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Digitalisation and banking: new risks and three scenarios for the European banking system of the future

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DIGITALISATION AND BANKING: NEW RISKS AND THREE SCENARIOS FOR THE EUROPEAN BANKING SYSTEM OF THE FUTURE

Abstract

This article discusses the impact of digitalisation on the structure of the European banking system. The recent wave of financial innovation, based on the opportunities created by digitalisation in terms of new products or new services, has come mostly from outside the incumbent banking system. How new financial service providers (fintechs and big techs) compete or cooperate with incumbent banks has the potential for substantial disruption in the provision of financial intermediation. As a result, financial risks may be partially shifted away from the banking sector, while non-financial risks increase their relevance. In order to better frame a policy response, we consider three scenarios for the future European banking system: (i) incumbent banks continue their dominance; (ii) incumbent banks retrench; and (iii) retail central bank digital currencies are introduced under certain specifications.

Keywords: banking, digitalisation, non-financial risk, financial innovation, fintech, big tech, systemic risk.

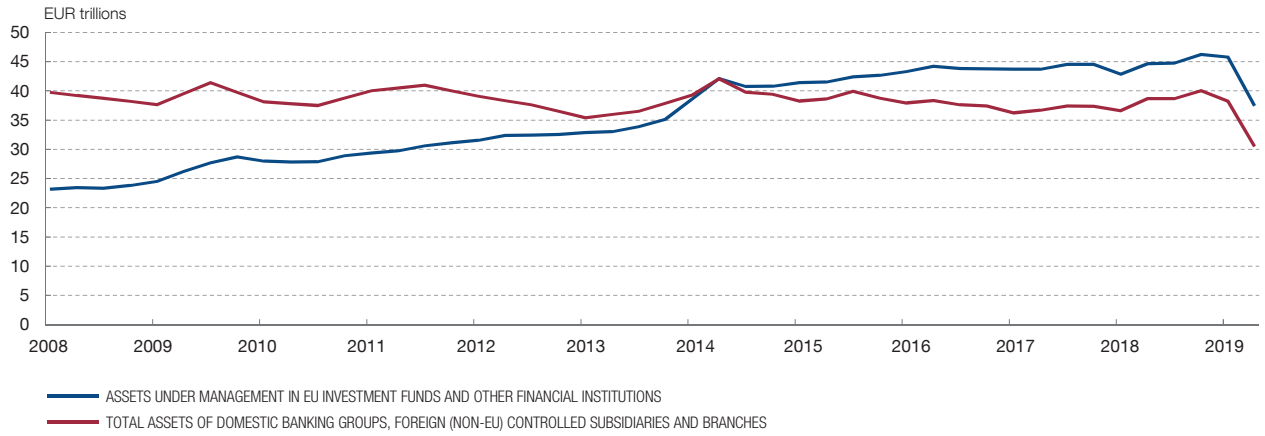
1 Introduction

Since the global financial and European sovereign debt crises, the European banking system has received increased attention from regulators and market participants. The global financial crisis led to an accumulation of non-performing loans in the balance sheet of European banks, which took years to address [see Council of the European Union (2017)]. Soon afterwards, the European sovereign debt crisis revealed the close links between banks and their sovereigns, and their potential to cause and amplify systemic risk [see European Systemic Risk Board (2015)]. In addition to it, a macroeconomic environment of low growth, low interest rates and low inflation has brought to the forefront existing vulnerabilities in the business model and the efficiency of European banks [see Committee on the Global Financial System (2018) and European Systemic Risk Board (2021)].

These developments have co-existed with the structural phenomenon of the high weight of banks in the EU financial system, usually referred as “overbanking”, which may lead to lower growth and higher systemic risk [see Pagano et al. (2014)]. Even if the EU banking sector has reduced the size of its balance sheet (see Chart 1) and a certain retrenchment of cross-border activities has also been observed since 2008 [see Portes et al. (2020)], the perception of an excessive reliance on banks for the provision of financial services in Europe remains. In parallel, assets under management of non-bank financial intermediaries have more than doubled between

Chart 1

ASSETS UNDER MANAGEMENT OF INVESTMENT FUNDS ANS TOTAL ASSETS OF EU BANKS



SOURCES: European Systemic Risk Board and European Central Bank.
Notes: The blue line represents assets under management of EU investment funds and other financial institutions, as reported in the 2020 Non-Bank Financial Intermediation Risk Monitor [see European Systemic Risk Board (2020)]. Data on the size of the banking system are taken from Consolidated Banking Data, including domestic banking groups, stand-alone banks and foreign (non-EU) controlled subsidiaries and branches, irrespective of their accounting framework. Consolidated banking data have been reported quarterly only since 2015, so linear extrapolation has been used for values before that year. Both time series end in 2019 to keep a constant sample of EU countries.

2008 and 2019 (see Chart 1). While this increases risk sharing across the financial system,[1] it also implies that niches of banking business models that were seen as stable and secure for banks are currently facing increased competition from other non-bank financial institutions. In this regard, it is important to note that the capital markets union initiative launched by the European Commission in 2014 may also affect the future of the banking sector in the EU, as it aims to expand access to non-bank sources of funding.

The European banking system is also challenged by two societal changes going beyond the financial system: digitalisation and climate change. Starting by the latter, in recent years, society has gained a better understanding of the consequences of climate change for the planet. Climate change may also affect banks: for example, assets in their balance sheets (or assets of borrowers or bond issuers that financial institutions are exposed to) may become stranded and see large decreases in their prices [see also Financial Stability Board (2020)]. Moving to digitalisation, it affects the way banks produce and provide financial services to their customers, and it also brings new institutions into the production and provision of financial services.[2] If digitalisation breaks or substantially reduces the importance of physical proximity

1 Even if financial risks (credit risk, liquidity risks and others) may shift to areas with lighter regulation than the banking system.

2 Banks have been intensive users of IT systems for decades. In the US, the largest banks spend an average of 10 billion USD per year on IT. In Europe, the IT costs of 80% of European banks under the Single Supervisory Mechanism were above 3% of operating income in 2020. Hence, the need to incur into additional IT expenses due to digitalisation should not be perceived as disruptive per se.

between a bank and its customers, competition may drastically change, affecting incumbent banks and shaping the future structure of the banking market [see Vives and Ye (2021)]. Similarly, if digitalisation reduces the value of banks' data on customers compared with data that other potential financial service providers have available (such as big tech companies), this might reduce traditional banks' franchise value.

In addition to it, the COVID-19 pandemic has severely affected economic structures and its impact on the banking sector may touch the core business models and operations of banks. Furthermore, digital transformation in banking may have been accelerated by the pandemic. The combination of banks being forced to accelerate the digital transition with their important role in providing support to the economy during the most acute phase of the pandemic might have pushed some banks to accelerate and/or consolidate their transformation process.

