app due to its immediacy.

The number of accesses to *digital channels has grown significantly* in recent years, rising to 25 million per month per bank on average in 2018. This has forced banks to study and invest in solutions and systems capable of supporting such demand or to consider moving some workloads to cloud infrastructures,⁶ leveraging their capacity to scale up easily and adapt to the new needs of digital business.

As can be seen in Table 1, which tracks *fund movements* in Spanish banks in 2018, the overall amount of movements through digital channels already exceeded at that time those made through traditional means.

With regard to the *degree of implementation* of digital transformation, banks appear to prioritise projects aimed at improving services for their customers compared to those geared towards evolving or improving their internal processes. In this respect, 17% of banks consulted stated that their internal transformation strategy was

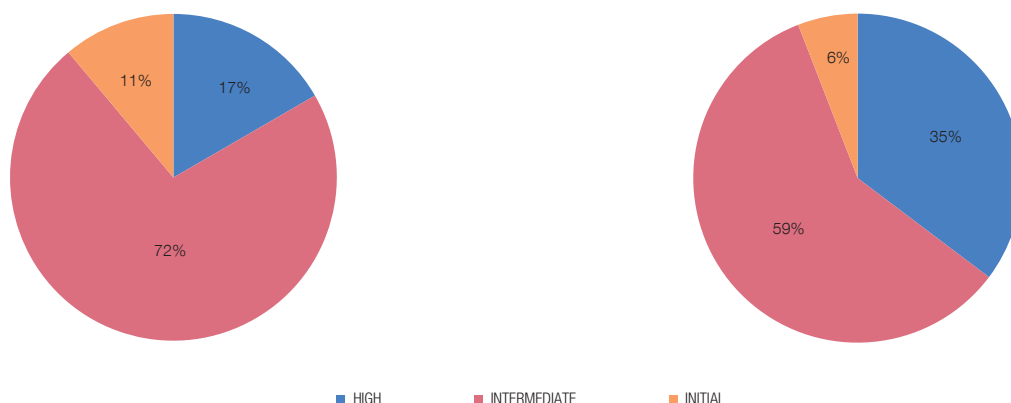
⁶ According to the EBA Guidelines on outsourcing arrangements, "cloud services means services provided using cloud computing, that is, a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."

Chart 2

DIGITALISATION IMPLEMENTATION STATUS AT THE END OF 2019

1 INTERNAL PROCESSES

2 VIS-À-VIS CUSTOMERS



SOURCE: Authors' own creation.

substantially in place in late 2018, with this figure rising to 35% of banks when we refer to transformation vis-à-vis customers or third parties (see Chart 2).

Although the digital transformation cuts across all types of customers (individuals, SMEs, large corporations, investors, etc.), banks' investment is currently focused on the *retail segment*.

The following paragraphs show what innovative technologies are being used by banks, ordered by the percentage of institutions using them.

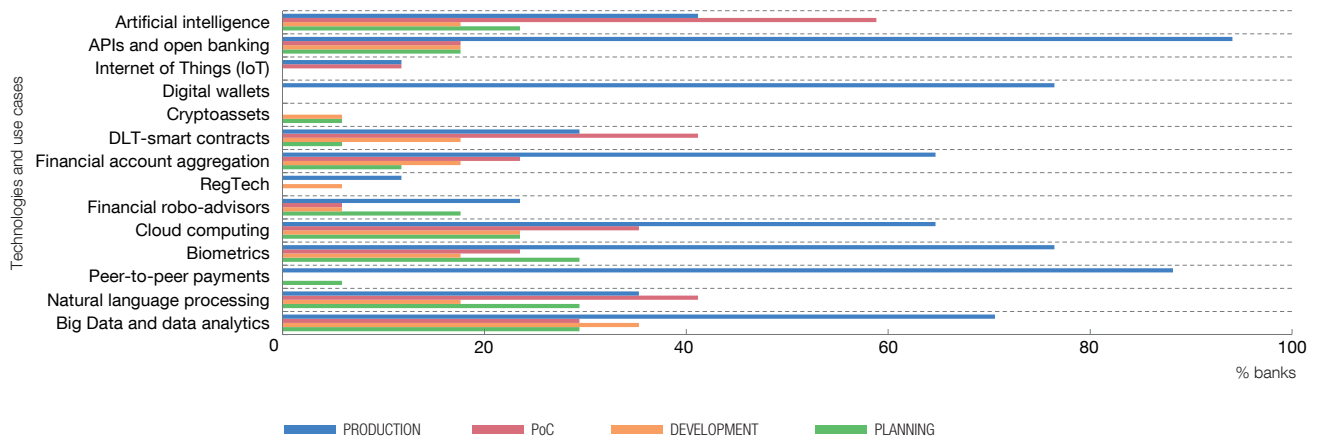
The *technologies* and *use cases* most implemented at the banks consulted are: biometrics, digital wallets, big data and data analytics, cloud computing and especially technologies related to payment services, boosted by the entry into force of the PSD2 (see Chart 3).

Biometrics is extensively used in Spanish banks for user authentication. Among the most prominent use cases are biometric signature, authentication of users in banks' mobile apps and facial recognition for remote identification in digital onboarding processes, where the customers' photograph in their identity card is compared with a snapshot of their face taken during a video call with the bank.⁷ Generally, for the use of biometrics, banks rely on third-party solutions, such as device manufacturers, operating system developers and software suppliers.

7 See authorisations of remote identification procedures by means of video-identification and video-conference published by Sepblac in https://www.sepblac.es/wp-content/uploads/2018/02/Autorizacion_video_identificacion.pdf and https://www.sepblac.es/wp-content/uploads/2018/02/autorizacion_identificacion_mediante_videoconferencia.pdf.

Chart 3

TECHNOLOGIES AND USE CASES AND IMPLEMENTATION STATUS AT THE END OF 2019



SOURCE: Authors' own creation.

Some banks have developed their own digital wallets to enable *payment by mobile phone*, while others offer the possibility of including their virtual cards in the wallets of major suppliers such as Apple Pay, Samsung Pay and Google Pay, among others.

Currently, financial institutions are using *big data and data analytics* mainly for the creation of models to personalise their commercial offer and reduce customer churn.

There is a growing movement among banks towards the use of *cloud services*, mainly through the use of major providers' infrastructures (IaaS)⁸ or through comprehensive solutions (SaaS)⁹. The main benefits of the IaaS model are flexibility, scalability, easy provisioning and potential cost-cutting. As for services under the SaaS model, specific solutions are set up rapidly to work, it is possible to always be updated to the latest available version and the responsibility for the software maintenance falls on the provider.

It should be mentioned that some providers currently offer their services only in connection with cloud infrastructures. This is either because solutions were developed specifically for processing in this type of environment or because they have decided to discontinue the versions they previously supplied on-premise. Banks prefer a *hybrid* cloud, comprising a mix of private cloud and public cloud services.¹⁰

8 Classified as IaaS are those cloud services which provide computing power, storage, networks and other essential computing resources.

9 Classified as SaaS are those services in which the customer makes use of a provider's applications that are run on a cloud infrastructure.

10 A public cloud is a cloud infrastructure available for open use by the public in general; a private cloud is available for the exclusive use of a single institution; a community cloud is for the exclusive use of a specific community of institutions; and a hybrid cloud is a mix comprising two or more of the foregoing cloud infrastructures.

Instant peer-to-peer payments are in place at 88% of the banks participating in the survey. This is mainly due to the fact that many banks participate in the Bizum payment platform. Here, almost 8 million users have registered and over 113 million transactions have been conducted since its launch in October 2016 to early May 2020. The service allows person-to-person payments to be made by introducing the recipient's mobile number. Funds are transferred in seconds from one account to the other. Payments can also be made to NGOs, associations and online businesses linked to this platform.

Banks are using or exploring *data analytics* and *natural language processing* technologies. Among the most common use cases are the personalisation of the commercial offer, fraud detection, chatbots, and the classification of documentation and extraction of relevant information.

Banks carry out numerous proofs of concept or pilot testing with *artificial intelligence* and *DLT technologies*, although the number of projects that are ultimately used in productive environments is limited.

Currently, most respondent financial institutions are not considering pursuing *cryptoasset*-related activities.

A very high percentage of surveyed banks – 88% – view positively the launch of a *regulatory sandbox* in Spain,¹¹ where they can test sectorial projects and innovative services in a controlled environment with a small number of customers. Among their arguments, banks highlight the timeliness of gaining access to multidisciplinary teams of the supervisor or supervisors involved, and the possibility of clarifying regulatory aspects that pose some uncertainty or knowing supervisory expectations.

3 Risks arising from digitalisation

3.1 Internal control and governance framework

Banks' internal governance framework must ensure their effective and prudent management. According to the EBA's internal governance guidelines, a credit institution's management body is responsible, among other matters, for the setting, approval and overseeing of the implementation of the overall business strategy; an appropriate and effective internal control framework; and a risk culture (awareness, definition of risk appetite and the assumption thereof).¹²

¹¹ See Ministerio de Economía, Industria y Competitividad (2018).

¹² See EBA (2017).

The growing importance of IT risk must be borne in mind within banks' control framework. Also, it is essential that the board of directors ensures that the bank's IT strategy is aligned to its business strategy.¹³ One circumstance that may provide for the attainment of this objective is the inclusion on the board of members with experience in IT-related matters.

3.2 IT risk

Nowadays, a bank's survival depends largely on the availability and proper functioning of its systems, and on its ability to cover all internal and external business needs.

Bank digitalisation entails growth in the degree of dependence on technology. Further, the amount of computing assets to be managed, their complexity and the growth of interconnectedness between banks themselves and with third parties extend the exposure perimeter to cyber threats, which are increasingly more sophisticated.

In this setting, market pressure, the attempt to be the first offering a new product or service and the increasing level of exigency on the part of customers, who demand greater flexibility and immediacy, may force banks to take decisions that could significantly increase their risk exposure. Such risks involve inter alia, the risk of using relatively immature technologies, giving priority to users' experience to the detriment of systems security and the data they handle, and developing systems without the required quality.

3.3 Reliance on third parties

Banks' interest in outsourcing activities to third parties has grown significantly in recent years. Their aims are clear: reducing costs in a period of low profitability, increasing flexibility and improving efficiency.

Sometimes banks outsource functions to third-parties that are experts in a specific field, and at other times they outsource tasks which do not bring any added value to them, so they can focus on more relevant activities. They also rely on other third parties with which they are obliged to interact in view of their activities, such as those offering market information services and clearing houses.

IT outsourcing, which often involves handling confidential information, is among the most common types of outsourcing due to its potential benefits. It provides banks

¹³ See EBA (2019).

with relatively straightforward access to new technologies and enables them to focus on the most significant activities of their business. Moreover, as mentioned before, outsourcing to cloud service providers has been intensified becoming one of the levers for the digitalisation of the sector.

It should be borne in mind that credit institutions cannot delegate their responsibility and must analyse in depth the risks stemming from their reliance on third parties before establishing business relationships. The risks involved are clear: a lack of control over activities and the loss of the knowledge required to perform them, problems to monitor activities, and difficulties to bring a service back in-house or to change providers if needed, etc. Of course, these risks are greater when outsourcing critical services, where having a viable exit plan is even more important.

Other circumstances increase the third-party risk. Interdependences and the existence of chain outsourcing extend the exposure perimeter, complicating the control that banks must exercise over the outsourced services and their supervision by the competent authorities. Further, concentration risk is increasingly evident as outsourcing to a small group of large providers inevitably grows. In the near future we may be talking about systemic providers, rather than systemic banks.

The EBA, aware of the risk posed by the reliance on third parties, published its Guidelines on Outsourcing on 25 February 2019 (EBA/GL/2019/02, in force since 30 September 2019).¹⁴ At the national level, in Spain, the outsourcing of services by credit institutions is also governed by Article 22 of Royal Decree 84/2015 and Rule 43 of Banco de España Circular 2/2016.

3.4 Business model risk

The widespread use of the Internet and mobile devices has been a wake-up call for many companies to evolve their business strategy. In this respect, as with other sectors, incumbent banks have identified risks to their business model sustainability if they are not able to adapt to customers' current expectations and increasing competition. Banks are working to adapt their strategy, processes and systems to integrate them into the new ecosystem of market solutions.

14 The Executive Commission of the Banco de España, as competent authority for the direct supervision of less significant institutions, payment institutions and electronic money institutions, adopted these Guidelines as its own on 29 July 2019, except for Guidelines 62 and 63 (see https://www.bde.es/f/webbde/INF/MenuHorizontal/Normativa/guias/EBA-GL-2019_02_EN.pdf).

Financial disintermediation is also a challenge for traditional banks, as they could be displaced by new players. In this respect, some experts consider that BigTech could be a threat due to the volume of data they have access to and their enormous customer base.

Faced with this situation, banks under pressure from competition might adopt a strategy that exceeds their risk appetite or, on the contrary, they might see their customer base shrink because they did not adapt in time. The pace of change in the IT environment and the ease of customers to switch banks are factors that increase this risk.

3.5 Human resources-related challenges

Identifying, attracting and retaining talent is a challenge in any specialised sector, including for banks when trying to recruit expert profiles to carry out their digitalisation strategy. There has been a change in the motivations and priorities of younger generations. Until a few years ago, workers sought stability and remained at the same company for their entire working life. However, the situation today is different and young people have other interests: salary, personal and professional development, and flexible working hours, among others, that foster mobility between companies. As regards innovation, it is sometimes hard to compete with large IT firms offering attractive working environments and a range of work incentives that are difficult for banks to provide. Moreover, attracting talent is not enough; ongoing learning and training plans must also be available.

Further, adopting a digitalisation strategy entails a cultural change throughout the organisation, which in certain circumstances can be difficult to assume for those workers who may be reluctant to embrace the change.

Digitalisation, which is founded on automated processes, can lead to a loss of knowledge of the business logic among employees. Banks should take appropriate measures to prevent their processes from becoming black boxes.

3.6 Other risks: compliance, legal, conduct and reputational

The risks described in this section are common to any process. However, they may be significantly greater in digital transformation initiatives, given the involvement of new actors and interconnections.

Banks might be sanctioned as a result of non-compliance with regulation after digitalising certain processes. Such non-compliance includes infringements of

the General Data Protection Regulation, hereinafter GDPR,¹⁵ and those related to the prevention of money laundering and terrorist financing, among others.

In this post-crisis climate, with increased regulatory pressure, credit institutions have to dedicate a significant amount of resources and time in their compliance departments. RegTech (Regulatory Technology) solutions have been developed to make this work easier, and are based on the use of technological innovations to facilitate regulatory compliance.

The fast-paced development of the market and the emergence of new actors with disruptive ideas sometimes lead banks to consider innovative solutions entailing some degree of regulatory uncertainty.

Digitalisation and the growing use of structured and unstructured data from different sources may increase conduct risk in various circumstances. Included here are the unauthorised use of customers' personal data under the GDPR, unethical employee behaviour and advice that is biased towards interests not aligned with those of the customer.

As described in section financial inclusion below, digitalisation contributes towards raising the percentage of people who can access financial services. However, in this new digital scenario, banks must also be socially responsible and prevent the financial exclusion of certain population groups, such as the elderly, people with some form of disability or those with difficulties in accessing digital channels. Banks must also monitor the outputs from their systems so that they do not deviate from expected behaviour by inadvertently discriminating against certain groups, for example when using machine learning models.

Lastly, the materialisation of any of the risks listed in this or the foregoing sections can expose banks to reputational damage; such impacts are difficult to measure, but can be very significant.

4 Opportunities

4.1 Improved efficiency and effectiveness

Regardless of the type of organisation, one of the core objectives of any digital transformation initiative is to improve efficiency and effectiveness in both internal and customer-centered processes.

¹⁵ General Data Protection Regulation, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679&from=E>.

The starting point for a true digital transformation of a bank is the review of its processes. Optimising processes, be it through automation, process simplification or eliminating redundant or unnecessary tasks or any other means, is the basis for implementing a successful transformation strategy. First, optimisation can increase process efficiency by reducing the time spent and resources used. Second, by automating tasks, organisations achieve more effective processes, minimising the number of errors and inconsistencies. Both the optimisation and the automation of processes increase productivity.

Another way to improve the efficiency and effectiveness of a bank is through applying innovative technologies. By way of example, the use of advanced data analytics techniques enable an organisation's sales force to have optimal schedules for their commercial visits, reducing their efforts and reaching customers with a tailored offering, which increases the commercial success rate. Moreover, through the use of mobile devices, customers can sign contracts anytime and anywhere, cutting product marketing times.

4.2 Enhanced customer experience

Customers in the digital era demand convenient and swift access to products and services. For this reason, enhancing customers' experience when they interact with the bank and understanding their behaviour are cornerstones of many marketing strategies.

Digitalisation makes it easier for banks to get closer to their customers, helping give them a 360 degree view of the customer through comprehensive management of their data. This in-depth knowledge of consumers enables a tailored offering and the implementation of an effective marketing strategy. By way of example, customer data analysis gives banks the ability to predict future needs based on past events. For example, they can offer personal loans to cover regular payments when consumers are not expected to have sufficient funds, so that payments adjust their income.