Against this background, this article discusses the impact of digitalisation on incumbent banks' and how the EU banking sector may look like in 2030, drawing policy implications from it. The entry of fintechs and big techs in the business of financial intermediation has spurred a remarkable effort to assess how the banking sector can be affected in the long-term. Digitalisation has an immediate impact in terms of competition and contestability of banking services, requiring an adaptation of the traditional business model of banks [see, among others, Boot (2017) and Vives (2020)]. It affects the traditional bank business model because specialised new institutions can take away from banks activities that do not require a depositor base, such as payments, and digital platforms may diminish the intermediation role of banks in lending [see Stulz (2019) and Boot et al. (2021)]. While there seems to exist consensus on the change to existing banking business models triggered by digitalisation, the accurate picture of how the provision of banking services may look like in the future is still dominated by uncertainty [see Frost et al. (2019) and Cecchetti and Schoenholz (2020)].

In this article, we approach the discussion from a financial stability perspective, but try to identify other relevant issues for, among others, microprudential supervision and consumer protection. Our contribution can be framed within two areas: the evolution of financial and non-financial risks in a financial system where fintechs and big techs are present, and the policy actions to be taken already now to address adverse developments under different scenarios for the banking system over the medium-term. The next section discusses briefly the main characteristics of the most recent wave of innovation in the financial system. Then, we identify the challenges for financial stability, with particular detail to the higher importance of non-financial risks. To address existing uncertainty about the ultimate impact of digitalisation in the banking system, we define three plausible scenarios for the European banking system in 2030, which we use as basis for discussing the appropriate macroprudential responses in the last section of this article.

2 Digitalisation and the recent wave of innovation

Innovation has been a constant feature of the financial sector in the last decades, leading to the development of new products (for example, derivatives), new technologies (such as credit scoring or automated teller machines, ATMs) and new financial institutions (like exchange traded funds, ETFs). The recent wave of innovation has been driven by advances in telecommunications and information technology and has significantly increased the capacity to process information and the ability to connect with economic agents.

There are three key specific technological advances in the current wave of financial innovation: (i) smart phone technology, the internet and application programming interfaces (APIs); (ii) artificial intelligence (AI) and big data technology; and (iii) distributed ledger technology (DLT) [see Allen et al. (2020), Martínez Resano (2021) and Beck et al. (2022)].

First, mobile phones (especially smart phones), the internet, and APIs have enabled quicker information exchanges, new delivery channels (away from traditional branch models), and better exploitation of economies of scale. This has allowed the entry of new payment service providers, such as mobile phone companies offering mobile money. Consumer credit and payment services are the main products marketed or distributed through digital platforms [see European Banking Authority (2021)]. Competition has also been affected by the internet, as, for example, customers can compare products and prices of different financial services across providers and certain platforms enable retail customers to shift deposits across banks as conditions change. APIs can also increase the interoperability and interconnectivity between systems and applications of different service providers, especially in the context of cross-border interactions.

Second, the information technology revolution, including the rise of cloud computing, has facilitated the creation, processing, and use of big data and applied statistics for measuring and managing financial risk [see Beck et al. (2022)]. These technologies should reduce loan origination costs and possibly minimise asymmetric information between borrowers and lenders, expanding the range of potential customers of banks and increasing the availability of credit supply. Some studies show that big data can be more useful in predicting default patterns than more traditional approaches, such as banks merely relying on credit registry data [see Jagtiani and Lemieux (2018), Frost et al. (2019), Björkegren and Grissen (2020)]. AI and big data may also be used in other relevant banking activities, such as fraud and cyber incident monitoring, anti-money laundering, and compliance checks, or by other financial institutions, such as insurance corporations and investment funds.[3]

3 For example, big data can be used for measuring underlying insurance risk more precisely, enabling more insurance contracts to be issued at lower costs, thus completing markets and expanding insurance markets both on the intensive and extensive margins. Besides, robo-advising leverages data provided by investors to construct and manage a tailored and appropriate investment portfolio for them.

Traditionally, banks have enjoyed an important informational advantage over other financial intermediaries, because they had access to proprietary data across different financial services. The introduction of big data could reduce or even remove this. Online non-financial service providers have access to a wealth of personal data, which could be used to assess more accurately a client's borrowing capacity and risk profile than with the use of traditional banking data.

The third technological advance is distributed ledger technology (DLT), which describes decentralised data architecture and cryptography and allows the keeping and sharing of records to be synchronised while ensuring their integrity through the use of consensus-based validation protocols. The most prominent DLT has been blockchain, which was introduced as a method of validating ownership of the cryptoasset bitcoin [see Nakamoto (2008)]. It is a decentralised distributed database that maintains a continuously growing list of records locked into a chain of hacking-proof 'blocks' [see Beck et al. (2022)]. Although cryptoassets have caught the attention of many investors, there has been a trend towards stablecoins, which are cryptoassets that are pegged to another asset (such as the US dollar) and whose value is guaranteed by holdings of sufficient reserves in these assets, similar in construction to a currency board. Following the increasing importance of private cryptoassets, central banks around the world have started exploring the value of central bank digital currencies for retail customers [see Bindseil et al. (2021)].

3 Challenges for financial stability

Digitalisation, in addition to enabling banks to work almost entirely through the internet and with a very limited number of branches, has resulted in the creation of new intermediaries such as peer-to-peer lending platforms and payment service providers. It has also allowed some non-financial corporations to enter the financial services markets, with mobile network organisations and big technological companies (such as Ant Financial, Amazon and Facebook) being prime examples. These new financial services providers can basically cooperate or compete with incumbent banks and such interaction can introduce substantial disruptions in the provision of financial services in Europe.[4] The new configuration of the financial system can also lead to a shift of financial risks across entities or to the emergence of new risks, some of which may not be adequately captured by the current regulatory framework.

4 The appearance of new financial intermediaries due to innovation is not a new phenomenon in financial history, as previous waves of innovation have also been characterised by the emergence of many new institutions and intermediaries over the centuries, often addressing new customer demands or regulatory constraints.

3.1 New competitors for incumbent banks

A typical classification of the new institutions that have entered the banking market following the recent wave of financial innovation defines them as fintechs or big techs. According to the Financial Stability Board, fintech is 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". Fintech companies would thus be providers using such new processes and providing new services, disrupting traditional providers. Big techs, on the other hand, are defined as "large technology companies with extensive established customer networks" [see Financial Stability Board (2019a and 2019b)]. Google, Facebook, Apple, Amazon, Alibaba and Tencent would be examples of big techs.