Another way to leverage information is through analysing the "customer journey", i.e., the path followed by a customer from the moment they express a need up to when they acquire a product. Banks can use these analyses, for example, to identify those points in the sale process where customers opt not to proceed with an operation.

At the same time, improving the experience offered to customers accessing banking services contributes towards attracting and retaining new and existing clientele.

4.3 New business models

In a constantly changing environment like ours, and in a low-interest-rate scenario, traditional banks need to reinvent themselves. In this respect, the digitalisation of the banking sector generates new business opportunities, as it enables institutions to obtain new sources of income and offer innovative products that contribute towards expanding their customer base.

Aware of these opportunities and of the risk of not adapting to the current environment, most banks are immersed in digital transformation processes aimed at improving the offering of digital channels in order to meet their customers' needs.

The trend is clear. Banks are trying to follow a customer-centric strategy, underpinned, above all, by the value of the data available, either their own or public or third-party data.

Data play a key role in a digital transformation strategy and are considered an asset in themselves. The potential of the data will vary depending on their quality and banks' ability to convert them into business intelligence. Although the volume of information is growing at a dizzying speed, technology has evolved to allow massive amounts of structured and unstructured data to be swiftly processed. A greater analysis and processing capacity enables, for example, to offer tailored products and services to customers, identify cross-selling opportunities and predict customer churn.

Open banking has also emerged as a potential opportunity for banks in their business models. Through open banking, new financial and non-financial services can be offered in co-operation with other organisations, using the bank's own or third-party platforms.

4.4 Cost reductions

Reducing costs is naturally another objective of digital transformation processes. Among the alternatives launched by credit institutions to achieve this objective are: optimising the branch network, co-operating with other entities to develop shared initiatives, outsourcing services or freeing up resources by automating manual tasks, so that employees can carry out more value added tasks for the institution. It should be noted that the cost of running an individual process after automation is generally negligible.

The digitalisation of documents is another method to reduce costs, as it grants immediate access to information, speeding up the processing of such information, avoids unnecessary travel and cuts down on paper usage.

Box 1

WHAT DO BANKS THINK?

For the banks surveyed, the most significant risks stemming from digital transformation are: increased cyber security risk, loss of customers as a result of not appropriately developing their strategy, greater reliance on third parties, compliance and legal risk, and greater reputational and operational risk in general (see Table 1). Other threats are the competition from BigTech and difficulties in monetising their investment.

Naturally, banks also identify opportunities from their digital transformation. As can be seen in Chart 1, noteworthy in this area are improvements in both efficiency and the customer experience, new business

models, the growth in the customer base and cost reductions. Other opportunities identified by banks are the capacity to increase their commercial and operational productivity, and the possibility of providing a tailored service remotely.

As can be seen in Chart 1, APIs¹ and open banking, cloud computing, natural language processing, and big data and data analytics are considered by all the banks surveyed to be technologies that present opportunities. In contrast, only around half considered that cryptoassets and the Internet of Things² (IoT) offer opportunities in the short to medium term.

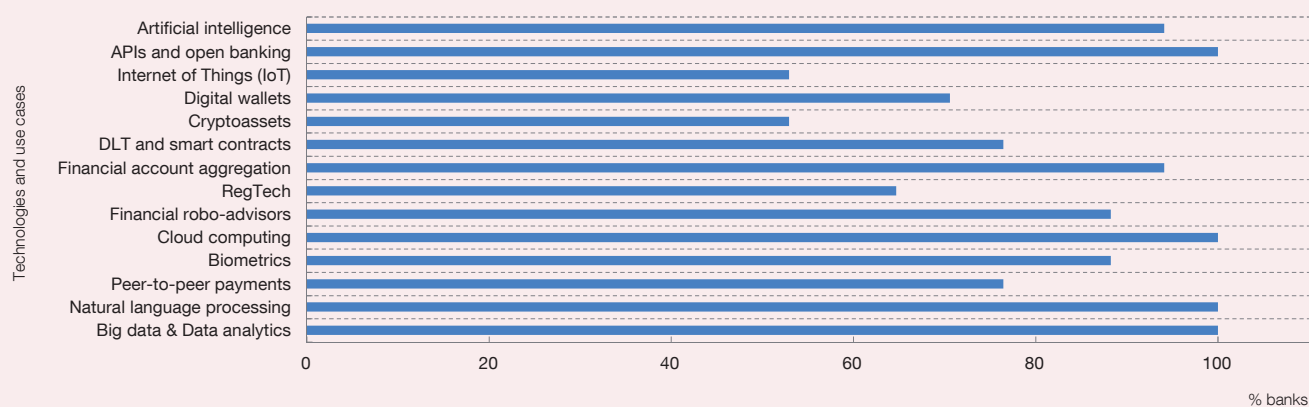
- 1 Application Programming Interface (API) is the formal specification of how one software component should interact with another software component.
- 2 The Internet of Things (IoT) refers to the digital interconnection of everyday objects that are connected to the Internet, such as smart watches, refrigerators and pill boxes, among others.

Table 1
RISKS AND OPPORTUNITIES OF DIGITALISATION ACCORDING TO SURVEYED BANKS

Risks	Opportunities
Increased cyber security risk	Improved efficiency
Loss of customers as a result of not developing their strategy on time	Improved customer experience
Increased reliance on third parties	New business models
Compliance and legal risk	Growth in customer base
Increased reputational risk	Cost reductions

SOURCE: Authors' own creation.

Chart 1
TECHNOLOGIES AND USE CASES THAT PRESENT OPPORTUNITIES



SOURCE: Authors' own creation.

4.5 Financial inclusion

According to World Bank data, financial inclusion¹⁶ in Spain stood at 94% of the population in 2017. Based on these data, 94 out of 100 Spanish adults had a bank account. In the euro area, this percentage was only exceeded by Germany, with 99%.

Among the factors contributing to the trend in inclusion are the widespread use of the Internet and smart phones and banking digitalisation. Through these tools, banks can reach millions of potential customers, as the new methods of communication remove the need for physical proximity or branches to attract and interact with customers. Access to customers has been democratised. Banks can set up business relationships straightforwardly with unbanked people, and position themselves in areas where they do not have branches or sales agents.¹⁷

The cost reductions obtained through digitalisation also contribute towards giving vulnerable groups or those at risk of exclusion access to basic financial services. In addition, it allows to provide retail investors with financial advice that was previously beyond their reach due to the high cost involved (see Box 1 on previous page).

5 Supervisory challenges

In this scenario, supervisors must be aware of the risks and opportunities stemming from digitalisation and the use of new technologies. Supervision of banks' IT risk in general and, specifically, of the use of innovative technologies poses a number of challenges for supervisors, which are described non-exhaustively below.

As in the case of credit institutions, competent authorities must be able to attract and retain talent. Further, the pace of IT change is very quick and ongoing training programmes must be in place to update supervisory knowledge.

It is essential that supervisors maintain a close dialogue with the industry in order to keep up to date on the state of the art of technology and the status of IT risk in the sector. Contact with the different actors in the ecosystem and a regulatory sandbox are some of the ways for achieving this objective, while at the same time provide a mechanism for clarifying regulatory matters and supervisory expectations.

16 According to the World Bank, "financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way."

17 Article 21 of Royal Decree 304/2014 sets out the requirements necessary for institutions when establishing business relationships or carrying out operations with customers in a non-face-to-face basis.

The concentration of services in third parties entails risks that could have an impact on financial stability, as a problem with a provider or a third party could systemically affect the entire sector.

Identifying these potentially systemic third parties is no easy task and is further complicated by the possibility of a high number of providers involved in a chain outsourcing. It should be noted that the criticality of a provider does not depend on the amount of a specific contract, as providers with a lower individual cost could have agreements with many banks or could offer services to large providers and become a single point of failure. Further, if these systemic providers could ultimately be identified, supervisors would have limited capacity to act, as those providers are outside their mandate.

Cooperation and coordination with other national and international authorities are key and go beyond the financial sector, for instance to areas related to personal data protection or cyber security, involving other authorities outside the sector.

6 Conclusions

The rapid developments in technology, the hyper-connectivity in a digital society, the emergence of new competitors and a setting of low interest rates and the reduction in margins have driven incumbent banks to reconsider their business models and improve their internal processes.

Banks are leveraging new business opportunities and developing products and services that open up new sources of income. The use of open-banking solutions is a good example of this.

Banks often collaborate with third parties as part of their digital transformation; this may include acquiring or investing in start-ups, outsourcing services, participating in consortia, or launching business accelerators or incubators. In this respect, banks have to appropriately manage risks in their relationships with third parties and they obviously continue to be responsible for compliance with regulatory requirements in their outsourcing arrangements.

As with other sectors, many banks are putting the customer at the centre of their strategies, as they seek to gain a 360 degree view of their customers that enables them to personalise their offer, meet their expectations and offer an optimal user experience.

As regards data governance, entities should ensure a proper internal governance framework, establishing the data owners, the golden sources and access levels, and ensuring at all times confidentiality, integrity and availability of their data.

Banks are also immersed in internal transformation processes. They are adapting their culture to evolve towards more collaborative working environments, and digitalising their processes to improve effectiveness and efficiency and to reduce costs.

Digital transformation undoubtedly offers major opportunities for consumers and institutions. However, it also poses risks for banks and challenges for supervisors, which must be duly managed.

In our experience, supervisory dialogue with the different market players paves the way for closer proximity to the industry. All parties can benefit from this dialogue: supervisors can keep up-to-date about the market situation, and institutions can learn about supervisory expectations. Supervisors must also co-operate and coordinate with other national and international authorities in the financial sector and with other relevant authorities in the context of digital transformation.

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The Banco de España in-house credit assessment system

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The authors are grateful to the teams involved in the day-to-day operations of the ICAS BE, without whose hard work this article would not have been possible.

Abstract

The implementation of monetary policy through traditional credit operations requires that counterparties provide adequate collateral. This collateral serves to protect the central bank providing the funding against losses that might adversely affect its financial independence and, ultimately, its credibility. It is therefore important for central banks to develop in-house capabilities to assess the risks associated with specific assets posted as collateral. The national central banks in the Eurosystem have the option of developing in-house credit assessment systems, known as ICASs. The Banco de España has used such systems to perform credit assessments of non-financial corporations since the late 1990s. It is extending the number and type of these systems with the ultimate aim of being in a position to accept loans extended to any Spanish non-financial corporation as collateral. With credit claims establishing themselves as important collateral assets in recent years, and in view of the synergies between the Banco de España in-house credit assessment system (ICAS BE) and other functions of the Banco de España, the next expansion phase of the ICAS BE is ready to begin. This entails the credit assessment of small and medium-sized enterprises (SMEs) in the country. The Eurosystem's recent response to the COVID-19 crisis will be particularly influential in this regard, prompting very swift action to extend the scope of the ICAS BE.

1 Introduction

Within the domain of Eurosystem monetary policy, certain national central banks (NCBs) have developed ICASs to determine the eligibility of credit claims as collateral in traditional credit operations.¹ These systems are currently in place at eight NCBs,² among them the Banco de España, and represent one of the sources of credit assessment in the Eurosystem Credit Assessment Framework (ECAAF). The other two sources of assessment are External Credit Assessment Institutions (ECAIs) and in-house models developed by counterparties³ to calculate minimum capital requirements under the internal ratings-based (IRB) approach.

1 The traditional credit operation tools for the implementation of monetary policy are marginal refinancing operations (MRO), longer-term refinancing operations (LTRO) and targeted longer-term refinancing operations (TLTRO), the marginal lending facility and intraday credit.

2 The NCBs of Germany, Spain, France, Italy, Austria, Portugal and Slovenia have an ICAS for domestic NFCs, and the Central Bank of Ireland has an ICAS for retail mortgage-backed debt instruments (RMBDs) [see European Central Bank (ECB) website: <https://www.ecb.europa.eu/paym/coll/risk/ECAF/html/index.en.html>].

3 The term “counterparty” refers to all banks authorised to participate in Eurosystem monetary policy operations.

The ICAS BE performs credit assessments of public and private Spanish non-financial corporations (hereinafter referred to as “NFCs”), with the aim of allowing the loans extended to them to be used as collateral by the counterparties themselves in monetary policy operations.

These credit assessments support the use of loans to NFCs in monetary policy implementation by two means. First, the ICAS BE assesses more NFCs than ECAIs. Work has been carried out in recent years to sequentially expand the type of NFCs assessed by the ICAS BE. Initially, listed NFCs and their major subsidiaries were mainly assessed, but in late 2018 the ICAS BE was authorised to assess the credit quality of any large Spanish NFC (understood as enterprises that do not satisfy the European Commission’s definition of SME).⁴ Furthermore, as described below, the COVID-19 crisis has forced the ICAS-BE expansion plans regarding the assessment of the remaining Spanish NFCs, particularly SMEs, to be brought forward.

The ICAS BE also represents a common source of credit assessment for all Spanish counterparties, supporting the uniform treatment of credit claims as collateral assets and bypassing the constraints inherent to not having in-house credit assessment systems for smaller counterparties.

In addition to these practical justifications, there are also strategic grounds for developing the ICAS BE. During the global financial crisis that began in 2008 and the subsequent sovereign debt crisis, the Eurosystem expanded the list of asset types eligible as collateral for monetary policy operations. Credit claims were central to this change owing to their abundance on banks’ balance sheets, particularly in the countries hardest hit by the crisis. This explains the need to progressively develop an in-house credit assessment system that can more optimally analyse the characteristics of such assets.

That an ICAS can be used by multiple areas of a central bank is all the more reason for its development. In terms of implementing monetary policy, an ICAS can be highly advantageous to an NCB in its capacity as lender of last resort. In economic research, such a system can provide important research data for matters relating to the transmission of monetary policy and financial stability. Where banking supervision is established at the NCB itself, an ICAS’ credit assessments can provide an external benchmark for the assessments provided by the supervised banks’ internal systems. All of which justify the development of an ICAS as a strategic undertaking for NCBs.

This article details the work performed at the Banco de España in relation to the development of its ICAS. Section 2 of this article reviews the role played by credit

4 See Article 2 of the Annex to Commission Recommendation 2003/361/EC: “The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding €50 million, and/or an annual balance sheet total not exceeding €43 million”.

claims as collateral in the Eurosystem, examining the case of Spain in particular. Section 3 discusses the function of ICASs and their strategic role at an NCB. Section 4 describes the most significant aspects of the ICAS BE, including its credit assessment model. Section 5 details future development plans for the ICAS BE. And Section 6 summarises the main conclusions.

Lastly, it is worth noting the very significant impact that the circumstances related to the COVID-19 crisis will have on two important aspects addressed in this article. Specifically, the relative importance of credit claims as collateral, which is likely to grow as a result of the measures announced by the Eurosystem, as was the case in previous crises. These measures have also affected the expansion plans for the ICAS BE, demanding swift action to provide Spanish counterparties with credit assessments of SMEs pursuant to the Eurosystem's new temporary guidelines. Each section ends with a brief description of these circumstances.

2 Credit claims as collateral

2.1 Background

The current framework for eligible assets in Eurosystem monetary policy operations covers a broad set of both marketable and non-marketable assets.⁵ Generally speaking, these assets are mainly associated with issuers (or debtors) in the public and private sectors (the latter largely accounted for by bonds in the banking sector and credit claims in the corporate sector), have a high credit quality step (minimum BBB-/Baa3/BBBL on ECAI scales) and are euro-denominated, established in European countries (or G-10 countries) and subject to European law (see Table 1).

A comparison with other central banks reveals that the Eurosystem's collateral framework covers a broad and varied pool of assets.⁶ This has traditionally been the case for both historical and structural reasons,⁷ particularly the need to ensure the availability of collateral for a wide variety of counterparties with varying business models and operating in different jurisdictions and markets.⁸

5 Non-marketable assets chiefly include loans and credit lines, along with other assets such as RMBDs (currently only used in Ireland) and fixed-term deposits, which carry far less weight.

6 See BIS (2013) for a summary of the main characteristics of the collateral frameworks of other central banks.

7 The first version of the general documentation [see ECB (1998)] already envisaged the need to address the differences in financial structure between the individual Member States. This prompted the creation of a two-tier system, with the first tier based on common eligibility criteria and the second tier comprised of assets for which eligibility criteria were set by each NCB, subject to the minimum eligibility criteria established by the ECB. For a more detailed assessment, see Bindseil et al. (2009), Chapter 9.

8 See Cœuré (2012).

Table 1

EUROSYSTEM COLLATERAL ELIGIBILITY CRITERIA

	Marketable assets	Non-marketable assets
Asset type	Debt instruments (e.g. asset-backed securities, covered bonds, corporate bonds, uncovered bank bonds, government bonds and agency bonds) with: a) a fixed and unconditional principal amount, and b) a coupon that cannot result in a negative cash-flow and has a simple structure	Credit claims with: (a) a fixed and unconditional principal amount, and (b) an interest rate that cannot result in a negative cash flow
Accepted credit assessment systems	Moody's, Fitch, S&P and DBRS (ECAIs) Other credit assessment sources (ICASs and IRB)	
Credit standards	Credit quality category 3 on the Eurosystem's harmonised scale, equivalent to a 1-year default probability of up to 0.40% Equivalence with ECAI ratings based on the Eurosystem's harmonised scale (second-best rating for securitisations; best rating for all other marketable assets)	
Place of issuance	European Economic Area (EEA)	Not applicable
Type of issuer, debtor or guarantor	NCBs, public sector, private sector, international and supranational institutions	Public sector, non-financial corporations, international and supranational institutions
Place of establishment of the issuer, debtor or guarantor	Issuer: EEA (except for asset-backed securities) or non-EEA G-10 countries (United States, China, Japan and Canada) Guarantor: EEA	Euro area
Currency	Euro	Euro
Minimum size	Not applicable	Minimum size threshold at the time of submission: For domestic use: minimum threshold of €25,000 euros or higher established by the NCB (a). For cross-border use: common threshold of €500,000
Governing law	For securitisations, the purchase of underlying assets must be governed by the law of an EU Member State. The law applicable to credit claims must be that of a euro area country	Law applicable to credit claim agreements and mobilisations: law of a Member State of the euro area. The total number of different laws applicable to the counterparty, the creditor, the debtor, the guarantor (if relevant), the credit claim agreement and the mobilisation agreement shall not exceed two.

SOURCE: ECB.

NOTE: This table provides a schematic view of the main characteristics of assets eligible as collateral for Eurosystem monetary policy operations. For more details, see Guideline (EU) 2015/510 of the ECB.

a The amount of €25,000 has been temporarily reduced to €0, in accordance with Decision (EU) 2020/506 of the European Central Bank of 7 April 2020, as part of the response to the COVID-19 crisis.

The general framework has been in force since the single list of eligible collateral was introduced for the 2005-2007 period, ushering in more standardised eligibility criteria than the individual euro area NCBs had applied since the ECB was founded in 1999. The single list was introduced in 2005, along with standardised criteria for marketable assets. In contrast with other central banks, traditionally more restrictive in relation to this asset type, in 2007 the Eurosystem included non-marketable assets in the single list. These would go on to play a central role in the set of collateral selected by counterparties.⁹

⁹ Spain, together with a small group of European countries, used such assets before the single list was created. High quality credit claims and large credit portfolios available to be pledged led to the inclusion of this asset type in the single list [see ECB (2006)].

Non-marketable assets, and credit claims¹⁰ in particular, have grown in prominence during recent years. The liquidity constraints faced by European banks during the global financial crisis, which began with the collapse of Lehman Brothers, saw the Eurosystem decide, in late 2011, to accept as collateral certain additional credit claims that, despite not being eligible under the single list, satisfied a series of specific conditions established by each NCB. These assets were sitting idle on banks' balance sheets and therefore constituted one of the main drivers of growth in eligible assets.

Specifically, the criteria were loosened in relation to the debtor type and the credit quality of credit claims, allowing some counterparties to use loans to individuals with a one-year probability of default (PD) of up to 1.5%¹¹ (or higher under certain conditions) and even non-euro denominated loans. Each NCB was required to specify the criteria that would be applied under this new framework, subject to prior authorisation by the ECB Governing Council. Some NCBs, including the Banco de España, therefore availed themselves of this national discretion.¹²

In the wake of this measure, and others introduced on a temporary basis,¹³ there has been a recent shift in the composition of the assets used as collateral in Eurosystem monetary policy operations, with non-marketable assets gaining weight (see Chart 1.1). The use of such assets in the Eurosystem grew notably during the crisis, rising from 3.8% of total collateral assets in 2006 to 26.5% in 2012 H2. There was a slight dip in subsequent years, but a gradual decline in the use of other assets, in particular uncovered bank bonds,¹⁴ has seen the weight of non-marketable assets return to near-2012 levels (24.1% in 2019 Q3).

In addition to this direct use, credit claims are also used as collateral by counterparties indirectly through the mobilisation of covered bonds¹⁵ and asset-backed bonds (particularly own-use covered bonds and retained asset-backed securities, which are backed by the institution's own credit claims). If we include these assets in the

10 The term "credit claim" broadly refers to all rights to repayment of monetary amounts constituted by a debtor's obligation to a counterparty, mainly loans and credit lines.

11 This PD level is one or two steps below the investment-grade credit quality required by the single list.

12 In the Banco de España's case, credit claims with a maximum PD of 1% and denominated in the main foreign currencies were accepted (<https://www.bde.es/f/webbde/SPA/sispago/ficheros/es/AT-2-2012.pdf>). For the other NCBs, see Tamura and Tabakis (2013), Table 5.

13 For example, in late 2011 the Eurosystem also relaxed requirements for less complex asset-backed securities. For a description of the measures adopted during the crisis relating to collateral eligibility criteria, see ECB (2015), Box 3.

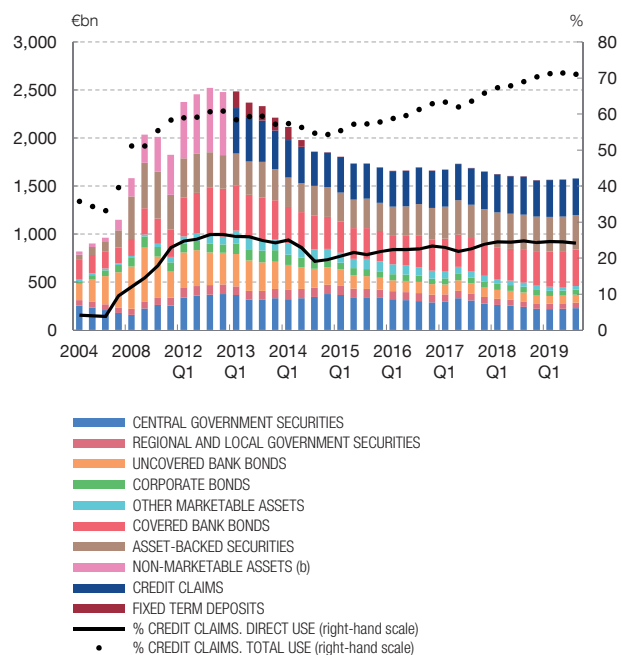
14 Uncovered bank bonds have been subject to several measures that have put constraints on their use as collateral, most notably the limitation, introduced in 2009, of such assets to a share of 10% in the value of the collateral pool of each counterparty (see <https://www.ecb.europa.eu/mopo/assets/html/index.en.html>).

15 The term "covered bond" refers to a debt instrument with a dual recourse mechanism: a) direct or indirect recourse against a credit institution, and b) recourse against a dynamic set of underlying assets, with no division into tranches of varying risk [Article 2(12) of the Orientation 2015/510 of the ECB]. In Spain, covered bonds include *cédulas hipotecarias* (Spanish mortgage covered bonds) and *cédulas territoriales* (Spanish public-sector covered bonds).

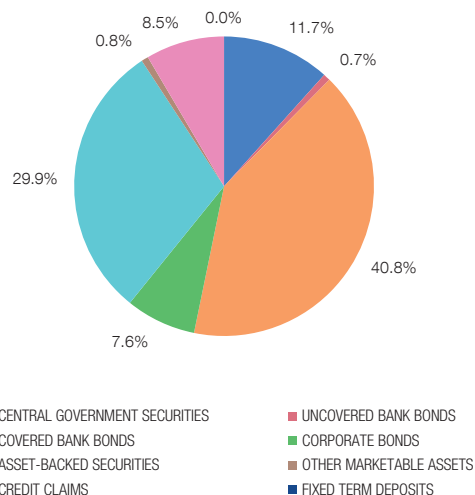
Chart 1

USE OF COLLATERAL IN MONETARY POLICY

1 USE OF COLLATERAL IN THE EUROSYSTEM (a)



2 USE OF COLLATERAL IN SPAIN (c)
December 2019



SOURCES: ECB and Banco de España.

- a Valuation after haircuts; average month-end data over each time period shown.
- b Since 2013 Q1, the category "Non-marketable assets" is split into two categories: credit claims and fixed term deposits.
- c Valuation after haircuts; data as at 27 December 2019, as a percentage.

above calculation, the figure would reach an all-time high of 71% of total collateral assets in 2019 Q3 (see Chart 1.1).

The use of non-marketable assets in Spain shows a similar trend to the Eurosystem, albeit with some notable differences (see Chart 1.2). The total use of credit claims (including indirect use) is more pronounced, accounting for 79.3% at end-2019 (above the average of 71% for the Eurosystem). Further, most of these assets are backed by the issuer’s own assets.¹⁶ However, direct use of credit claims is considerably lower, standing at 8.5% (compared with 24.1% for the Eurosystem). As explained below, the expansion plans for the ICAS BE aim to make directly available to Spanish counterparties a greater number of eligible credit claims, thus driving convergence with the rest of the Eurosystem.

As part of the emergency response to the COVID-19 crisis, the ECB Governing Council recently announced a series of temporary measures aimed at underpinning

¹⁶ At end-2019, own-use covered bonds accounted for 98% of the total and retained asset-backed securities 93% of the total.

the availability of sufficient collateral assets for Eurosystem refinancing operations and simultaneously supporting bank lending.¹⁷ As was the case in previous crises, the measures relating to additional credit claims are particularly significant. Specifically, credit claims guaranteed by public sector schemes in response to the crisis have been deemed eligible and the scope of acceptable credit assessment systems used in the ACC frameworks has been enlarged. The impact of these measures will be seen over the coming months. However, combined with the additional reduction of valuation haircuts applied to these assets, the likely upshot is an increase in the relative weight of credit claims in the total pool of collateral used by Spanish counterparties, repeating the pattern observed during previous crises.

2.2 Characteristics of credit claims as collateral

One key explanation for the growing use of credit claims as collateral lies in the incentives for counterparties to harness these less liquid assets (especially direct credit claims, retained asset-backed securities and own-use covered bank bonds) in monetary policy credit operations, allowing their more liquid assets (such as sovereign debt securities) to be used to guarantee market financing operations and comply with regulatory liquidity requirements.¹⁸ This is made possible by the central banks' capacity to weather liquidity crises and transform the liquidity of the assets that they receive as collateral,¹⁹ thereby helping to shore up financial stability.²⁰

The use of credit claims also benefits central banks themselves in a number of ways. Firstly, it helps to more directly transmit monetary policy measures to the real economy, particularly towards those agents, such as enterprises, that do not issue debt instruments on organised markets. In this respect, the ECB conducts a regular study of the financing of euro area enterprises, which continues to indicate that bank credit is the primary source of funding for European SMEs.²¹

Secondly, the use of credit claims has provided the Eurosystem with a more diversified collateral base and allowed it to successfully cope with the high volume of temporary credit operations. This is all the more significant since the assets that

17 https://www.bde.es/f/webbde/GAP/Secciones/SalaPrensa/ComunicadosBCE/NotasInformativasBCE/20/presbce2020_64.pdf.

18 Grandia et al. (2019) analyse the availability of high quality liquid assets (HQLA) in the euro area and the main driving factors. In their paper they refer to demand factors such as the holding of liquid assets to satisfy the regulatory liquidity coverage ratio (LCR) requirement and the use of these assets as collateral in market operations (both repo and OTC derivatives transactions).

19 Grandia et al. (2019) likewise examine the factors that affect the supply of liquid assets, noting the transformation effect of central banks' financing operations, enabling less liquid assets (pledged as collateral) to be replaced with liquid assets (provided that the funding is held at the central bank as excess reserves).

20 See Liikanen (2017), p. 3, and Bindseil et al. (2017), pp. 11-13, on the financial stability benefits of central banks being able to accept less liquid assets as collateral.

21 According to the ECB (2019), banking instruments (loans, credit lines and bank overdrafts) had recently been used (or were going to be used over the next six months) by half of the respondents. Meanwhile, market instruments were significant for far fewer enterprises (11% for shares and 4% for debt).

have traditionally been eligible as collateral have been progressively acquired by Eurosystem NCBs since 2014, under their securities purchase programmes; accordingly, they are less likely to be used by counterparties for traditional monetary policy operations. Further, this temporary broadening of the collateral framework probably contributed, albeit more indirectly, towards the success of these temporary operations by sending the market a signal that collateral availability would remain ample for some time to come.²² Lastly, the broadened range of eligible collateral also benefited NCBs' role as lenders of last resort (this is examined in greater detail in Section 3.2).

Thirdly, and finally, the use of credit claims spurs the development of additional sources of credit assessment in the Eurosystem, since the scant coverage provided by ECAs (which focus on assessing NFCs with debt issuances on the markets) means a large number of NFCs with credit claims potentially eligible for counterparties are overlooked. The ECAF can thus avail itself of numerous alternative sources, specifically eight ICASs that enable it to develop its in-house credit assessment capabilities, a move consistent with the goal of reducing reliance on ECAs approved by the Financial Stability Board (FSB) in 2010.²³

However, the use of credit claims is not without difficulties. Unlike marketable assets, credit claims require a series of more restrictive legal and operating requirements, geared towards allowing a faster and more effective enforcement of the Eurosystem's rights in the event of counterparty default. In practice, this means counterparties must regularly confirm the existence (and eligibility) of their credit claims, guarantee the validity of mobilisation agreements with the NCB (including against third parties) and ensure that contracts with debtors include no restrictions on the mobilisation and realisation of collateral, nor any other restrictions arising from banking secrecy. Section 4.4 describes how the Banco de España's current collateral eligibility framework aims to facilitate compliance with these requirements.

A further notable consequence of ECAs not assessing the credit quality of these assets, aside from reducing reliance on such institutions, as discussed above, is the use of credit claims becoming contingent on the availability of alternative credit assessment sources of due quality. This has a bearing on counterparties that either have no ICAS that can rate domestic NFCs in their jurisdiction or that lack an ECAF-approved internal ratings-based (IRB) system.

Lastly, the assessment of credit claims for the purposes of constituting Eurosystem collateral also poses a significant challenge. The valuation haircuts applied to these assets, like those applied to any other asset, must comply with the risk equivalence

22 See Bindseil et al. (2017), p. 25.

23 See FSB document "Principles for Reducing Reliance on CRA Ratings" (available at https://www.fsb.org/wp-content/uploads/r_101027.pdf).

Table 2

VALUATION HAIRCUTS APPLIED TO COLLATERAL ASSETS

Asset type	Credit quality (a)	Minimum haircut (%)	Maximum haircut (%)
Marketable assets (b)	CQS 1-2 (AAA-A)	0,5	25,5
	CQS 3 (BBB)	6,0	38,0
Credit claims (c) (fixed interest payments)	CQS 1-2 (AAA-A)	12,0	45,0
	CQS 3 (BBB)	19,0	63,0
Additional credit claims (d) (applied by Banco de España)	CQS 1-2 (AAA-A)	12,0	45,0
	CQS 3 (BBB)	19,0	63,0
	CQS 4 (BB+)	42,0	78,0

SOURCES: ECB and Banco de España.

a Credit quality is defined based on the Eurosystem harmonised scale, which establishes equivalence between the different Credit Quality Steps (CQS) and ECAI risk categories (shown in brackets).

b Guideline (EU) 2019/1032 of the ECB, Annex, Table 2, amending Guideline (EU) 2015/510.

c Guideline (EU) 2019/1032 of the ECB, Annex, Table 3, amending Guideline (EU) 2015/510.

d To illustrate the haircuts applied to credit claims under the temporary framework, the haircuts applied to the additional credit claims eligible for the Banco de España are shown (Technical Application 4/2019 of the Banco de España, p. 7).

principle, which essentially means riskier assets are subject to larger haircuts.²⁴ The risk that marks out credit claims – which are valued based on their outstanding amount – from other assets is unquestionably their liquidity risk. The Eurosystem methodology therefore takes into account longer settlement periods for credit claims, which is why such assets are subject to larger haircuts than those applied to marketable assets (see Table 2).

3 The role of ICASs

3.1 ICASs as a source of credit assessment

The eligibility of credit claims as collateral is subject to a series of requirements, as described in the previous section. Foremost among these is the credit quality step, which must exceed a minimum threshold. There are three possible credit assessment sources for this type of asset under the ECAF: ECAIs, ICASs and IRB. The counterparties must select one of these as their main credit assessment source, as well as additional sources should the primary credit assessment source lack sufficient coverage.

All of the sources are subject to ECAF rules, the main purpose of which is to ensure high credit quality standards across all of the assessment systems and to map each

²⁴ Valuation haircuts reflect the loss of value of collateral in an adverse scenario, defined for all assets as for the average loss in the worst 1% of cases.