Fintechs have shown impressive growth in the last years [see Martínez Resano (2021)]. They typically offer a specific financial service targeted at a specific clientele, which they perceive as under- or non-served by incumbent institutions. Even if they are individually of small size and mostly specialised in certain financial services, in aggregate, they cover a diverse group of financial services (see Chart 2). Although initially seen as competitors to incumbent banks, they are increasingly perceived as a complement to banks, with banks offering start-up fintech accelerator hubs and investing in or even acquiring fintechs. The different capacities of banks and fintechs to comply with a wide array of regulation (not only prudential regulation , but also anti-money laundering, data privacy and consumer protection) may be one explanation for this change in the perception of fintechs from competitors to complements.[5]

Big techs have potentially big advantages compared with banks and fintechs, as they combine all the technical capabilities of fintechs and the scale (financial capacity, existing customers) of large incumbent banks. These advantages of big techs vis-à-vis fintechs and banks can be captured by data analytics, network externalities and interwoven activities (called their "DNA") [see Bank for International Settlements (2019)]. The value from participating on one side of a platform (for example, as a seller) increases with the number of participants on the other side of the platform (i.e., buyers). The increasing number of participants in the platform allows the Big tech to collect more data, which, once analysed, can improve the existing services and attract new users to the platform. In this process, big techs become dominant in their businesses and could be able to expand into new lines of business, such as the provision of financial services. Big techs can thus follow an envelopment strategy by moving from non-financial to financial services [see De la Mano and Padilla (2018) and Beck et al. (2022)].

5 It is difficult to estimate of the costs of regulatory compliance for banks, but they are certainly not negligible, particularly for smaller institutions. An estimate for US banks sets the cost of compliance as 8% of non-interest expenses for small banks (total assets below USD 1 billion) and 3% for medium-sized banks (total assets between USD 1 billion and USD 10 billion) [see Dahl et al. (2016)].

Chart 2

DISTRIBUTION OF FINTECH FIRMS IN THE EURO AREA BY CLUSTER OF ACTIVITY

SOURCE: European Central Bank [see European Central Bank (2020)].
NOTES: Data are based on an ECB experimental collection. Clusters of activities as defined by the European Banking Authority [see European Banking Authority (2017)]. One entity is allocated to one cluster only.

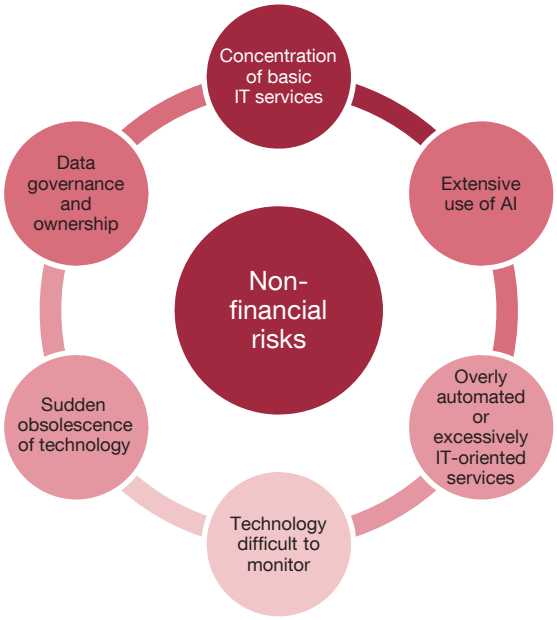
One important aspect here is how incumbent banks could interact with fintechs and big techs, an area still dominated by uncertainty. In the case of big techs, they could decide to enter into the provision of financial services in cooperation with incumbent banks or through their own financial subsidiary. Through cooperation, the risk of disruption to the current structure of the banking system seems smaller, although banks may see a decrease in their profits as they would need to share at least part of their income with big techs. If big techs decide to enter the banking industry with their own subsidiaries, banks may react by increasing their risk appetite in order to defend their dominant position in the market. Initiating such a Red Queen Race could have detrimental effects for financial stability. Ultimately, the main issue would be whether the credit provided by fintechs and big techs would replace or complement bank credit. The policy implications would be quite different depending on which of the two possibilities prevails.

3.2 Financial risks and new non-financial risks

Before discussing policy implications from the entry of fintechs and big techs into banking activities, it is necessary to reflect on how they can affect existing and identified financial risk and lead to the rise of new non-financial risks.

New institutions operating with bank-like intermediation models would be exposed to the already identified known risks in banking (liquidity risk, credit risk, market risk, etc.), affecting, in turn, system-wide risk. As noted above, incumbent banks may take greater risks to compete with fintechs and big techs, increasing the overall level

Figure 1
NON-FINANCIAL RISKS STEMMING FROM DIGITALISATION IN BANKING SERVICES



SOURCE: Authors' elaboration.

of risk. While more competition could enhance stability over the long term, concentration (particularly with big techs) could result in new too-big-to-fail institutions, and a stronger focus on transaction-based intermediation could make the system more procyclical [see Beck et al. (2022)]. Furthermore, cooperation between big techs and incumbent banks might lengthen intermediation chains, moving them towards the originate-and-distribute model, which raises concerns about incentives and risk distribution [see Purnanandam (2011)].

In addition to financial risks, which are mainly covered by prudential regulation, digitalisation also poses significant non-financial risks, both to banks and to new service providers (i.e., fintech and big techs). Currently, non-financial risks are only indirectly captured by the prudential framework. The following paragraphs discuss some of these non-financial risks [see Figure 1 and also Beck et al. (2022)].

The first risk relates to the increased concentration of the provision of basic IT services, such as cloud computing, over a small number of providers [see Financial Stability Board (2019b)]. This risk is mainly affecting banks and fintechs, which are increasingly using the same small group of cloud service providers to build their IT infrastructures. As a result, in addition to the underlying IT risk stemming from the IT environment, these financial institutions may be gaining exposures to a small number of providers of IT services, which may even be located in countries outside their jurisdiction. Disruptions of one of these key IT service providers could adversely affect several banks and fintechs simultaneously.

The second risk stems from the extensive use of AI in finance [see Buckmann et al. (2021)]. AI algorithms are complex to understand by humans and they are not free of flaws. For instance, they may include subtle biases, inaccurate data and feedback loops whereby AI models jointly drive trends, similar to herding behaviour among investors.[6] As a result, AI algorithms may give the impression of delivering better outcomes than they are doing in reality. Financial institutions may therefore misprice financial services that rely heavily on AI algorithms, driven by a false sense of security. This is an area where supervisory authorities should build strong expertise coupled with methodologies for the supervision and control of these models.

Third, overly automated or excessively IT-oriented services may increase market fragility. While one of the main benefits of APIs is that they allow communication between different software applications, expanding the provision of financial services to underserved niches, they can also lead to risks of operational failure or vulnerability to cyberattacks. These risks can propagate quickly through the system, increasing market fragility. Furthermore, when APIs are combined with smart phones, there could be risks of introducing errors and undetected vulnerabilities with any new IT redeployment.

The fourth risk arises from trust in a technology that is difficult to monitor and prone to cyber crime. This risk affects banks when they use, for example, screen, web and data scraping to collect transactional data of economic agents to assess their credit worthiness, and is exacerbated when moving to unsupervised financial institutions offering financial services. In general, excessive reliance on IT and automatised systems, without human intervention, may offer new possibilities for cyber crime and money laundering, as it may be really difficult for supervisory authorities to follow money flows across jurisdictions. In view of this risk, microprudential and conduct authorities should focus on strong internal controls on Know Your Customer (KYC) procedures in all types of financial institutions offering financial services.