Table 3

EUROSYSTEM HARMONISED RATING SCALE FOR ECAIS

ECAI rating		CQS		
		1 (PD ≤ 0.10%) (a)	2 (PD ≤ 0.10%)	3 (0.10% < PD ≤ 0.40%)
Long-term	DBRS	AAA/AH/AA/AAL	AH/A/AL	BBBH/BBB/BBBL
	Fitch Ratings	AAA/AA+/AA/AA-	A+/A/A-	BBB+/BBB/BBB-
	Moody's	Aaa/Aa1/Aa2/Aa3	A1/A2/A3	Baa1/Baa2/Ba3
	Standard & Poor's	AAA/AA+/AA/AA-	A+/A/A-	BBB+/BBB/BBB-
Short-term	DBRS		R-1H, R-1M	R-1L, R-2L, R-2M, R-2L
	Fitch Ratings		F1+, F1	F2
	Moody's		P-1	P-2
	Standard & Poor's		A-1+, A-1	A-2

SOURCE: ECB.

a The CQS are established based on the one-year probability of default of the assets rated by the assessment system.

system's ratings to the Eurosystem's harmonised rating scale (see Table 3, which illustrates, by way of an example, the rating mapping for the four approved ECAIs). To satisfy this two-fold objective, each assessment system seeking endorsement under the ECAF must go through an acceptance procedure. Additionally, all sources accepted in the ECAF are subject to annual performance monitoring to identify and remedy in time any weaknesses that may arise.²⁵

Although both ECAIs and IRB systems provide high quality assessments, there are certain drawbacks to using these two sources for credit claims in monetary policy operations. Regarding the former, few Spanish NFCs are rated by ECAIs. This naturally hinders the extensive use of credit claims. Further, ECAI assessments were designed to measure the ability to repay marketable debt (and not necessarily bank debt). As for the latter, assessments provided by IRB systems are only available for credit institutions that have been authorised to use such systems. This may have a bearing on the competitiveness of those counterparties that lack IRB systems.

None of these drawbacks affects ICASs. Their assessments are applied uniformly to all counterparties of the same NCB, coverage of Spanish NFCs is generally broad, and they have been designed exclusively for the purpose for which they are used (i.e. to assess the eligibility of credit claims). Furthermore, developing an ICAS strengthens the NCB's in-house credit assessment capabilities while simultaneously reducing its mechanical reliance on external ratings.

²⁵ The annual performance monitoring may result in a re-mapping of the assessment source's rating grades to the Eurosystem's credit quality steps, as well as its suspension or even permanent exclusion (see ECB/2015/510, Article 126).

In Spain, the source selected by counterparties to assess loans to Spanish NFCs is the ICAS BE. At end-2019, the total collateral accounted for by this group amounted to €5,938 million, representing 2.7% of the collateral pool. Such loans to NFCs represented 31.5% of non-marketable assets, a group that also includes loans extended to debtors in the general government sector (assessed using ECAI ratings).

The COVID-19 crisis will drive up the volume of ICAS BE-assessed credit claims pledged as collateral by Spanish counterparties. This increase will occur in two ways. Initially, counterparties are expected to mobilise loans extended to the country's largest NFCs that have already been assessed by the ICAS BE during the past year, using the model described in Section 4. Counterparties will subsequently be able to mobilise loans to SMEs thanks to the measures recently approved by the Eurosystem. Under these, the ICAS BE will be able to assess SMEs, which will help to support bank lending.

3.2 Other uses of ICASs

Aside from their role in monetary policy implementation, Eurosystem NCBs are also responsible for the provision of emergency liquidity assistance (ELA) to financial institutions which are solvent but face temporary liquidity problems. This also means that NCBs are responsible for the function's attendant effects; particularly, they must bear the costs and risks arising from the provision of ELA.

As in monetary policy operations, the provision of ELA must be sufficiently collateralised to cover the risks arising from a potential counterparty default and to safeguard the NCB's financial independence.²⁶ However, the applicable collateral framework may not necessarily match that used in monetary policy since it is set by the NCB concerned. It will also not be rigidly defined ex-ante, since some leeway must be allowed based on each situation. Nonetheless, the eligible collateral in these cases must satisfy the risk equivalence principle discussed previously, and thus contribute towards the objective of collateral sufficiency.

As lenders of last resort, NCBs must be in a position to assess a pool of sufficiently ample and varied assets in order for them to be used as collateral in ELA operations by applicant counterparties. Having an ICAS can help in this regard in several ways. First, they can play a preventive role, with the function of lender of last resort performed within the monetary policy framework since sufficiently ample assets (in this case in the form of credit claims) are made available to counterparties. Second, the development of in-house credit assessment capabilities means assets beyond those strictly eligible for

²⁶ See ECB (2015), Section 2.6.

monetary policy operations (i.e. those eligible for ELA operations) may be assessed, thus contributing towards the more effective provision of temporary liquidity.

The expansion plans for the ICAS BE detailed in Section 5, which have been brought forward in response to the COVID-19 crisis, aim to assist in this regard by making a greater number of assessed NFCs and, therefore, a greater number of potentially eligible credit claims available to Spanish counterparties. However, the success of these plans will depend on how prepared the counterparties are to post such assets as collateral. In order to satisfy the operating and legal requirements described above, and be in a position to process detailed information regarding credit claims, counterparties will need to implement the processes required to mobilise such assets.

In addition to performing tasks associated with providing counterparties with funding, ICASs can also contribute towards the design and implementation of other NCB functions, as described below:

- Their assessments may be used to prepare economic research articles, analysing aspects such as monetary policy transmission to the real economy and funding trends among non-financial corporations.²⁷
- In terms of financial stability, the assessment systems for NFCs developed by ICASs can be used by NCBs to analyse the microeconomic risks of these agents, how they interact with other agents and their potential systemic impact.
- The information compiled by ICASs on NFCs and the counterparties that apply for assessments can help some NCBs to expand their financial information database. In turn, this information can be used in economic analysis of the corporate sector.²⁸
- In the supervision of credit institutions, ICAS assessments serve as a reference when analysing the probability of default (PD) used in stress tests or to calculate regulatory capital requirements based on IRB systems. Likewise, the assessments are used as a reference when estimating provision coverage for projected credit losses on banks' loans and receivables.

27 Cahn et al. (2018) analyse the effect of external assessments provided by the ICAS on banks' lending decisions. Their main conclusion is that the effect is greater on those banks and NFCs where there is no relationship, which helps to reduce the problems of information asymmetry and nurtures competition between credit institutions.

28 Deutsche Bundesbank (2019) sets out the annual analysis of German enterprises' profitability and financing in 2018.

4 The Banco de España ICAS

Use of the ICAS BE began at the end of the 1990s in order to assess all listed Spanish NFCs, regardless of whether or not they had an external rating from an ECAI. By using the ICAS BE, credit claims vis-à-vis those NFCs were eligible as collateral within the two-tier framework for eligible collateral in force at that time.²⁹

In 2014 the ICAS BE was transferred to the Banco de España's Financial Risk Department.³⁰ Since then, various actions have been conducted, all geared towards the common aim of expanding the Banco de España's in-house credit assessment capacities. As part of this strategy, particular emphasis has been placed on increasing the number and type of NFCs assessed, ensuring in tandem compliance with the high standards of credit quality required by the Eurosystem. To do so, the ICAS was equipped with a robust organisational structure, comprising three independent units engaging in the development of assessment methodologies, case-by-case analysis of each NFC and the independent validation of the processes and methodologies applied.³¹

4.1 NFCs assessed

Eurosystem ICASs should assess the ensemble of the country's NFCs, regardless of whether they are public or private, their sector of activity, their size or their legal form. However, the specific scope of each national ICAS depends on the assessment systems formally authorised by the Eurosystem. As detailed below, 2019 was an important milestone in relation to the ICAS BE's assessment scope.

Between its creation and 2014, the aim of the ICAS BE focused on assessing the main Spanish NFCs that were listed on securities markets. From 2014 the ICAS BE began to assess new unlisted public and private economic groups.³²

In 2019 the scope of action of the ICAS BE extended significantly due to the authorisation granted by the Eurosystem to assess any large enterprise. It should be noted that, unlike the prior period, all the assessment systems used by the Banco de España ICAS since 2019 have been constructed in their entirety

29 See ECB (1998), p. 39.

30 The Financial Risk Department belongs to the Directorate General Operations, Markets and Payment Systems of the Banco de España.

31 This structure, similar to that at commercial banks, enables a clear segregation of functions and complies with the rules applicable to all Eurosystem ICASs.

32 From 2011 the Banco de España was authorised to assess economic groups presenting their financial statements in accordance with International Financial Reporting Standards (IFRS). These included, aside from listed companies, other groups of companies that had opted voluntarily to present their financial statements using this format.

in-house at the Banco de España. This has contributed to achieving the main aim of further developing the in-house credit assessment capacities described in Section 2.2.³³

In order to use its resources more efficiently, the ICAS BE selects the NFCs that it assesses, focusing on those with higher credit quality and higher volumes of credit claims. To estimate the credit quality of the group of potentially assessable NFCs, an individual automated assessment is performed based on the most recent financial statements available for each NFC. As regards the volume of credit claims, the information available in the Banco de España's Central Credit Register (CCR) enables a (partial) verification for each NFC of those credit claims that would satisfy the eligibility criteria.³⁴ The analysis of potentially eligible credit claims for the large enterprise group shows a high level of concentration among individual groups, with 80% of those loans having been extended to less than 15% of the enterprises (equal to a total of 500, as per Chart 2.1). The ICAS BE thus focuses its efforts on a lower number of NFCs, upon which it conducts an extensive analysis as described in Section 4.3.

In addition to the NFCs assessed on its own initiative, the ICAS BE also assesses, upon a specific request, those NFCs whose credit claims are being used, or are likely in the short term to be used, by a counterparty.³⁵

The outcome of the NFC selection process has enabled significant growth each year in the volume of credit claims available to counterparties (see Chart 2.2).³⁶ While the growth during the initial years was due to a more efficient selection of NFCs and a better understanding of the economic groups, the increase in 2019 was due to the inclusion in the ICAS BE's assessment scope of all large enterprises.

The response to the COVID-19 crisis has entailed the inclusion of Spanish SMEs in the scope of the ICAS BE sooner than envisaged. Section 5 describes the plans that already existed in the ICAS BE when this article was written to gradually include those enterprises over the coming years and their consistency with the Eurosystem's new measures.

33 Between 2011 and 2018, assessments by the ICAS BE of the groups presenting financial information under IFRS were based on CoCAS, the statistical credit assessment model developed by the German and Austrian NCBs [see Deutsche Bundesbank (2015), p. 39], supplemented by the qualitative review by Banco de España analysts.

34 See note a in Chart 2.

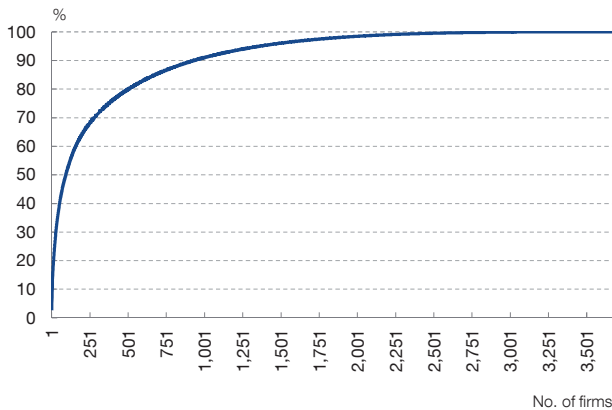
35 ICASs may perform a credit assessment on a counterparty's specific request (see Guidelines ECB/2014/60, Article 121).

36 The time variation shown in Chart 2.2 includes the effect of the changes in the financing obtained by NFCs from banks. However, their impact is adverse and of a lower order of magnitude than that of the changes in the set of NFCs assessed by the ICAS BE.

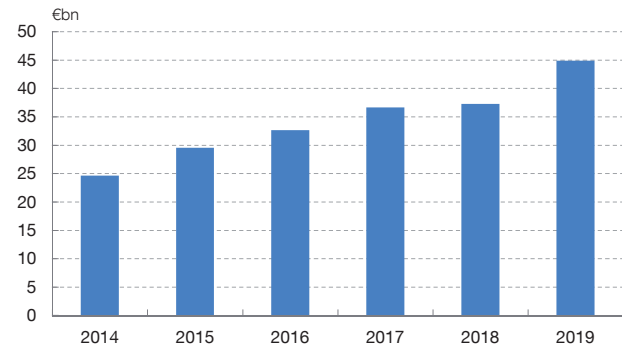
Chart 2

POTENTIALLY ELIGIBLE CREDIT CLAIMS VIS-À-VIS LARGE ENTERPRISES (a) (b)

1 INDIVIDUAL CONCENTRATION (c)



2 TOTAL BALANCE ASSESSED ANNUALLY BY THE ICAS BE (d)



SOURCE: Banco de España.

- a The information available in the Banco de España’s CCR enables a full or partial verification of a significant portion of the eligibility criteria for credit claims (see Guideline ECB/2014/60, Articles 89 to 105). The criteria relating to governing law (Article 97), handling procedures (Article 98) and the additional legal requirements for credit claims (Articles 100 to 105) are not subject to verification.
- b Large enterprises are deemed to be those which do not meet the following definition of SMEs established by the European Commission (see Commission Recommendation 2003/361/EC, Annex, Article 2): “The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million”.
- c Cumulative balance by enterprise of potentially eligible credit claims. The enterprises are ranked (from largest to smallest) by individual credit balance. Data at November 2019.
- d Total balance of potentially eligible credit claims for the set of enterprises with an ICAS BE credit assessment equal to or better than CQS 4.

4.2 Information sources

The Banco de España ICAS uses a wide range of information sources to conduct its activity. First, it analyses NFCs’ economic and financial information to assess matters such as their level of indebtedness or their ability to generate cash flows to discharge their debt obligations. Second, it uses NFCs’ payment history to determine which NFCs have defaulted on their loan obligations or show signs of potentially defaulting in the short term.

The Banco de España has long-established databases for each of these two sets of information. With respect to the economic and financial information, the ICAS BE uses the annual accounts deposited at the Banco de España’s Central Balance Sheet Data Office (CBSO). The CBSO has the financial statements of more than 700,000 NFCs, gathered annually, and even quarterly in the case of larger enterprises, from various sources.³⁷ The CCR provides information on substantially all financial institutions’ credit claims, guarantees and exposures in general vis-à-vis their customers. This information is sourced monthly, enabling the

37 For more information, see <https://www.bde.es/bde/en/areas/cenbal/>.

creation and regular monitoring of a series of leading indicators of default for the assessed NFCs.³⁸

In addition to these two sources, the ICAS BE uses another type of information of a more supplementary, albeit relevant, nature. For example, information is gathered from various market sources to evaluate the main sectors in which NFCs assessed by the ICAS BE operate and to make economic projections for the NFCs based on information available to the public. Information is also received from the other two information sources accepted by the Eurosystem (ECAIs and IRB), which provide the analyst with a valid external reference on an NFC's position. Lastly, information on assessed NFCs from the press and other media is processed daily in order to monitor them and identify possible impairment.

4.3 Credit assessment system

The ICAS BE is structured in two stages: the statistical model and the expert model. The first stage provides an automated assessment based on the NFC's most recent financial statements. In the second stage, the analyst incorporates in the final assessment of the NFC all those relevant matters that the statistical model was unable to capture.

4.3.1 Statistical model

The statistical model's design contains two distinct phases. The first phase consists of ordering the NFCs based on their credit quality using a score calculated as the statistical combination of a series of their financial ratios. In the second phase, the risk associated with each score is quantified so that it reflects the NFCs' probability of defaulting on their loan obligations in the next 12 months (i.e. one-year PD). The expert criterion is present in both phases so that the final statistical model evenly combines the quantitative criteria inherent to statistical estimation techniques and the qualitative criteria provided by the analysts.

As regards the first phase, a logistic regression model estimated with a broad time window selects the set of financial ratios and their respective weightings. Unlike counterparties' IRB systems, in which the information on default tends to be confined to the scope of their individual relationships with NFCs, the variable that the ICAS BE model must explain reflects the percentage of loans defaulted by NFCs in the Spanish banking system as a whole.³⁹

³⁸ For more information, see https://www.bde.es/bde/es/secciones/servicios/Particulares_y_e/Central_de_Infor/Central_de_Info_04db72d6c1fd821.html.

³⁹ The event of default is consistent with the definition of Article 178 of Regulation (EU) No. 575/2013 on prudential requirements for credit institutions and investment firms.

Table 4

ECONOMIC GROUP ASSESSMENT SYSTEM. OTHER SECTORS

Category	Name	Description
Size	Operating assets	Total assets – Non-current assets held for sale
Financial structure	Self-financing capacity	Reserves / Total assets
	Net financial indebtedness	Net financial debt / Operating assets
	Cash flow coverage	(Cash flows from operations – Changes in working capital) / Borrowing costs
Expense structure	Cost of borrowing	Borrowing costs / Financial debt
Asset structure	Capital intensity	(Current assets – Cash) / Operating assets
Liquidity	Short-term solvency	(Cash + current financial assets) / Current payables
Profitability	Economic profitability	EBITDA / Operating assets

SOURCE: Banco de España.

The ICAS BE has different models depending on the types of NFCs and their economic sectors. As regards types, different statistical models have been developed for NFCs and economic groups, based on their separate and consolidated financial statements, respectively. Furthermore, a sector-specific statistical model was estimated for each of these two types, distinguishing between the construction sector and the other sectors (see Table 4, which presents, by way of illustration, the financial ratios used for the general group model).

In the second phase, the calibration of the one-year PD associated with the statistical assessment uses as the main element the historical frequency of defaults observed over that time span. The scores are grouped in a finite set of ranges (representing the model's credit assessments), differentiated by the level of defaults observed in each interval. These levels are used to tie an estimated PD to each assessment and assign it to the corresponding credit quality step (CQS) in the ICAS BE's master scale (see Table 5).

4.3.2 Expert model

The proposed automated assessment from the statistical models is supplemented with more recent and forward-looking information gathered by the analysts from the information sources described in the previous section. The most recent economic or business events, which are not contained in the financial statements due to a time lag between when they take place and when they are disclosed to the public, can thus be taken into account.

Table 5

MAPPING OF THE ICAS BE TO THE EUROSISTEM'S HARMONISED RATING SCALE

	Credit Quality Step						
	1&2 (PD ≤ 0.10%) (a)	3 (0.10% < PD ≤ 0.40%)	4 (0.40% < PD ≤ 1.00%)	5 (1.00% < PD ≤ 1.50%)	6 (1.50% < PD ≤ 3.00%)	7 (3.00% < PD ≤ 5.00%)	8 (PD > 5.00%) and default (D)
ICAS BE credit assessment	1, 2+, 2, 2-, 3+, 3 and 3-	4+, 4 and 4-	5+ and 5	5-	6+	6 and 6-	7+, 7, 7-, 8 and D

SOURCE: Banco de España.

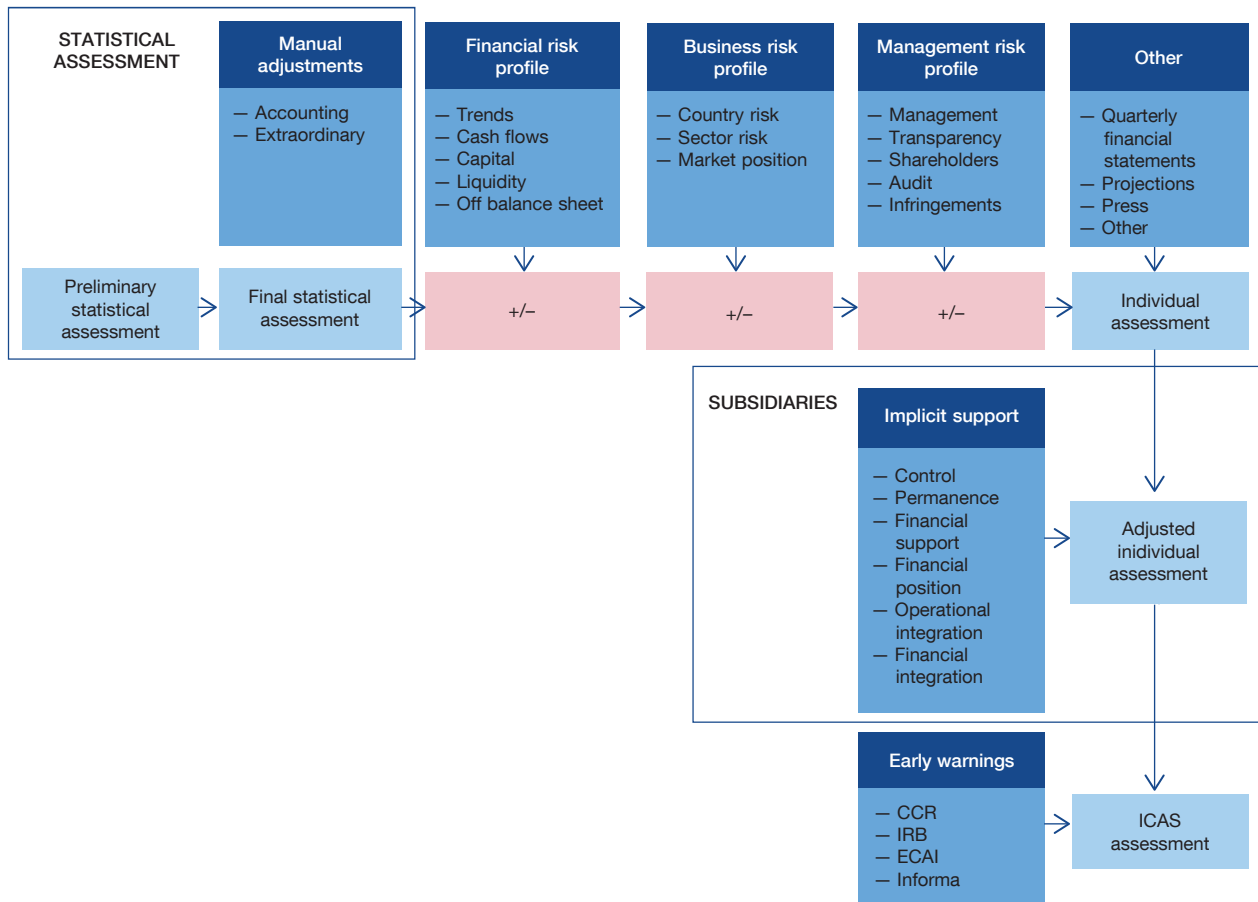
a The CQSs are defined on the basis of the one-year probability of default of the assets assessed by the assessment system.

The expert model of the ICAS BE has five areas of analysis, each with a series of risk indicators. The analysts progress through the areas sequentially (see Figure 1):

- A *statistical assessment validation* is performed by evaluating the accuracy and consistency of the financial information used and taking into account the possible non-standard or extraordinary effects that might exist.
- The *financial risk* profile is evaluated, supplementing the information used in the statistical assessment. In this case, less easily quantified aspects are taken into account, such as trends observed in the main balance sheet and income statement aggregates, NFCs' financial flexibility or the existence of financial contingencies not reflected on their balance sheets.
- The *business risk* to which the NFC is exposed is estimated. This is key to understanding future developments in its ability to discharge its financial obligations. The analyst evaluates the specific characteristics of the sector (or sectors) in which the NFC operates and its competitive position within it (them).
- *Management risk* is taken into account. The quality of management and of corporate governance, elements that also affect the credit assessment, is reviewed. The findings in the audit reports and the possible penalties imposed on NFCs for infringements are used by analysts as evidence for this type of risk.
- A review is conducted of any *additional information* that might be relevant to evaluating the NFC's creditworthiness; the information is gathered from various sources, such as the media, specialist market providers or even quarterly summaries of the financial statements provided by the NFCs themselves.

Figure 1

ICAS BE EXPERT MODEL (a)



SOURCE: Banco de España.

a The expert model analysis process is based on the preliminary statistical assessment and, following analysis of various elements, it provides the corporation's individual assessment. If the corporation is a subsidiary of an economic group, the implicit support that it could receive from the parent is analysed, giving rise to the adjusted individual assessment. Lastly, all corporations, be they subsidiaries or not, are subject to an analysis of possible early warnings from external references. The corporation's ICAS assessment is finally obtained using this last piece of information.

It should be noted that environmental, social and governance (ESG) criteria are included throughout the analysis process. The consideration of these factors in the credit assessment is in line with the practice of other external assessment sources (e.g. ECAIs). These sources apply a comprehensive approach when evaluating NFCs' credit risk, which takes into account not just environmental, but also social and governance factors. It is important to highlight that these factors are considered insofar as they could have an impact on NFCs' financial risk (in this case, credit risk). Therefore, these factors are unrelated to their preparedness for dealing with the threats and opportunities that ESG factors may pose in more general terms. Over the coming years, the ICAS BE will more closely monitor the

impact of these factors on credit assessments in order to incorporate best practices and thus be able to conduct a systematic and uniform analysis of the ESG factors.

The outcome of this entire analysis process is the NFC's preliminary assessment. In those cases where the NFC belongs to an economic group, it is also advisable to consider the positive and adverse decisions that the parent undertaking could take in relation to the assessed NFC. To do so, an assessment is conducted of matters such as the parent's percentage of ownership of/degree of control over the subsidiary and its integration in financial and business terms within the group.

Once the effect of the implicit support has been incorporated in the NFC's assessment (in the case of subsidiaries), an analysis is conducted of the possible early warning alerts triggered in the CCR and the divergence from the assessments provided by external references (ECAIs and IRB).

This entire analysis process results in the ICAS BE's final assessment, which, for the purposes of determining the eligibility of credit claims and the valuation haircut to be applied, directly matches the Eurosystem's harmonised scale (see Table 5). Specifically, on the ICAS BE scale the credit assessments 1 to 5 are mapped to the eligible CQSs on the Eurosystem's scale (1 to 4) and the other credit assessments (5 to D) are mapped to the ineligible CQSs (5 to 8).

4.4 Credit assessments

Having described the credit assessment process, it is worthwhile to highlight some of the relevant aspects of the assessments performed by the ICAS BE:

- *12-month time horizon.* The assessments characterise the NFCs with a conservative estimation of the probability of default over the next 12 months. The statistical assessment of the first stage ties a one-year PD to an NFC, based on information from the most recent financial statements, and the expert model corrects this assessment upwards or downwards on the ICAS BE's rating scale.
- *Yearly validation.* The assessments are subject to a rigorous performance monitoring process on a yearly basis. This consists of analysing the consistency, for each risk category, between the frequency of default observed in the last twelve months and the PD assigned to each category. Significant unjustified deviations could lead the Eurosystem to apply an adjustment penalising the ICAS's assessments and, ultimately, its exclusion as a credit quality assessment system source.

- *Stability.* The assessments are intended to be stable over time, despite being tied to a relatively short time horizon. The aim of this characteristic is for counterparties to be able to rely on a stable source of collateral that is not affected by the impact of the economic cycle. To achieve this aim, the ICAS BE includes some elements, particularly in the expert model, that lend stability to the assessments assigned.
- *Consistency.* The centralised organisation and structured nature of the ICAS BE contribute to the consistency and comparability of the assessments assigned. Furthermore, all the individual credit assessment reports are subject to the four-eyes principle, which requires reviews and discussions by the two committees.
- *Ongoing monitoring.* In addition to the yearly review of the assessments, the ICAS monitors them on an ongoing basis in order to identify as soon as possible any changes in the assessed NFCs' credit quality that might necessitate a change to their assessments. This intends to ensure that impairment of collateral is identified early. To facilitate this process, a list of corporations with unfavourable prospects is kept and reviewed on an ongoing basis. The NFCs on this list are subject to maximum supervision.
- *Confidentiality.* The credit assessments are confidential and not disclosed to the public. Their use is also restricted. The assessments are performed by the Banco de España in the exercise of its functions, specifically to implement monetary policy. The assessments are not shared with either the NFCs or the counterparties, which can only gain access to ascertain the eligibility of an NFC, based on the information provided by the collateral framework described in Section 4.5.

4.5 Operational aspects of credit claim mobilisation

The developments implemented in the ICAS BE in recent years have been accompanied by an improvement in the IT systems handling collateral mobilisation. In this context, in 2014 the Banco de España launched a new application for pledging and handling non-mortgage loans in order to make this process more efficient, harmonise practices and act as a catalyst for liquidity for all Spanish counterparties.

The improvements brought about by this new application in the area of credit claims can be grouped into two types. First, the counterparties can consult the eligibility of the NFCs assessed by the ICAS BE independently, both through electronic consultations (by file) – using the list of NFCs to be consulted – and, shortly, manually by terminal. They can also send electronically all the information required to mobilise credit claims. This facilitates a swift response from the Banco de España.

However, mobilisation of credit claims still requires interested counterparties to submit to the initial and regular verification of the veracity of the information on the credit claims. Undoubtedly, this could entail the adaptation by the applicants of their IT systems and of certain legal and operating procedures.

5 ICAS BE expansion plans

As detailed above, the ICAS BE has a strategic role within the Banco de España due to its contribution to the development of in-house credit assessment capacities. In the monetary policy arena, this development has two significant effects, outlined in previous sections. First, a more direct transmission of monetary policy measures to the real economy, in this case to NFCs. Second, an advantageous effect on the role of NCBs as lenders of last resort.

To achieve these aims, the ICAS BE devised a plan, the first phase of which was completed in 2019, to expand by assessing all large Spanish enterprises (including unlisted enterprises). The second phase of the plan envisages the assessment of all remaining Spanish NFCs, i.e. the SMEs.

As described in Section 2.1, bank financing is highly important to SMEs, particularly in Spain. Information on the financing structure of NFCs shows that Spanish NFCs are more dependent on bank loans than their euro area counterparts.⁴⁰

The NFCs' reliance on loans also means, from the supply side perspective, that loans extended to those NFCs represent a significant share of counterparties' balance sheets, with this being particularly significant in Spain.⁴¹ By enterprise size, the total volume of loans extended to SMEs is of a similar magnitude to that of loans extended to larger enterprises overall (see Chart 3.1). This makes SMEs a clear potential target for the ICAS BE.⁴²

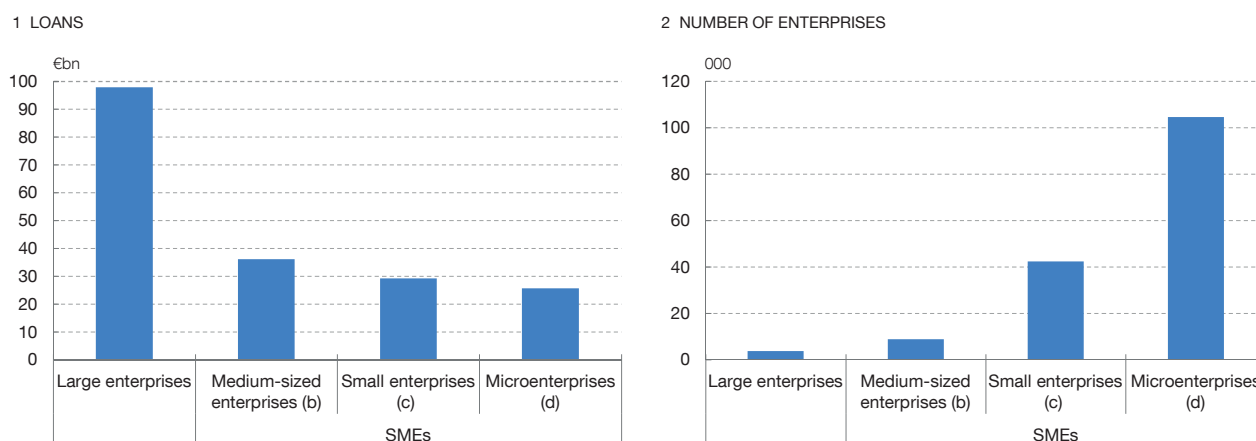
With regard to assessing Spanish SMEs, it is important to highlight the repercussions for the ICAS BE of assessing such a high number of corporations. In the case of large enterprises, the concentration of credit claims in a relatively small set of enterprises (around 500) enabled each NFC to be assessed individually by an

40 Tamura and Tabakis (2013) analyse the geographical differentiation of the financing structure of NFCs in the euro area. The findings for Spain show that bank debt accounts for more than 50% of total financing, with a negligible amount of financing obtained through marketable debt securities [see Chart 2 of Tamura and Tabakis (2013)].

41 Tamura and Tabakis (2013) also analyse the weight of lending to NFCs on counterparties' balance sheets and once again found significant differences between countries; in Spain and Italy the weight was much higher (exceeding 20%) than in France and Germany (10%).

42 The ICASs of other NCBs also assess smaller enterprises. At the Banque de France, 95% of the NFCs assessed have annual turnover of less than €50 million [see Schirmer (2014)]. At the Deutsche Bundesbank, 82% of NFCs are deemed to be SMEs [see Deutsche Bundesbank (2019), p. 3].

Chart 3

LOANS EXTENDED TO ENTERPRISES (a)

SOURCE: Banco de España.

- a The volume loans was calculated as per Note a to Chart 2, with the sole difference being that, due to the unavailability of a credit assessment source for SMEs, the credit quality filter was not applied in any case.
- b Medium-sized enterprises are deemed to be all those enterprises within the SME category as defined by the European Commission (see Commission Recommendation 2003/361/EC, Annex, Article 2) that are not included in the small enterprise or microenterprise subcategories.
- c Within the SME category, a small enterprise is defined as an enterprise which employs fewer than 50 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 10 million (see Commission Recommendation 2003/361/EC, Annex, Article 2.2).
- d Within the SME category, a microenterprise is defined as an enterprise which employs fewer than 10 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million (see Commission Recommendation 2003/361/EC, Annex, Article 2.3).

analyst. The complexity of Spain's large economic groups and the significant amount of public information available for financial analysis justified this approach.

SMEs are in particular abundance (in excess of 150,000) (see Chart 3.2). Furthermore, there is less public information available. This limits the value added by the expert analysis. The concurrence of both factors leads to the conclusion that a case-by-case assessment of SMEs is not the most appropriate option. Other alternatives need to be evaluated.

The assessments resulting from the statistical models must be the basis of the credit assessment of the SMEs. These models may incorporate manifold information sources, such as those set out in Section 4.2. Thus, the financial information from the financial statements, which is not disclosed as and when events occur, may be supplemented with the regular monthly information from the CCR on NFCs' payment history. External references provided by other sources will serve to incorporate additional relevant information from the sources' financial relationships with the NFC. Lastly, sectoral analyses conducted in the assessment of large enterprises may help to foreshadow the aggregate effects that might affect SMEs, the impact of which should be greater due to their businesses being less diversified.