The fifth risk relates to the replacement of a central authority in control of a process by a leading technology that is subject to suddenly becoming obsolete. Although converting legacy to modern IT systems can eliminate latent vulnerabilities, even current leading technologies may become obsolete in the future (or even fail to respond to the new needs of economic agents), creating additional risks for financial institutions. In the particular case of payment systems, the structural risk from potential technological obsolescence is amplified by situations where users are principally placing their trust in technology rather than in the existence of a central authority that might be expected to stand behind the payment system in question and to which to recur in case of problems.

6 In the area of consumer protection, biases in AI algorithms could result in discrimination against certain groups of customers.

Last but not least, an inadequate approach to data ownership and governance may create risks for consumer protection and financial stability. Incumbent banks have traditionally enjoyed a competitive advantage against other financial institution as a result of the availability of customer data. The potential entry of new institutions with more up-to-date data capabilities into the financial system and developments in the field of "open data" may have repercussions on the supply of financial services [see He et al. (2020)] and create additional risks if existing structures of data governance and ownership are not timely updated. In the current regulatory framework, defined by the revised Payment Services Directive (PSD2) in the EU, banks are obliged to share customers' data with authorised third party providers in digital form and free of charge. However, the General Data Protection Regulation (GDPR) requires third party providers, including big techs, to share these data only if it is technically feasible [see De la Mano and Padilla (2018)]. Maintaining this asymmetry in the sharing of customer data and, even more, sharing the data without the consent of the customer, may have negative implications for the quality of customer screening made by banks (as the data would be shared with direct competitors at no cost), and distort competition between incumbent banks and big techs, with material consequences for the level of non-financial risk in the system.[7]

4 Three scenarios for European banking in 2030

The ultimate contribution of financial and non-financial risks to the overall level of risk in the system depends on (i) the current state of the EU banking system,[8] and (ii) how incumbent banks interact with fintechs and big techs in the future, an area still dominated by uncertainty. As a way to address that uncertainty, we define three scenarios for the EU financial system in 2030, which could serve as basis for a discussion of the appropriate macroprudential policy response [see Beck et al. (2022)].

These scenarios do not cover every possible path of the European banking system over the next ten years, but they are relevant in their implications for the interaction between incumbent banks, and fintechs and big techs. Scenarios 1 and 2 are directly related to the five forward-looking scenarios for the banking system designed by the Basel Committee on Banking Supervision [see Basel Committee on Banking Supervision (2018)]. The third scenario introduces central bank digital currencies, as certain configurations could lead to a substantial structural change in the financial system.

Our first and second scenarios cannot occur simultaneously, while the third scenario could occur in combination with one of the other two. We do not define probabilities

7 Alternatives to the current situation could be to enforce a symmetrical exchange of data between banks and big techs, to create separate "data warehouses" and to reinforce current data privacy regulation [see De la Mano and Padilla (2018)].

8 We provide the main features of the EU banking system in the introduction [see also Beck et al. (2022)].

to the different scenarios and – most importantly – their probability of occurrence is endogenous to regulatory responses that are still to be defined.

4.1 Scenario 1: incumbent banks continue their dominance

Under this scenario, banks maintain their central role in money creation and financial intermediation and they aggressively respond to the competitive threat through technological adaptation, acquiring fintech companies, and lobbying. Fintechs are limited to service specific niche markets, while big techs offer payment services but, in general, do not have access to central bank clearance and payment systems.

Cooperation between incumbent banks and big techs may result in customers using big techs' platforms to choose among financial services provided. While this can increase competition, it can also result in misaligned incentives. In these partnerships between traditional banks and big techs for lending services, the former could mainly provide their balance sheet and big techs their data for screening and monitoring. At the extreme, this situation would lead to the scenario of "relegated banking" [see Basel Committee on Banking Supervision (2018)].[9] The cooperation between incumbent banks and big techs could evolve in a way that customers relationships shift from banks to big techs, leaving banks as mere providers of services in terms of financial products and risk management. They would maintain their dominant role in financial intermediation but turning their current relationship banking into a "commoditised" provision of financial services.

As a result of the increased cooperation between banks and big techs under this scenario, consumer protection will have to change its focus, as personal data will become more important for the provision of credit, insurance and other financial services. For instance, current regulations that force banks to share personal information but do not allow them to gain access to data that big tech companies have would need to be changed [see also De la Mano and Padilla (2018)].

In this scenario, there is a large change in the banking system, as new providers and new products are incorporated, but there is not a major disruption in the way financial services are provided. Financial risks will continue to be concentrated in the banking system, as well as in non-banking financial institutions linked to the banking system. However, the regulatory framework would need to adjust to the new financial environment. In addition to changes in consumer protection as mentioned above, non-financial risks will be located in a small number of IT service providers and will require a stronger regulatory focus on these institutions. Besides, regulatory responses will have to focus on the interlinkages and cooperation between banks, on the one side, and fintech and big tech companies, on the other.

9 Similar scenarios have been called "banking as a service" and "beyond banking" [see Martínez Resano (2021)].

4.2 Scenario 2: incumbent banks retrench

The second scenario is characterised by big techs offering financial services through regulated financial subsidiaries. Therefore, big techs capture the hard-data, transaction-based lending market and incumbent banks need to adjust by increasingly focusing on relationship-intensive services at the high end (investment banks) and low end (community banks) of the market. The banking system reduces its size and relative importance in the provision of financial services, especially because mid- and small-sized banks are no longer able to exploit scope economies.

This transition to a smaller banking system will create fragility risks due to the necessary deleveraging and market exit by some of the incumbent banks. At the same time, new sources of financial risks and challenges for macroprudential regulation emerge. First, retail depositors will have an increasing number of investment opportunities, some of which could be located outside the current scope of the financial safety net. Investor runs on financial institutions outside the regulatory perimeter could cause fragility, lead to disruption inside the regulatory perimeter and put pressure on authorities to expand the safety net on an ad-hoc basis. Second, the increasing role of big techs in the financial system could result in concentration and too-big-to-fail risk, as well as in transition risk, as one dominant platform firm could be replaced with another if, for example, its technology becomes suddenly obsolete. Third, a general move towards more hard and less soft information could make lending cycles even more pronounced and pose additional challenges for macroprudential policymakers.

Our second scenario leads to a structural change in the financial system. In it, financial risk is no longer concentrated on incumbent financial institutions but is distributed over a more diverse set of institutions. The existence of firewalls between the financial and non-financial parts of big tech and similar companies will become important. In terms of non-financial risks related to IT, they will play an even more important role. Like in the previous scenario, the concentrated provision of IT-related services could create additional interlinkages between banks and non-bank providers. Above all, the regulatory response to this scenario should have two critical areas: (i) the regulation of fintech and big techs, and (ii) the access to lender of last resort facilities and coverage by deposit insurance beyond incumbent banks.

4.3 Scenario 3: retail central bank digital currencies

The third scenario is designed on the premise that the issuance of retail central bank digital currencies, under certain intermediation models, results in a different structure of the financial system. There is intense ongoing work in the central bank community

on how to design central bank digital currencies and our scenario should be seen as very hypothetical. Actually, to be able to transform the provision of financial services, central bank digital currencies cannot be anonymous, have to be supplied elastically and must not be only available to residents of the issuing jurisdiction, as such a restriction would amount to capital controls.

Regarding incumbent banks, our scenario should lead to higher funding costs and a more volatile funding base, as the traditionally stable retail deposit clientele switches, at least partially, to the digital currency issued by the central bank. Consequently, financial intermediation moves away from incumbent banks and the central bank now plays a central role in the financial system, as it has to allocate the funds attracted by the digital currency. As a result, the traditional banking system no longer plays the role of a stable anchor. Banks would have to rely more on wholesale funding and/or more expensive retail funding for loan origination, which in crisis times could result in (i) runs among other holders of short-term liabilities of incumbent banks, and (ii) a "crunch" in the bank's lending capacity. This scenario could also be prone to major and sudden cross-border outflows from countries whose currency is no longer regarded as trustworthy. At the same time, other financial service providers (including fintechs and big techs) will be able to offer tailormade and specialised services in areas such as lending, asset management, and risk management.

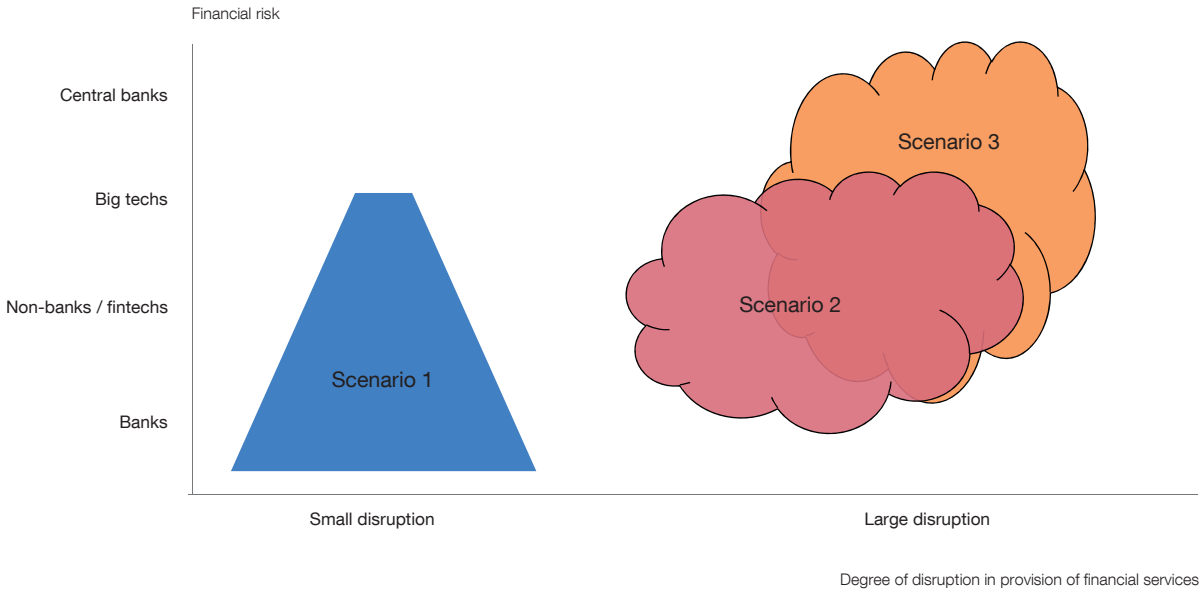
The regulatory response to this hypothetical scenario would have to deal with both scaled-up central bank intermediation and a diverse set of financial service providers with riskier profiles and higher exposure to runs. While the central bank might create stability through its dominating role as money creator, its lending role might expand significantly, replacing a more decentralised, market-based process for the allocation of credit. Financial risks would then, at least partially, move from banks to the central bank. The points made in the second scenario on regulating fintechs and big techs, and on the access to last resort facilities and to deposit insurance schemes would also be relevant under this scenario.

Chart 3 represents schematically the degree of disruption in the provision of financial services implied by each scenario (x-axis), compared with the current structure of the financial system, and the sector bearing financial risks under each scenario (y-axis).

The first scenario would mainly be a continuation of the current situation, where banks are the main bearers of financial risks and are, consequently, tightly regulated and have access to the safety net. In the second and third scenarios, the distribution of financial risks among banks, non-banks, fintechs and big techs (plus central banks) changes (even if the precise allocation is still unclear) and banks no longer bear as much financial risk as nowadays.

Chart 3

FINANCIAL RISKS AND DISRUPTION IN THE PROVISION OF FINANCIAL SERVICES IN OUR THREE SCENARIOS



SOURCE: Authors' elaboration.

5 Policy conclusions

Before discussing concrete macroprudential actions that could be taken in order to ensure an efficient transition to the banking system of the future, it is important to note that developments in the financial system are endogenous to regulatory responses and adjustments, especially during periods of potentially disruptive transformations. So, the regulatory response to the current transformation of the financial system will also shape that transformation. Furthermore, the regulatory response will be a key driver of which of our three scenarios materialises.

Our proposed policy actions are intended to address both financial and non-financial risks. Some of them may apply to all three scenarios, while others would be more relevant only for one scenario.

First, the regulatory perimeter and the conditions to access the safety need would need to be expanded and/or adapted. In addition to existing non-bank financial institutions, the extension of the regulatory perimeter would be necessary to capture the banking activities of big techs as well as the growing role of fintechs. These institutions would ideally need a new prudential framework, which should also consider consumer protection, data governance and anti-money laundering. In our second and third scenario, access to the safety net should also be enabled for these institutions, which would play a more decisive role in financial intermediation and could otherwise increase the risk of runs.

Related to it, big techs should be required to pursue their financial intermediation activities through a subsidiary that falls within the regulatory perimeter. However, this policy measure may require large organisational changes and could reduce the appeal for big techs to enter into the provision of financial services, decreasing the probability of occurrence of our second scenario.

Second, global cooperation among supervisory authorities needs to be enhanced. Most fintechs and big techs operate on a global sale, with no permanent establishment in jurisdictions where they are present. To avoid undesired and untimely discussions among different jurisdictions during periods of financial stress, mechanisms for cross-border cooperation across prudential authorities should be defined ex ante.

Third, cooperation among supervisory authorities in different sectors will need to be enhanced. The extended use of non-financial institutions that are under the remit of non-financial regulators (such as telecom regulators) would require the establishment of a fluid dialogue between authorities in the same jurisdiction. For instance, regulatory approaches toward platform companies (i.e., big techs) should involve also financial sector regulators.

Fourth, regulatory and supervisory practices must be adjusted to the increased importance of digitalisation in the financial system. The current structure of financial regulation and supervision dates back to a period where digitalisation and non-financial risk were not as important as they are today and are expected to be in the future. A more accurate reflection of non-financial risks in the prudential framework of financial institutions and an adjustment in the skills of staff in regulatory and supervisory authorities would be two required actions to be taken in this regard.