The measures recently approved by the Eurosystem in response to the COVID-19 crisis have enabled the extension of the scope of the acceptable credit assessment systems. The different alternatives include the possibility of the ICAS BE temporarily assessing non-financial corporations using purely statistical models, provided that the assessment is conservative enough to mitigate the risk of not resorting to expert analysis.

The set of tools used by the ICAS BE in the analyses of all Spanish NFCs contains statistical models developed for SMEs. These models are similar in nature to the statistical model described in Section 4.3.1 and are differentiated according to enterprise size (see the differentiation in Chart 3). In order to satisfy the Eurosystem's new requirements, the statistical assessments from these models have been adjusted using conservative criteria and supplemented with information from external sources, in line with what is set out in previous paragraphs.

The assessment of NFCs using statistical models will enable Spanish counterparties to avail themselves of a greater number of eligible credit claims. First, new NFCs may be identified that satisfy the minimum credit quality requirement (one-year PD of up to 1.5%) applied to date to debtors until now. Second, portfolios of business loans may be presented that, in certain conditions of uniformity and granularity, may even have a one-year PD of more than 1.5%. In the latter case, the ICAS BE must use estimates of the credit claims' loss given default (LGD) in order to calculate the applicable valuation haircuts. These haircuts, as in the case of any collateral, follow the principle of risk equivalence; accordingly, the haircuts are larger for assets with a higher PD/LGD. However, the haircuts may be lower than those applied to individually mobilised credit claims due to the mitigation of risk resulting from belonging to a diversified portfolio.

6 Conclusions

The Banco de España in-house credit assessment system has been operating since the end of the 1990s and has focused on the use of credit claims as collateral in traditional monetary policy operations. It has thus enabled the mobilisation of credit claims vis-à-vis Spanish NFCs that did not have an external rating from an ECAI. Since 2014 the ICAS has undertaken a series of actions, geared towards increasing the number of NFCs assessed, with the ultimate aim of being in a position to assess any Spanish NFC.

Simultaneously, the use of credit claims in the Eurosystem's monetary policy has increased significantly as a result of the global financial crisis triggered in 2008. The level reached in 2012 remains to this day, and there are various factors behind why the effect has not been temporary. The key factors include it being in the

counterparties' interest to use this type of less liquid asset for central bank financing transactions, leaving more liquid assets for compliance with regulatory targets or to be provided as collateral in market operations.

However, central banks can also benefit from the use of these assets, as it facilitates the transmission of monetary policy to the real economy and provides a wide collateral base that ensures the effectiveness of their expansionary financing policies. One option available to NCBs with a view to mobilising these assets is to develop ICASs, which also means avoiding the disadvantages inherent in other sources (ECAIs and IRB). The relevance to other NCB functions may render ICASs a strategic asset for such institutions.

In this connection, mention should be made of the role of ICASs in the provision of emergency liquidity assistance. Given that the collateral framework applicable in this case may not coincide with the monetary policy framework, the NCB should be in a position to assess a sufficiently abundant and varied group of assets, among which credit claims can play an important role. The expansion plan designed by the ICAS BE makes it possible to cater to this and other needs. However, the success of the plan hinges on the preparedness of the counterparties themselves to meet the more numerous eligibility requirements imposed on these assets than on more standard asset types.

The ICAS BE had future plans to perform credit assessments on the Spanish NFCs that were not at that point being assessed. However, the COVID-19 crisis has brought those plans forward and Spanish SMEs now fall within the scope of the ICAS BE. The challenge that lies ahead is ambitious, as the high number of new NFCs combined with the current economic uncertainty will require all efforts to be focused on anticipating any adverse developments in credit risk that might affect the soundness of the Eurosystem's and, in particular, the Banco de España's balance sheets. However, the necessary response to the COVID-19 crisis, in the terms established by the ECB Governing Council, has led to this step being taken, thus facilitating access by Spanish counterparties to Eurosystem financing transactions and capitalising on the high interdependence between SMEs and the Spanish banking sector.

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Euro risk-free interest rates: the transition from EONIA to €STR

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Abstract

The decline in the trading volume of unsecured transactions following the financial crisis led to a loss in EONIA's representativeness.¹ Moreover, the manipulation of some of the main benchmark rates, such as LIBOR, and the sanctions imposed by the authorities, resulted in a large number of institutions stopping their voluntary contributions to these and other benchmarks, such as EONIA. In this situation, the need for appropriate and reliable benchmark rates became clear. This article describes the key features of the new euro risk-free interest rate, known as the euro short-term rate (€STR), and why it was created. In addition, the article gives an account of the progress made by the working group on euro risk-free rates and the transition required to gradually replace EONIA, which has until now served as the benchmark for many money market contracts and as an indicator for monetary policy decisions in the Eurosystem.

1 Introduction

The worldwide scandals caused by the manipulation of major benchmark rates such as LIBOR, and the sanctions imposed on a number of financial institutions, led to a sharp fall in the number of institutions contributing voluntarily to these benchmarks, thus making them less representative. In Europe, in addition to the manipulation detected in LIBOR rates, the fall in voluntary contributions had an impact both on EURIBOR and EONIA, compounded by the very significant decline in money market activity as a result of the subprime crisis. The fragile nature of indices based on voluntary contributions from credit institutions and, in the case of EURIBOR, on quotes and not on actual transactions, revealed the need for a uniform set of rules and a more rigorous, mandatory methodology largely based on actual transactions.

Until then, EONIA had served as an implicit benchmark for the monetary policy of the European Central Bank (ECB), allowing to gauge the impact of Governing Council decisions on changes in key ECB interest rates. The importance of this rate also stemmed from its use as a benchmark in a large volume of financial contracts. To address the decline in the volume and in the number of institutions contributing to EONIA, the ECB decided to provide the market with a new benchmark rate to support the short-term euro money market. To this end, in September 2017 it announced the creation of the €STR, taking on the role of its administrator.

¹ EONIA: euro overnight index average.

At the same time, a number of European organisations set up a working group to identify and recommend risk-free rates for the euro area that could serve as an alternative to the benchmarks used until then in a variety of financial instruments and contracts. In turn, the group was tasked with developing a plan for the transition of new and legacy contracts to risk-free rates. The group recommended that the €STR be used as the risk-free rate for the euro area and has since focused its efforts on planning for a smooth transition from EONIA to the €STR and on creating the conditions for a liquid derivatives market based on risk-free rates. The group's objectives also include ensuring that stakeholders coordinate and communicate well with each other.

This article focuses on the progress made since the ECB announced that it would create a new index until it was published for the first time in October 2019. The authors give a detailed account of the stages of the transition from EONIA to the €STR and underline the main challenges ahead to successfully complete the transition by January 2022, when EONIA will cease to be published.

2 Market context: Manipulation of benchmarks and financial crisis

Between 2013 and 2016, the European Commission imposed fines totalling more than €2,000 million on nine financial institutions, following an investigation by the EU competition authorities into the alleged manipulation of EURIBOR (the euro interbank market benchmark rate²) by some of the institutions making up the panel of over 40 contributing banks.³ According to the Commission, the sanctioned institutions had infringed Article 101 of the Treaty on the Functioning of the European Union,⁴ which regulates the rules on competition applying to EU undertakings.

EURIBOR was calculated as the average of the interest rates published daily by a panel of banks responsible for offering the quoted rates for different maturities in the unsecured segment. The resulting rates for each maturity in the euro money market were the average of the quoted rates, following elimination of the highest and lowest 15% of quotes. In the case of EURIBOR, the highest and lowest 25% of daily quotes were eliminated and, consequently, only 50% of the information reported was used to calculate the benchmark.

The lack of objectivity in the calculation of the benchmark, which was not based on actual transactions but on the voluntary contributions of credit institutions, which submitted the rate at which they would be prepared to lend to other financial institutions, along with the absence of effective controls, meant that some participants

2 EURIBOR has now been reformed to encompass a broader segment of the money market and is no longer limited to the interbank market. See [EURIBOR reform](#).

3 See [EURIBOR panel banks](#).

4 See [Treaty on the Functioning of the European Union](#).

were able to manipulate prices to their own benefit. The mechanism was straightforward, since agents from the different panel banks agreed on the quote submissions, thus changing the value of EURIBOR at their convenience.

The manipulation of benchmarks was not limited to EURIBOR or the EU, but was preceded by similar cases in other jurisdictions. In 2012, Barclays reached an agreement with the UK and US authorities, namely, the Financial Stability Authority (FSA) and the Federal Reserve System (FED), to pay a fine of USD 450 million for having rigged LIBOR information between 2005 and 2009, for its own benefit. This marked the first in a series of investigations over the next few years which led to sanctions being imposed on a number of financial institutions for manipulating LIBOR for different currencies.

As a result, many of the banks which voluntarily contributed to these rates stopped doing so, thus drastically reducing the number of EURIBOR and EONIA panel banks. At present, a total of 18 banks remain on the EURIBOR panel, after 26 banks stopped contributing, mostly between 2012 and 2016.

On 9 August 2007, BNP Paribas Investment Partners announced the suspension of redemptions and share subscriptions in three of its investment funds, since it had become impossible to calculate their net asset value owing to the absence of market prices and the loss of liquidity of the assets in its portfolios. These funds invested in instruments referencing the US mortgage market. This episode marked the beginning of the great financial crisis and set the stage for the collapse of the investment bank Lehman Brothers and the start of a long period of distrust among financial institutions, which would lead to a diminished interbank market.

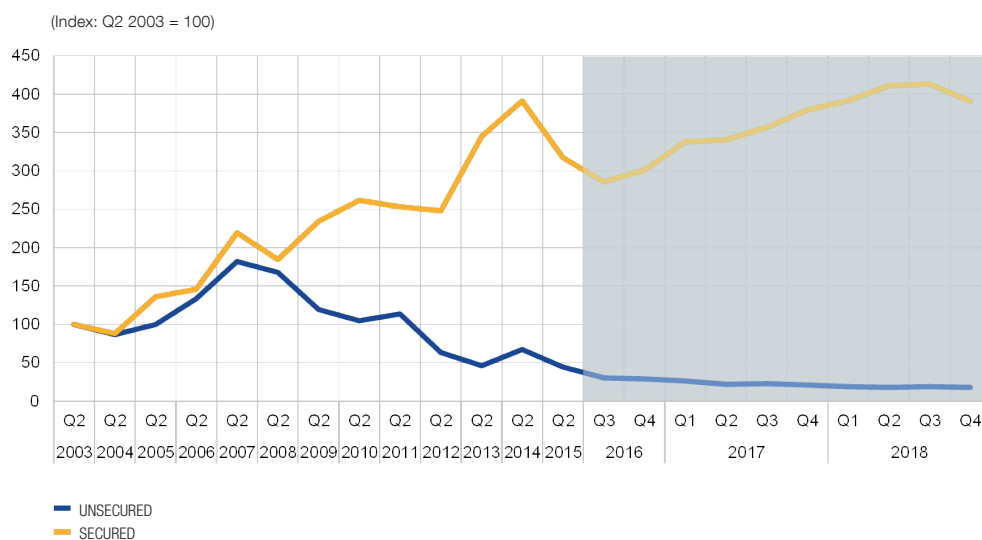
The subprime mortgage crisis affected the solvency of many financial institutions, leading to a loss of confidence among them, reflected in the diminished volume of the unsecured interbank market (see Chart 1). From then on, collateralised loans would become the norm and their terms would be shortened. This had a direct impact on interbank market benchmark rates which, faced with a declining number of actual transactions as the crisis worsened, began to rely increasingly on the subjective assessment of agents who contributed daily to their calculation, submitting quotes for different maturities, for a market with an ever-lower number of transactions.

The financial crisis, which began in 2007 in the United States and would culminate in the collapse of Lehman Brothers in September 2008, led to the sovereign debt crisis, as the lack of confidence in banks' solvency had also spread to other sovereign states.

Against this background, and given the doubts raised about the integrity of the benchmark rates, the G20 commissioned the Financial Stability Board (hereafter, FSB) to undertake a review and a reform of the main benchmarks, to ensure that they were robust and reliable, and thus avoid cases of manipulation in the future.

Chart 1

TRADING IN THE UNSECURED AND SECURED SEGMENTS



SOURCE: European Central Bank. *Euro Money Market Study 2018*.

NOTE: Data to 2015 drawn from the *Euro Money Market Survey* and data from mid-2016 on (shown in light blue), from *Money Market Statistical Reporting*. A sample of 38 banks was used.

The FSB set up a high-level working group made up of regulators and central banks, known as the Official Sector Steering Group (hereafter, OSSG), and tasked it with coordinating the reviews of existing interest rate benchmarks, ensuring their consistency, and studying the feasibility of introducing new benchmarks. The FSB decided that the OSSG’s initial review would focus on the most widely used benchmarks in the market, LIBOR, EURIBOR and TIBOR, because of their importance for financial stability.

In turn, the OSSG formed a group of market participants, with a view to involving the private sector, which would study the feasibility of implementing new indices and analyse the implications of a transition to these new benchmarks. The OSSG decided to form five currency sub-groups (US dollar, euro, pound sterling, Swiss franc and yen), to ensure that the recommendations of the group of market participants took into account the characteristics of each jurisdiction, as regards their market structure, institutions, and regulatory and supervisory frameworks.

In July 2013, the International Organisation of Securities Commissions (hereafter, IOSCO) published a report in which it proposed a series of principles to guide the development of financial benchmarks. This report was drafted by a working group set up following the manipulation incidents, which had exposed the shortcomings of the benchmarks.⁵

⁵ See [IOSCO principles for financial benchmarks](#).

In July 2014, the FSB published an initial report setting out its recommendations for financial benchmarks,⁶ drawing on the IOSCO principles, establishing a series of common international standards on governance, quality, methodology and accountability for benchmarks. The main recommendations are as follows:

- Calculating the “ibor” and other benchmark rates in unsecured lending markets on the basis of actual transactions, as far as possible.
- Improving processes and controls relating to the submission of data by participating institutions.
- Identifying or developing alternative risk-free benchmark rates.
- Encouraging the development of, or transition to, derivatives markets referencing alternative indices.

Since the publication of its initial report, the FSB has periodically published other reports on the progress made on implementing these recommendations.

3 European benchmark regulation

In the wake of the benchmark manipulation scandals, and given the importance of using sound and reliable benchmarks for a large volume of financial contracts traded daily worldwide, the authorities of the main economies decided that specific, strict and uniform regulations were needed to ensure the integrity and accuracy of those benchmarks. The IOSCO principles served as the basis for developing a European regulation on benchmark rates.

In June 2016, *the Official Journal of the European Union* published Regulation (EU) 2016/1011, applicable from 1 January 2018⁷, on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds. The regulation aimed to ensure the reliability of benchmarks and to minimise conflicts of interest in the benchmark determination process in the European Union.

The new regulation addresses the development of benchmarks and the contribution of data to calculate them, and is therefore binding for both benchmark administrators and the entities contributing input data. All supervised entities in the European Union should use benchmarks authorised by the regulation.

⁶ See [FSB report on reforming major interest rate benchmarks](#).

⁷ See [Benchmark Regulation \(BMR\)](#).

In addition, the regulation distinguishes between indices, benchmarks and critical benchmarks. An index is any figure that is published regularly and that is determined by the application of a formula or method of calculation, on the basis of the value of one or more underlying assets. A benchmark should, in addition, be used to determine the value or amount payable under a financial instrument or a financial contract, or to measure the performance of an investment fund. Critical benchmarks are particularly important for financial stability and, consequently, are subject to stricter rules.⁸ EURIBOR and EONIA were designated as critical benchmarks in August 2016⁹ and June 2017, respectively.¹⁰

All entities that provide an index that is considered a benchmark under the regulation must ensure that it complies with all the requirements and that it has been expressly authorised by the corresponding national competent authority. Additionally, all market participants that use a benchmark must ensure that it has been determined by a duly authorised administrator.¹¹

Although the regulation became effective on 1 January 2018, a series of transitional provisions were established to allow for the determination and use of previously existing benchmarks until 1 January 2020.

As neither EONIA nor EURIBOR fulfilled the requirements of the new regulation, a reform was undertaken to bring them into line with the new provisions before the transitional period ended. The calculation methodology of EURIBOR was changed to comply with the regulation and its administrator, the European Money Market Institute (EMMI), received authorisation from the Belgian Financial Services and Markets Authority in July 2019.¹² As the same could not be done for EONIA, given the small volume of transactions in the overnight unsecured interbank market, it was decided to stop its publication and to replace it with the €STR, a new, more representative, benchmark rate based on deposit transactions. A transitional period was established during which both benchmarks would coexist, and EONIA's calculation methodology was changed to meet the regulation requirements during that period.¹³

In parallel, on 13 September 2018, the working group on euro risk-free rates recommended the use of the €STR as the euro area benchmark rate, and expressed its support for the transition from EONIA to the new benchmark.

8 Benchmarks can be divided into those that are critical, significant and non-significant. The first category are those that have an impact on financial stability and are therefore subject to stricter rules and have their own college of supervisors. The provisions of the regulation relating to critical benchmarks have been applicable since 2016.