Fifth, any decision on central bank digital currencies and the access of retail customers to them must be carefully balanced between efficiency gains and stability risks posed to the financial system. While over the short-term, central bank digital currencies can benefit customers and result in healthy competition among financial institutions, there could be large implications over the long-term for the structure and stability of the financial system, which should also be taken into account in the decision-making process of relevant authorities.

Sixth, last but not least, the framework for an orderly exit of incumbent banks and for capacity reduction should be strengthened. Our three scenarios have portrayed a challenging environment for European banks, with increased competition and narrower margins. Furthermore, in the second and third scenarios, there will be a large reduction in the role of banks in the provision of financial services. As a result, a process of reducing capacity and exiting the market can be expected to occur and could be facilitated by, among others, avoiding government support for unviable banks, facilitating mergers, easing barriers to market exit and liquidation, and completing the banking union.

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Reflections on the future business model of European banks and the supervisory approach

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REFLECTIONS ON THE FUTURE BUSINESS MODEL OF EUROPEAN BANKS AND THE SUPERVISORY APPROACH

Abstract

Relevant forces are reshaping the banking sector and redefining banks' business models. On the one hand, banks have been facing structural difficulties, such as a prolonged low interest rate environment and the costs of excess capacity. In addition, banks need to deal with more recently developing challenges, like the digital transformation, the entrance of new competitors in the banking sector and the climate change. A demanding regulatory environment and the impact of the COVID-19 pandemic further aggravate the situation. As a result, European banks are not being able to produce enough returns to cover their cost of capital, making it necessary to urgently face these challenges. To that purpose, banks may adopt different strategies, some of them complementary, among which the following can be highlighted: the reduction of overcapacity, consolidation, diversification or specialisation and the exploitation of the value of long-term relations with clients, as well as taking advantage of the opportunities stemming from digitalization and sustainable finance. Supervisors will need to stay abreast of the changes in the banking environment and closely monitor the adaptation processes. This article is intended to serve as a basis for discussion, given that several of the issues raised are controversial and uncertain under the current fast changing environment.

Key words: banks' business models, profitability, sustainability, challenges, supervisory approach.

1 Introduction

In the euro area, banks are key financial players[1] and perform essential functions for the economy. Commercial banks primary functions include: 1) Maturity transformation and liquidity provision, by taking deposits and granting loans with longer maturities (allowing banks to expand/reduce the money supply in an economy and have the monopoly of issuing digital money), and 2) Provision of retail and wholesale payment services with access to central bank payment settlement accounts. Their intermediation role provides them with valuable information for the management of risks and the establishment of strong relationships with clients.

1 According to the Financial Stability Board, banking financial assets represented 36% of total financial assets in the euro area in 2019, still a significant percentage, although the share has halved since 2002. It is lower in the US (22%), but higher in China (59%) and the UK (46%). In terms of GDP, euro area banks' assets represented 258% (112% in the US, 249% in China and 496% in the UK). See Total Financial Assets / Eurozone, US, China and UK in Financial Stability Board (2020).

Considering the importance of the banking sector in the European economy, banks' profits are a fundamental source of capital to support economic growth (through financial intermediation) and preserve financial stability. Banks with a business model that is not able to generate enough earnings to cover their cost of capital, have higher funding costs and are more exposed to liquidity runs, threatening contagion to other banks, with potential consequences on financial stability [Fernandez-Bollo et al. (2021)]. In this respect, the profitability of the sector has been suffering since the Global Financial Crisis (GFC): return on equity (RoE) for euro area banks was 5.3%[2] in the third quarter of 2021 annualized, which falls short of their cost of capital (CoE).[3] RoE remains below their own level observed back in 2007, close to 10%, and compares poorly[4] with the close to 14%[5] of US banks in the third quarter of 2021.

A correct identification of the relevant business models is essential to perform an adequate supervision. In this respect, Mark Carney (2015), then Governor of the Bank of England, referred to the need to adapt supervisory practices to the different subsets of banks: "Our supervision is forward-looking and judgement-based. It is risk-based and proportionate – tailored to different business models around the sector". In the same line, Janet Yellen (2015), Chair of the Board of Governors of the Federal Reserve System at the time, noted that "when it comes to bank regulation and supervision, one size does not fit all … rules and supervisory approaches should be tailored to different types of institutions".

Banking business models have traditionally been established in terms of the funding structure, the asset side, the interbank operations and the derivatives activity. These features give rise to four broad business model categories: retail funded commercial banks, wholesale funded commercial banks, trading oriented banks, and universal/complex banks. The popularity of business models has changed in the past twenty years. While the wholesale-funded model was quite popular in the run-up to the crisis (2005-2008) thanks to favourable funding conditions, the subsequent hostile environment made many banks switch to the retail-funded model [Roengpitya et al. (2017)]. Large banks have remained focused on the universal banking model, although changes have been observed in their geographical distribution: a decade ago, the ten largest banks by assets were based in Europe or the United States, while nowadays the rank is dominated by six Asia-based banks [Vives (2019)].

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2 Source: European Central Bank (2022b).

3 Altavilla et al. (2021) have developed a methodology to estimate the cost of equity of euro area banks. According to this methodology, the cost of equity ranges between 7.7% and 12.7%, with a median close to 10%. Similarly, Fernández Lafuerza and Mencía (2021) have estimated the cost of equity for a large sample of European financial institutions using two different approaches: a dividend discount model, which yields results in the 6-9% range, and a factor model in the 6-14% range.

4 According to Fernandez-Bollo (2021) European banks have not been able to recover profitability at the pace of US banks mainly due to three factors: 1) the Sovereign debt crisis, 2) the high level of non-performing loans (NPLs), and 3) the divergent interest rates evolution in the two areas. Additionally, other factors such as excess capacity could explain the different profitability.

5 Board of Governors of the Federal Reserve System (2021).

The European Banking Authority (EBA) expects bank supervisors in the European Union (EU) to conduct a regular business model analysis as part of the annual Supervisory Review and Evaluation Process (SREP), which leads to the setting of bank-specific Pillar 2 capital requirements. Through this analysis, authorities aim to determine whether a bank is able to generate sustainable returns over a medium-term horizon.

This article tries to foster the discussion surrounding the evolution of the business model of banks under the new market and environment setting. We start identifying the main challenges traditional banking is facing, both pre- and post-COVID, then we put forward several potential competitive strategies that banks may adopt, which are not necessarily mutually exclusive, and finally we provide ideas for the supervisory approach related to these potential strategies. We would like to highlight the influence of the paper by Cardillo, Gallo y Guarino (2021) from Banca d'Italia on the analysis performed in this article.

2 Challenges to traditional banking

The banking business has been increasingly challenged for over a decade leading to meagre profits and reduced stock quotations. The COVID-19 crisis has further exacerbated this trend.