9 See [Regulation on critical benchmarks](#).

10 See [amended Regulation on critical benchmarks](#).

11 See [official register of authorised administrators](#).

12 See [authorisation of EURIBOR by the FSMA](#).

13 See [authorisation of EONIA by the FSMA](#).

In December 2019, the transitional provisions relating to critical and third country benchmarks were extended for another two years, until 31 December 2021.

In addition to the European reform undertaken pursuant to the Regulation, other changes affecting benchmark rates have taken place worldwide. Jurisdictions that have also adopted benchmarks based on deposit market transactions include the United Kingdom, with SONIA (Sterling Overnight Index Average) and Japan, with TONA (Tokyo Overnight Average Rate). However, some countries have opted for benchmarks based on secured transactions, for example, the United States, with SOFR (Secured Overnight Financing Rate) and Switzerland, with SARON (Swiss Average Rate Overnight).

4 Creation of the €STR: new overnight benchmark rate

On 21 September 2017, following a decision by its Governing Council, the ECB made two important announcements.¹⁴ First, it undertook to publish a new euro short-term interest rate based on data already available to the Eurosystem, to complement existing benchmark rates produced by the private sector. Second, it launched a working group led by the private sector, whose key mission was to identify and recommend risk-free interest rates that could serve as an alternative to existing benchmarks, and to prepare for the transition to these rates. The working group would comprise credit institutions, and also representatives from the FSMA (Belgian Financial Services and Markets Authority), the ESMA (European Securities and Markets Authority), the European Commission and the ECB itself, providing the Secretariat. The most significant characteristics of this working group (Working group on euro risk-free rates, WG RFR) are described in section 5.

4.1 Design of the euro short-term rate (€STR)

The ECB led the process of creating this benchmark against a background of profound benchmark regulation reforms, as mentioned above. The importance of the new interest rate known as the “euro short-term rate” (€STR) stems, on one hand, from the decisive role of money market interest rates in the transmission of monetary policy decisions and, on the other, from the pivotal function it must adopt as a benchmark for instruments and contracts traded on financial markets.

Initially, the €STR was not intended to replace any of the existing indices, rather to complement them. Since EONIA did not meet the benchmark regulation requirements owing to the limited number of transactions on which its calculation was based and

¹⁴ See [ECB announcement on the development of an overnight interest rate](#).
See [joint announcement on the launch of a working group on risk-free interest rates](#).

to the concentration of volumes in a small number of contributors, the EMMI tried to bring it into line with the requirements of the new European Benchmark Regulation (hereafter, BMR). However, in May 2018, the EMMI confirmed that an EONIA rate conforming to the new requirements could not be produced. Consequently, in the following months, EONIA was to gradually be replaced with the €STR, until its full phase-out at the end of 2021. Both interest rates would coexist for a time in order to enable a smooth transition for new and legacy contracts. In September 2018, the WG RFR recommended that the €STR be used as the benchmark rate for the euro area, and has since focused on supporting the transition from EONIA to the €STR.

The information used to calculate the €STR should be based on data available to the Eurosystem. Specifically, and pursuant to Regulation (EU) No 1333/2014 of the ECB of 26 November 2014 concerning statistics on the money markets,¹⁵ the ECB started, in July 2016, to collect data on all the short-term euro transactions in these markets. Those with reporting obligations are credit institutions whose total main balance sheet assets exceed 0.35% of the total balance sheet assets of all the monetary financial institutions in the Eurosystem. These institutions must submit, on a daily basis, data to the national central bank or to the ECB on all the money market transactions concluded on the previous business day.¹⁶ This information goes into a new statistical, detailed and harmonised dataset referred to as Money Market Statistical Reporting (MMSR¹⁷). In April 2020, the panel of reporting entities comprised 50 credit institutions.

The ECB, as the €STR administrator, has led the process to design this benchmark through internal and external working groups, and has gathered market feedback through two public consultations, the results of which were published in February¹⁸ and May¹⁹ 2018.

After assessing the different options and analysing the responses received, the ECB decided that the €STR would be an unsecured deposit rate which reflects the borrowing costs on the euro wholesale market. The transactions are overnight and are conducted at arm's length by MMSR panel banks with their counterparties. Specifically, they are deposit-raising transactions conducted with deposit-taking institutions (except for transactions conducted with central banks for monetary policy purposes), money market funds, investment funds, captive financial institutions and money lenders, insurance companies, pension funds and other financial corporations.

According to the findings of the public consultations, the features of the new benchmark rate were well received by market participants, who also noted the

15 See [Regulation concerning statistics on the money markets](#).

16 Specifically, secured, unsecured, foreign exchange swap and overnight index swap transactions, excluding intragroup transactions.

17 Information on the MMSR is available [here](#).

18 See [responses to the first public consultation on the overnight interest rate](#).

19 See [responses to the second public consultation on the overnight interest rate](#).

€STR's suitability as a benchmark to be adopted in contracts and valuations which had until then referenced EONIA.

At end-June 2018, the ECB published the calculation methodology for the €STR,²⁰ which is published at 08:00 on each TARGET2 business day.²¹ For the benchmark to be considered valid, certain minimum market activity criteria must be met. Specifically, there must be at least 20 contributing banks and the volume of the five largest contributors must not exceed 75% of the value of the transactions included in the daily calculation. If any of the minimum criteria are not met on a given day, contingency procedures will be applied. These basically consist of calculating the volume-weighted average of a given day's rate and that of the previous day, making the necessary adjustments if the key interest rate has changed between those two days. In the event that the ECB, as the calculation agent, receives new data immediately after publication of the €STR, or detects errors which would make the rate vary by more than 2 bp, a new rate would be published before 09:00 on the same day. Although the ECB is not subject to the BMR, as it is a central bank whose integrity and independence are assumed, its legal framework is consistent with the best practices established in the regulation and in the IOSCO principles.

Although the ECB is the €STR administrator and is responsible for its publication, Eurosystem central banks are the main point of contact with counterparties in the daily benchmark determination process, mainly for the verification of data provided by banks. Using the infrastructure created for MMSR, central banks that have not delegated this responsibility to the ECB, collect data daily and submit them to the ECB. In a subsequent data-editing stage, all the central banks with reporting agents in their jurisdictions are responsible for checking the accuracy of the data received and preventing the inclusion of values that do not conform to the usual standards.²²

4.2 Main differences between EONIA and €STR

One of the key differences between the €STR and EONIA is that the former represents the interest on borrowing transactions, while the latter is an interbank lending rate. Both of them are unsecured.

All the transactions on which calculation of EONIA was based related to the interbank market, while the €STR is based on transactions between reporting agents and a wide range of counterparties from the wholesale market, as discussed in the previous section.

²⁰ See [€STR methodology](#).

²¹ See [TARGET2 long-term calendar](#).

²² In March 2020, an amendment was published to the Guideline on the €STR whereby Eurosystem national central banks may delegate their data-checking tasks, providing that they have only one reporting agent in their jurisdiction and that the central bank in question does not operate a local data collection platform.

Table 1

CHARACTERISTICS OF €STR AND EONIA

Benchmark	€STR	EONIA
Maturity	1 day (overnight)	1 day (overnight)
Source	Actual transactions	Actual transactions
Instrument	Deposits	Deposits
Cost of liquidity	Borrowing	Lending
Counterparties	Wholesalers	Banks
Contributors	Required by regulation	Voluntary
Administrator	ECB	EMMI
Publication	D + 1 (08:00 h)	D (19:00 h)

SOURCE: Banco de España.

As Chart 2 shows, the €STR has lower values than EONIA, for two fundamental reasons. First, due to the nature of their business, credit institutions borrow at a lower rate than that at which they lend; second, because the counterparties with which the €STR calculation panel banks can operate may include non-banks or non-residents that do not have access to the Eurosystem’s deposit facility, meaning that trading is feasible beyond the interest rate “corridor” defined by the ECB’s standing facilities.²³

As mentioned in earlier sections, institutions contributed to EONIA voluntarily, while those contributing to the €STR are obliged to do so under the MMSR regulation.

Lastly, another difference is that the EMMI published EONIA daily, at the close of business, based on the day’s transactions, while the ECB, as the €STR administrator, publishes the rate before 09:00 each day, based on eligible transactions concluded on the previous business day.

Table 1 shows a comparison between the two interest rates.

4.3 Pre-€STR

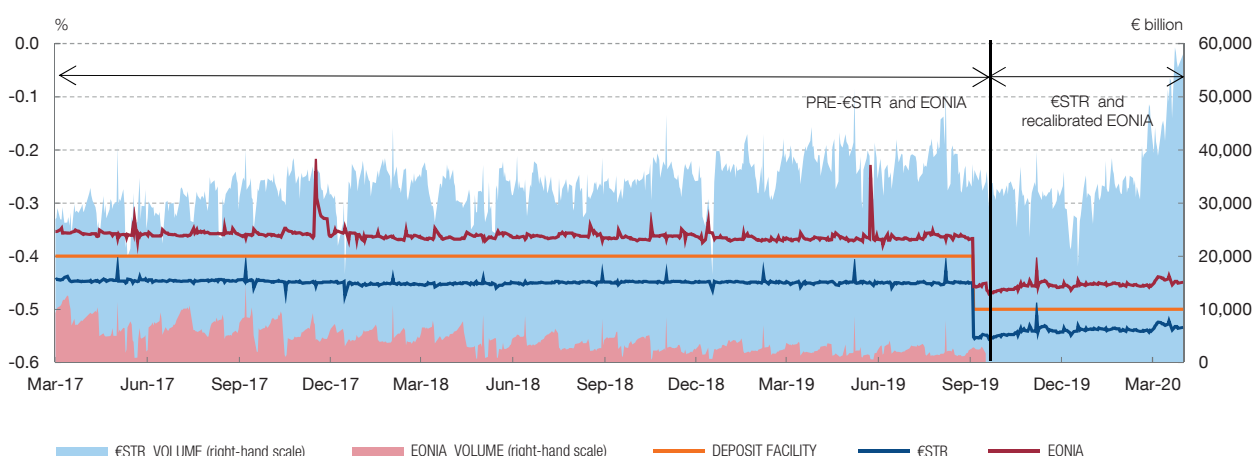
Before the launch of the €STR and as a result of the two public consultations conducted in 2018, it became clear that institutions needed a preliminary benchmark, referred to as the pre-€STR.²⁴ The new data helped to reduce market uncertainty and allowed participants to familiarise themselves with the statistical properties of the new benchmark and to adapt their processes to the transition to the new rate.

²³ The ECB offers counterparties two standing facilities: the marginal lending facility, which provides credit against the presentation of collateral, and the deposit facility, in which banks may voluntarily deposit their surplus liquidity. The interest rates on these facilities provide a ceiling and a floor for the overnight interbank market rate.

²⁴ See [press release on the pre-€STR](#).

Chart 2

EONIA AND €STR: INTEREST RATES AND VOLUMES



SOURCES: European Central Bank and Banco de España calculations.

However, the publication of the pre-€STR was purely informative and the data were under no circumstances to be used as a benchmark in any financial contract.

Calculation of the pre-€STR was also based on MMSR data, using the same methodology as that defined for the €STR. In the summer of 2018, the ECB published a data series going back to 15 March 2017 and announced that, from that date, it would publish daily data in its Statistical Data Warehouse,²⁵ once each minimum reserve maintenance period had concluded (see Chart 2).

4.4 Launch of the €STR and new methodology for EONIA

After several months of internal testing, the ECB finally published the €STR for the first time on its website²⁶ on 2 October 2019, based on transactions conducted on the previous day. Since then, the rate has been published without having to apply contingency arrangements or to subsequently revise data leading to a correction of the first €STR data published that day, always based on the previous business day's trading activity.

In order to explore the possible transition paths from EONIA to €STR, the WG RFR conducted a survey among market participants. The feedback received²⁷ reveals a preference for restricting the use of EONIA until it is definitively phased out on

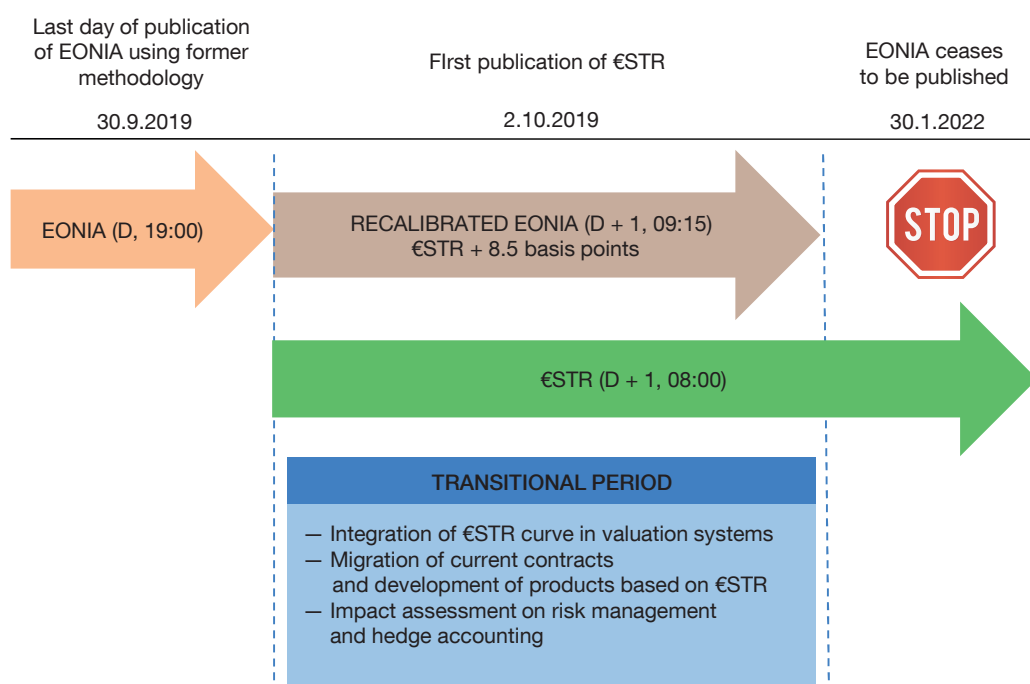
25 ECB's Statistical Data Warehouse.

26 See daily publication of the €STR.

27 See feedback on the WG report on the transition from EONIA to €STR.

Figure 1

TIMELINE OF TRANSITION FROM EONIA TO €STR



SOURCES: European Central Bank and own preparation.

3 January 2022. Additionally, following a public consultation, in March 2019 the WG RFR recommended that the EMMI, as the administrator of EONIA, modify the calculation methodology for the transition period, so that it consisted of the €STR plus a spread. In response, the EMMI announced that it would start using the methodology recommended by the WG RFR following the first publication of the €STR. Thus, the €STR and EONIA, recalibrated using the new methodology, will coexist during the transitional period. This will allow users with contracts referencing EONIA and maturing beyond 31 December 2021 to adapt their methodology to the €STR, both from an operational standpoint, and from a legal, accounting and risk management perspective. (See Figure 1)

The ECB calculated the fixed spread for the recalibration of the new EONIA following the WG RFR’s recommendations. These consisted of calculating a simple average of the spreads observed over a one-year period, from 17 April 2018 to 16 April 2019, but excluding the lowest and highest 15% of observations so as to avoid unwanted outliers in the series. In May 2019, coinciding with the EMMI’s announcement of the change in EONIA’s methodology, the ECB announced that the fixed spread would be 8.5 bp²⁸ (0.085%), applicable from 2 October 2019 until 3 January 2022. The recalibrated EONIA is published daily at 09.15.

28 See [press release on the spread between €STR and EONIA](#).

5 Working group for the study of risk-free interest rates

As noted above, in September 2017 the ECB, the FSMA, the ESMA and the EC established the WG RFR, led by the private sector, to identify and recommend alternative risk-free rates for the euro. Such rates will additionally serve as a basis for constructing forward curves that could be used as alternatives to the benchmark rates used in a variety of financial instruments and contracts in the euro area. The WG RFR has also created a transition plan for legacy contracts referencing the previously used benchmarks.

5.1 Composition and work streams

The working group is made up of 26 credit institutions, including 21 voting members and five non-voting members, together with another two institutions as invitees. A further four institutions (the FSMA, ESMA, ECB and EC) have observer status.²⁹ The ECB is tasked with coordinating the Secretariat. The working group's structure has changed over time, and new subgroups have been created to address needs as they have arisen, be they preparing and selecting the appropriate benchmark rate, drafting recommendations, or defining possible calculation methodologies for the forward curve and fallback rates.