2.1 Prior to the COVID-19 crisis

Since the onset of the GFC in 2008, three major developments have affected the banking industry:

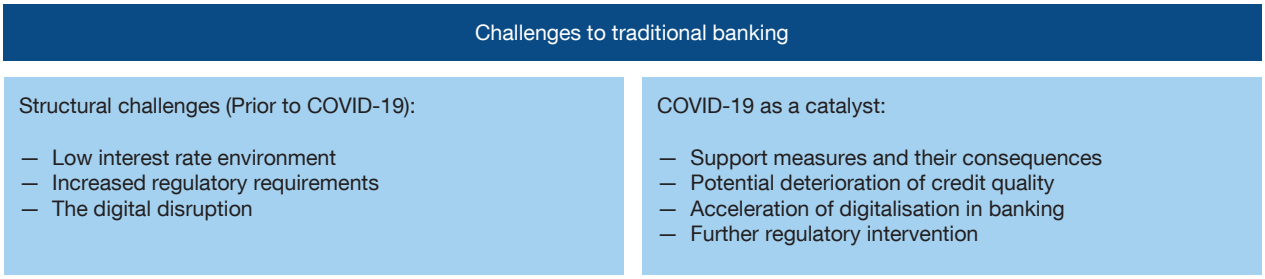
2.1.1 Low interest rate environment (LIRE)

The decade following the GFC has been characterized by a persisting trend of declining nominal interest rates, setting in some cases [e.g. European Central Bank (ECB), Bank of Japan] negative rates for excess reserves. The LIRE has several negative and positive consequences on the banking business:

On the negative side:

Net interest income (NII) compression: Although at the beginning of the GFC an interest rate drop may have been beneficial for banks due to a faster adjustment in the prices of liabilities than assets, the persistent low interest level has eventually led to a flattening of the yield curve, reducing spreads between short-term and long-term

Figure 1
MAIN CHALLENGES TO TRADITIONAL BANKING



SOURCE: Own elaboration.

rates and jeopardizing banks' capacity to profit from the maturity transformation activity. This margin compression affects not only new credit operations, but also existing ones in banks with a high volume of floating rates. The rigidity of funding costs causes a more than proportional decrease in NII to an interest rate drop. This effect is more pronounced in smaller banks, typically with a higher reliance on deposits. Moreover, negative rates are not easily transferrable to clients. This pressure on NII is partially offset by the ECB's provision of funding at negative interest rates through the targeted longer-term refinancing operations III (TLTRO III) program,[6] as well as by the increase in credit demand fuelled by the LIRE.

Competitive pressure from non-bank intermediaries (e.g. investment funds, money market funds) increases at a time when bank deposits become less attractive as a savings vehicle and clients search for other more profitable alternatives. Technological innovations enable non-financial intermediaries to provide financial services.

Search for yield: There also seems to be evidence that certain banks are more prone to invest in riskier securities. A recent study [Bubeck, Maddaloni and Peydró (2020)] suggests that, after the introduction of negative rates, euro area systemic banks that relied more on deposits invested in riskier portfolios.

On the positive side:

Price increases in other assets: Lower interest rates help drive up the prices of financial and real assets. This effect is particularly quick in the case of debt securities, especially long-term ones, as their prices are more sensitive to yield changes. Prices of equities and real assets such as the real estate market, are also boosted by lower

6 According to Dor (2020) estimates, the combined negative interest rate policies on excess liquidities and TLTRO loans resulted in a net gain of about € 4.8 billion for banks in the euro area as a whole in 2020.

interest rates, although other factors play a relevant role as well (such as the macroeconomic outlook).[7]

Lower credit risk favoured by declining rates may reduce the need for loan loss provisions and increase investors' appetite for NPLs, with a positive effect on the recovery rates of impaired assets. Banks would therefore scale down their overall risk profile and capital needs. It may also lead to an increase in lending, thus triggering a volume effect on interest margins that can partially offset the price-based reduction.

Banks are *incentivized to exploit other non-interest based profitability* levers, such as those based on fees and commissions. However, so far evidence suggests that revenues stemming from commissions and fees do not fully offset the NII decline [Brei, Borio and Gambacorta (2019)].

In summary, the LIRE has contrasting effects on banks' profitability. Overall, the negative effects seem to prevail.

2.1.2 Increased regulatory requirements

In the aftermath of the GFC banking regulation increased significantly, with major intervention in all the main banking areas: capital (quality and quantity), leverage, liquidity and funding, governance, remuneration, crisis management (including orderly bank resolution), macroprudential tools, etc. These more comprehensive regulatory requirements have come along with a new and more complex European supervisory architecture, which involves a greater number of stakeholders (ECB, national competent authorities, macroprudential authorities, etc.).

In the short term, the increase in regulation has led to lower returns due to higher capital requirements, the shift to safer and more liquid exposures to reduce risk weighted assets (RWAs), and the increase in operational and compliance costs [Carletti et al. (2020)]. In the long term, however, banks' higher capitalisation can have a positive effect on funding costs and some studies[8] support the idea that raising high quality capital enhances banks' profitability and solvency during downturns.

Some cases of banking misbehaviour that came to light during the GFC have led to additional pressure in conduct regulation and supervision. Higher transparency and customer protection requirements to banks have certainly empowered the client in its relationship with the bank.

7 Hernández de Cos (2019).

8 Bodganova, Fender and Takáts (2018) and Calomiris and Nissim (2014).

In addition, climate related risks are increasingly gaining ground. Regulation related to sustainability is still in its early stages, but will likely contribute with additional regulatory requirements in the coming years. The increasing importance of this topic is expected to have significant effects on the financial activity of banks (higher relevance of green finance) and will even trigger changes in their internal functioning (aimed at improving their environmental sustainability).

Finally, more banking regulation and more intense supervision can have a disruptive effect on the market. New competitors that do not have to comply with these requirements (e.g. shadow banking and FinTech companies) are gaining market share. This has opened the debate on an entity-based vs. an activity-based regulatory approach.

In any case, it is undeniable that banks have been subject to increasing regulatory requirements in recent years and this trend will very likely continue in the medium term in response to the changing environment and the ground gained by the associated risks (e.g. climate risk regulation and digitalisation).

2.1.3 The digital disruption

Technological innovation has affected the banking industry over time (e.g. ATMs[9] in the 1970s, followed by telephone banking, and online banking with the internet in the late 1990s). More recently, there have been very relevant technological innovations, which are reshaping the way the banking industry operates. Well known examples are mobile devices, Application Programming Interfaces (APIs), Artificial Intelligence (AI), Big Data, cloud computing and infrastructure, Machine Learning (ML), digital currencies or Distributed Ledger Technology (DLT)/Blockchain.

This new environment poses several challenges to the banking industry:

— *Change in service expectations by customers:* Clients are increasing service expectations due to the digitalisation of commerce and the real-time transacting capability of internet connected devices. Additionally, digital consumer interfaces enable financial providers to directly reach consumers both near and far, offering greater convenience (ubiquitous access to digital banking and available 24/7), speed and user-friendliness of financial services. In this context, 58% of the people in the EU used internet banking in 2019, compared to 25% in 2007.[10] Peer-to-Peer (P2P) lending platforms,[11]

9 ATM stands for "Automated Teller Machine".

10 Saravia and Saletta (2020).

11 These platforms match borrowers and lenders directly without bank intermediation. P2P lending is growing in the United States, the United Kingdom and other European countries such as Germany, France, and Finland, although the role of P2P lending is in general limited in the EU [OECD (2020)].