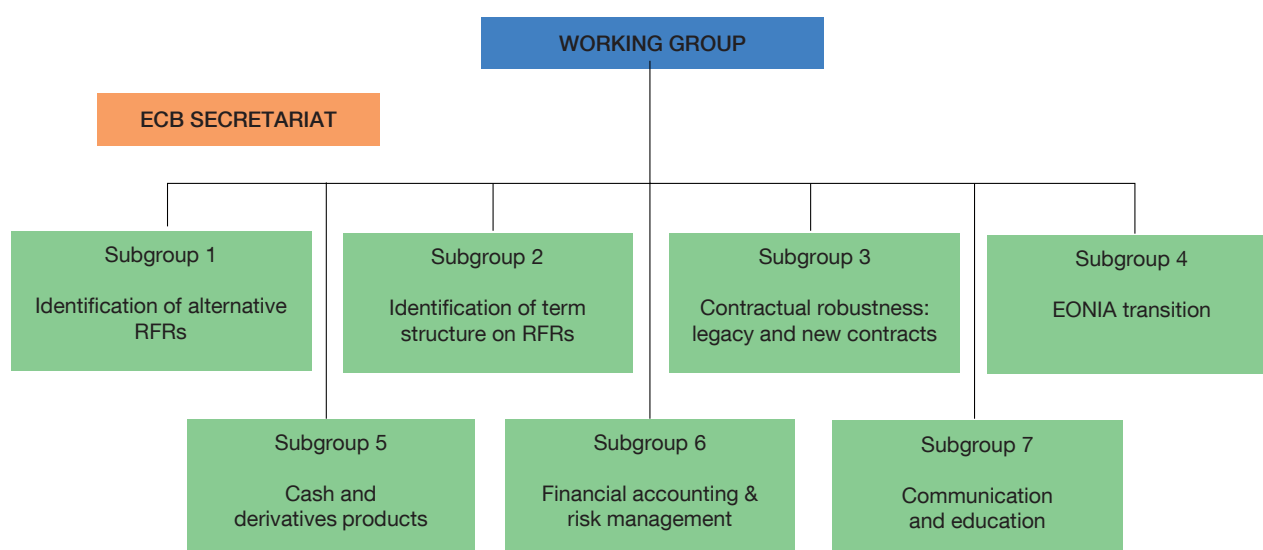
Three work streams related primarily to the development of the €STR were initially defined: identification of risk-free rates, methodological matters and matters related to compliance with the IOSCO principles and the BMR. This structure was expanded in February 2020 to encompass a total of seven work streams, with varying levels of activity as and when required. Each subgroup has been assigned specific terms of reference, such as ensuring the robustness of legacy and new contracts, the transition of cash and derivatives contracts, and risk management and financial accounting; a final subgroup is tasked with communicating and raising awareness of the work required to ensure a smooth transition (see Figure 2).

5.2 Guidance of the WG RFR for the transition of contracts and products referencing EONIA to the €STR

In order to minimise disruption to the market and consumers and to safeguard the continuity of contracts, the WG RFR has launched a transition path to move from EONIA to the €STR through various approaches, with the aim of addressing the legal implications for new and legacy contracts. The working group has also published various reports setting out its recommendations for the change in the benchmark from contrasting standpoints with a view to standardising the transition to the €STR for the market.

²⁹ See [composition of the WG RFR](#).

Figure 2

STRUCTURE OF THE WG RFR AND ITS SUBGROUPS

SOURCES: European Central Bank and own preparation.

The working group published a legal action plan³⁰ in July 2019, following a consultation of market participants. Among other considerations, the working group recommends, whenever feasible, avoiding entering into new contracts referencing EONIA, in particular those maturing after 31 December 2021. Furthermore, in contracts referencing EONIA and maturing after the discontinuation of this rate, the working group recommends replacing the benchmark rate as soon as possible or embedding fallback provisions. Additionally, for transparency purposes, the working group recommends that contracts signed before October 2019 include a clause acknowledging the change in methodology and clarifying that references to EONIA shall be understood to be references to EONIA as changed, unless otherwise agreed by the parties. Although such acknowledgement is not strictly necessary for ensuring the transition, it enhances transparency.

Since 1999 EONIA has been widely used both as a reference rate and as a collateral remuneration and cash flow discounting rate for financial products. Consequently, the working group considered its report on the impact of the transition on cash and derivatives products, published in August 2019, to be a key milestone.³¹ The report highlights the need for market participants to adapt their IT systems and review the current documentation, processes and procedures, product structures and terms of application of all contracts. The report takes a highly practical approach, presenting recommendations for dealing with the change in EONIA's publication time (from

³⁰ See [WG recommendations on the legal action plan](#).

³¹ See [report on the impact of the transition on cash and derivatives products](#).

19:00 on T to 09:15 on T+1) and the period of transition from the recalibrated EONIA to €STR (between 2 October 2019 and 3 January 2022). It also sets out alternative proposals from operational and financial product valuation standpoints, based on general market practices, and analyses the implications for EONIA-based valuation models.

This report was updated in February 2020³² to provide guidance on how to ensure a liquid €STR cash and derivatives products market. Transferring the liquidity already present in EONIA market to products referencing the €STR is considered essential. The report provides clarification around some topics that have been discussed since the July report and stresses that continuing to reference EONIA in contracts with maturities beyond January 2022 entails significant risks; planning a smooth transition for each product is therefore recommended.

In October 2019, the working group issued its recommendations on the risk management implications of the transition from EONIA to the €STR and the introduction of fallbacks for EURIBOR based on a €STR-based term structure.³³ This report includes an analysis of the major risks identified, as summarised in Figure 3, and an assessment of their impact, focusing chiefly on interest rate risk, their implications for valuation and regulatory aspects. Although EURIBOR will continue to be provided under its reformed methodology, its use needs to comply with the requirements of the BMR. As a contingency measure to avoid financial instability, the BMR requires EU supervised entities to produce and maintain robust detailed plans setting out the main actions they will take in the event that a benchmark changes or ceases to be provided, including fallbacks. This means that supervised entities must include a fallback rate for EURIBOR in their written plans and contracts where feasible and appropriate. The report focuses mainly on the risk management implications for banks and on the various challenges facing the asset management and insurance sectors. The recommendations should be considered in conjunction with EONIA to €STR legal action plan and the report on the impact of the transition on cash and derivatives products referred to above.

Furthermore, in November 2019, the WG RFR issued its recommendations on the financial accounting implications of the transition from EONIA to the €STR and the introduction of fallbacks for EURIBOR based on a €STR-based term structure.³⁴ This report highlights the possible impacts and focuses on the implications for hedge accounting.

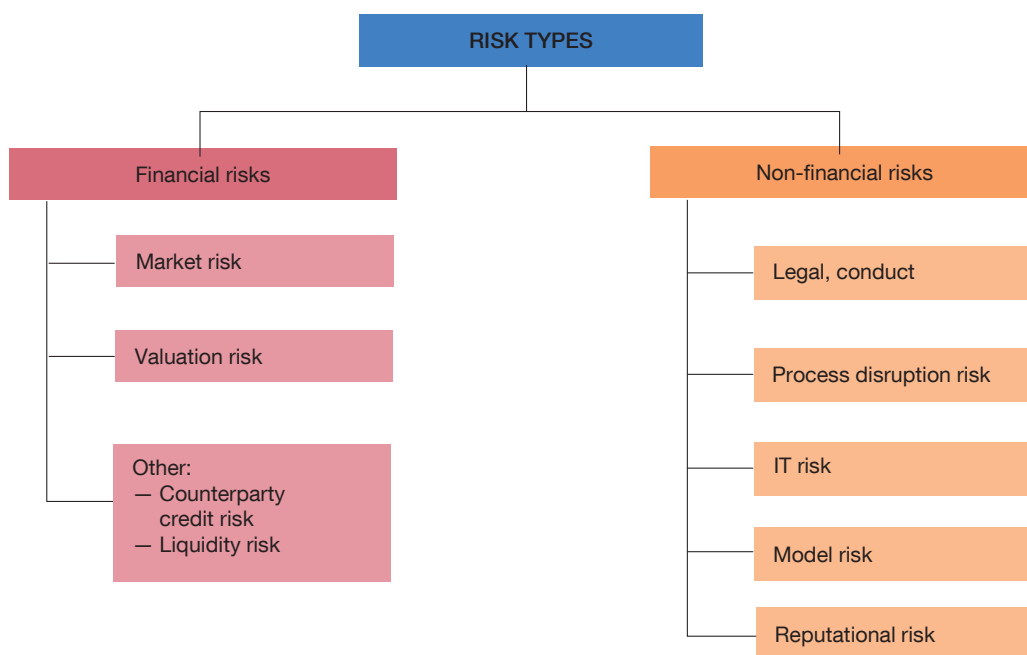
Lastly, also in November 2019, the working group published guidance for entities so that they have comprehensive detailed plans in the event that a benchmark changes

32 See [additional considerations to the report by the WG RFR on cash and derivatives products](#).

33 See [report on the risk management implications of the transition from EONIA to the €STR](#).

34 See [report on the financial accounting implications of the transition from EONIA to the €STR and the introduction of fallbacks](#).

Figure 3
RISK TYPES IDENTIFIED BY THE WG RFR



SOURCES: European Central Bank and own preparation.

or ceases to be provided³⁵ (requirement of the BMR). The report describes the €STR fallback arrangements when this index is used as a benchmark in contracts. Two options are analysed: (i) including, as a fallback for the €STR, one of the alternative rates that were considered in the public consultation before the €STR was selected as the new risk-free rate,³⁶ or (ii) taking into account the reviews of the €STR that the ECB will conduct on a regular basis, as well as the policies and procedures to be followed in the event of the possible cessation of the €STR. The working group ultimately concluded that the second option, combined with the recommendations included in EONIA legal plan,³⁷ provided sufficient contingency as fallback measures for the €STR.

6 Challenges going forward: the development of €STR-based markets and the introduction of fallbacks in contracts

All of the foregoing recommendations from the WG RFR will have to lead to concrete action by the entities concerned. Although the competent authorities (the ECB,³⁸ together with the National Securities Market Commission (CNMV) and the Banco de

35 See report on €STR fallback arrangements.

36 See public consultation on the new euro risk-free rates.

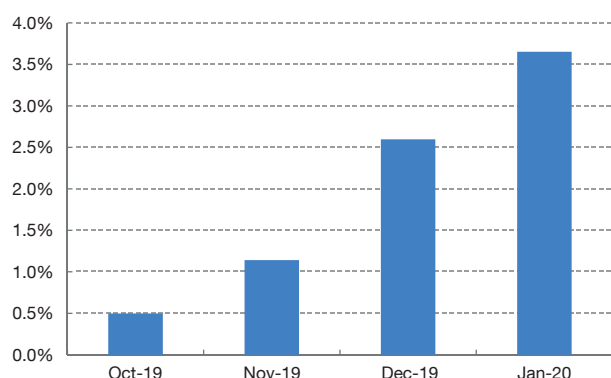
37 See WG legal action plan from EONIA to €STR.

38 In its role as supervisor of significant institutions.

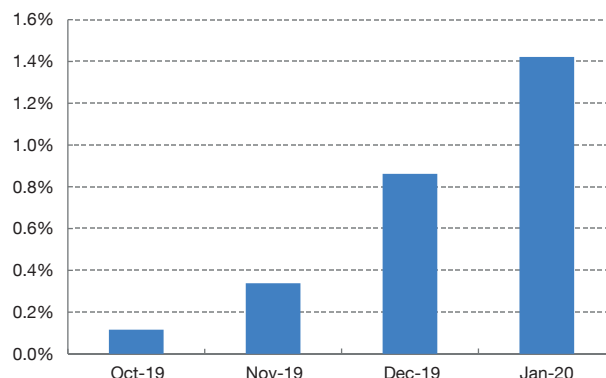
Chart 3

GRADUAL INCREASE IN OIS REFERENCING THE €STR

1 PERCENTAGE OF EUR OIS VOLUMES LINKED TO €STR



2 PERCENTAGE OF EUR OIS OUTSTANDING LINKED TO €STR



SOURCE: European Central Bank, based on data published by LCH.

España in the case of Spanish entities) can instigate and ease the way for a smooth transition, it is market agents who must implement the necessary changes and adapt to regulation in the most efficient manner possible.

Among the most pressing challenges is the development of a liquid, robust derivatives market based on the new overnight interest rate €STR, by harnessing the markets and infrastructure already in place for EONIA. Significant progress has been made in this regard in recent months. At end-2019, two of the largest clearing houses in the European Union, LCH and Eurex Clearing, announced that they would begin to clear €STR-based derivatives. This became a reality in October 2019, when the first swaps benchmarked to €STR were cleared by LCH.³⁹ This market is beginning to be developed, as shown by the gradual increase in the volume of interest rate derivatives benchmarked to €STR⁴⁰ (see Chart 3).

Furthermore, the WG RFR has encouraged central counterparties to make headway on two very important aspects: collateral remuneration and the use of a discounting curve, both based on the €STR. At present, counterparties trading OTC⁴¹ derivatives through a clearing house may post collateral in the form of euro-denominated liquidity, which uses EONIA as the collateral remuneration rate, meaning that the discounting curve used for calculating the present value of these contracts is based on this interest rate. However, both LCH and Eurex Clearing have already announced their intention to benchmark the discounting curve used for pricing their OTC

39 See [LCH's press release on clearing €STR swaps](#).

40 See [IRS turnover](#).

41 Over-the-counter; bilateral operations tailored to parties on the basis of their interests, unlike standardised trades listed on organised markets.

derivatives to the €STR.⁴² Other clearing houses have followed their lead⁴³ and all central counterparties are expected to switch to the new index on the same date, in theory on 27 July 2020.

In October 2019 the International Swaps and Derivatives Association (ISDA)⁴⁴ published two documents setting out definitions for using the €STR as a floating rate in derivatives contracts and for embedding €STR-based fallbacks into derivatives which reference EONIA.⁴⁵

The European Investment Bank issued its first €STR benchmark on the primary market⁴⁶ in October 2019, comprising a three-year bond with a nominal amount of €1 billion and a variable coupon of €STR + 200 basis points. This first operation has been followed by other variable-rate issuances referencing the €STR by commercial banks.

Furthermore, in December 2019 RepoClear, an LCH Group company, announced that it had cleared the first variable-rate repo referencing the €STR on the secured money market.

Another aspect of particular importance is that of fallbacks for contracts referencing EONIA and EURIBOR. Article 28(2) of the BMR requires entities to have written plans setting out the specific actions that they would take in the event that a benchmark ceases to be provided. Such plans must include alternative benchmarks that could be used to substitute the primary rate. In the case of EONIA, the working group only recommended the €STR as the fallback rate.

The development of a €STR-based term structure serving as a fallback for EURIBOR at its different time horizons is particularly significant. In this case, using a forward curve or a €STR-based temporary structure is recommended and the matter is being examined from two different approaches. First, in March 2019 the working group issued a recommendation for the development of a €STR forward curve based on OIS quotes, and invited benchmark administrators to present their proposals on this matter.⁴⁷ Five administrators⁴⁸ responded to the invitation and presented their proposals in October 2019.

Second, in August 2019, the working group presented an analysis of the viable methodologies based on the realised €STR for constructing a term structure.⁴⁹ Both

42 See [Eurex circular on discounting switch on OTC market](#).

43 See [CME proposal on the discounting change in derivatives](#).

44 See [ISDA website](#).

45 See [ISDA €STR-based fallbacks](#).

46 See [EIB €STR benchmark bond issuance](#).

47 See [call for expressions of interest from benchmark administrators to present their candidacy for developing a forward-looking curve](#).

48 The administrators were: EMMI, FTSE Russell, ICE, Refinitiv and IHS Markit.

49 See [the analysis of the viable methodologies based on the realised €STR in order to construct a term structure](#).

approaches, i.e. using methodologies that include expectations (forward looking) and those based on realised rates (backward looking), are currently under consideration in order to determine which is the most appropriate for cash and derivatives products referencing the €STR.

7 Conclusions

Developments over the last decade in relation to the main benchmarks have prompted arrangements and legislation to be put in place geared towards preventing, as far as possible, manipulation of indices. The sharp decline in the trading of some instruments and dysfunctional money markets triggered by the financial crisis which began in 2007 led to a loss of representativeness for EONIA as a reference in ECB decision-making.

Both developments have resulted in the creation of the €STR, a new overnight benchmark rate for the unsecured market administered by the ECB.

In parallel, a group of supra-national institutions and a sizeable delegation of private credit institutions at European level established a working group, with the help of the ECB, in order to identify risk-free rates and plan the smooth transition of markets and contracts thereto.

The period of transition from EONIA to the €STR is still ongoing, with just over a year and a half to go until the last day of publication of EONIA (3 January 2022). Among the most pressing matters is the legal transition of legacy contracts referencing EONIA, in particular those maturing after December 2021. EONIA will also need to be gradually replaced by the €STR in all new contracts.

The transition of contracts referencing EONIA to the new interest rate presents fundamental implications for various matters, such as accounting by entities and (financial and non-financial) risk management.

Of vital importance at present is the development of €STR-based markets and financial products that also help to create a forward curve. Moreover, numerous efforts are under way to introduce fallbacks in contracts referencing the €STR and EURIBOR.

The transition to new reference interest rates is a reality and is leading to a huge collaborative effort between national authorities and financial market participants, along with international authorities and organisations, in order to ensure a smooth transition and minimise risks as far as possible, specifically those that could affect financial stability. Thanks to the efforts of the WG RFR, the active participation of the various market agents, and the involvement of national competent authorities, notable progress has been made in the transition from EONIA to the €STR, although there is admittedly a long way to go until it can be considered to have been completed.

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ISSN: 2605-0897 (electronic edition)