Robo Advisors[12] and other FinTech firms have taken advantage of unmet customer needs or cost advantages in payments, transfers (such as international remittances), credit and investment advice [Vives (2019)].

FinTechs are pushing towards more holistic and customer-centric business models, thus, setting up new standards of service and customer experience. In general, consumers do not desire financial services by themselves, but see them as a means to another activity (e.g. pay a driver to reach a destination, obtain a working capital loan to finance inventory) and with the advent of the new technological ecosystem they are becoming even less aware of financial services or not noticing them at all (e.g. when buying in Amazon or using Netflix).

Additionally, demographic factors also play a role, with younger generations being more inclined to adopt the innovations offered by FinTechs [Frost (2020)].

Another aspect to take into account is that there may be a common perception among certain consumer groups of FinTech credit,[13] especially P2P lending, as more socially responsible than conventional banking credit activity [Vives (2019)].

— *Obsolescence and need for transformation of back, middle and front office processes, systems and skills:* Technological innovations have made certain processes and employees' skills replaceable. Developments in data analytics, ML and Big Data techniques [e.g. data processing, credit scoring, electronic know-your-customer (e-KYC), asset management, anti-fraud prevention] will have significant implications on the cost and the need for transformation of the traditional back and middle office infrastructures [Cardillo, Gallo and Guarino (2021)]. However, banks' capability to adopt these innovations might be hampered by problems in the organisation of data, as well as their legacy of outdated IT systems. The front office is also being affected by technological innovations, with great potential to streamline its cost structure (further developed in Section 3.1).

— *Technology firms are reshaping the financial industry:*

12 Computer programs that generate investment advice according to customer data. Through the use of Machine Learning tools, robo-advisors represent a cheap alternative to human wealth advisors. If programmed properly, they may help alleviate the usual conflicts of interest that are widespread in the banking sector. Nevertheless, robo-advising is still a young technology and represents only a fraction of overall financial advising; this is particularly true in Europe, where assets under robo-management amount to much less than those in the US.

13 Total global alternative finance volume for 2020 is estimated at USD 114 billion [Cambridge Centre for Alternative Finance (2021)]. This online alternative finance comprises various lending, investment, and non-investment models that enable individuals, businesses, and other entities to raise funds via an online digital marketplace.

- *Disaggregation of the value chain:* Prior to the advent of FinTech, the combination of transactions costs and economies of scale and scope resulted in large financial intermediaries that tended to be integrated vertically (including back and middle office and client point of sale) and horizontally (producing different financial services). Nowadays, the production chain for financial services can be disaggregated in both ways thanks to technological advances that enable an increased information exchange and a reduction in transaction costs [Feyen et al. (2021)]:

  i) *Vertically* (firms providing elements of the value chain): Connectivity and information transfer technologies enable different companies to provide elements of the transaction value chain. The customer-facing provider might incorporate features and functions from external firms (e.g. third-party sales agents, internet marketplace originators, external credit scoring services, outsourced card issuer processing).

  ii) *Horizontally* (unbundling of financial services): Customers now have more information from different providers and an increased ability to interact with them through digital distribution channels. Two examples are payments (driven by high earnings, especially in cross-border transactions, and the accumulation of data) and asset management (also a profitable area where investment advices can rely on AI and automation).

  Disaggregation could affect the *cross-subsidies* that are inherent in the integrated banking model, potentially stripping away the more profitable products and services that have stand-alone profitability, and leaving traditional providers with an embedded cost base and products with low margins or which the market expects to get for free. *Open banking* regulations that require banks to share customer data with FinTechs could accelerate this process, further eroding the traditional incumbent-customer relationship. Additionally, open banking APIs enable non-banks to offer payment initiation services, without being part of any of the payment systems themselves.

- *FinTechs* are introducing new ways of providing financial services, operating as leaner businesses, benefiting from state-of-the-art technologies without the limitations of legacy systems, allowing a swift and flexible response to changes in consumer preferences. They can focus on the banking activities with higher RoE, such as payments, advice, and distribution of financial products. In contrast, FinTechs face also significant challenges that they must overcome, such as the lack of an installed loyal customer base, the limited access to soft information about potential customers, a comparative lack of reputation and brand

recognition, as well as a relatively high cost of capital [Financial Stability Board (2019)]. They have not managed to acquire a dominant position in the market and represent a small share of total credit. Presently, FinTechs are mainly collaborating with incumbents by providing certain back office services in the form of partnerships or providing SaaS[14] engagements.

- *BigTechs* could potentially be much more disruptive for banks. They have most of the advantages of FinTech firms with practically none of the drawbacks. They have an established loyal customer base and enormous quantities of customer data[15] they can exploit to design new services in the banking industry; a strong reputation and lobbying capacity; strong brand names; a proven ability to take advantage of network effects; and a low cost of capital [Vives (2019)].

  The ability to embed tailored financial services into any economic, business, or social activity may be the most powerful disruptor of traditional financial services, and this is an area in which BigTechs excel. Their power relies on the feedback loop of customer data generation, processing, and exploitation of network externalities, which in turn generates more activity and more data (then used to further improve algorithms and prediction capacity, leading to dynamic economies of scale and scope). This feedback loop consolidates an ecosystem with high endogenously generated switching costs for customers to change platforms.

  Furthermore, focusing on the lending activity, there seems to be certain evidence[16] that BigTech lenders may have better predictive power for loan repayment prospects using Big Data ML and AI techniques (e.g. on platform transactions and reputation of sellers) compared with traditional methods using credit bureau information. Nonetheless, this superior performance cannot be generalized, as banks also consider soft information and look at full business cycles.

  The penetration of BigTechs has been deeper in less-developed banking markets (in the field of payment services, money market mutual funds and insurance) as well as those with less competition and laxer regulation in lending.[17]

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14 FinTechs with specialized capabilities that sell their Software-as-a-Service (SaaS) to banks (e.g. data processing, credit scoring, e-KYC).

15 BigTech platforms with a focus on internet search (e.g. Google) gather information about customers from their searching activity; those with a focus on social media (e.g. Facebook) have direct personal data of users and their connections; and those with a focus on e-commerce (e.g. Amazon) have data of both sellers and buyers and their habits.

16 Frost et al. (2019).

17 Cornelli et al. (2020).

— *Digital money and payments:* Payment technology has been disrupted and, together with digital money, poses a challenge to the traditional banking business model. The use of cash is steadily declining. The increasing digitalisation of our economic activities, fostered by technology platforms and social media, has led to a growing customer demand for faster and cheaper forms of payments (e.g. Bizum). Cryptocurrencies and the associated blockchain technology is a natural solution for the new demand for alternative digital assets outside of the traditional deposit-taking institutions. Money can be stored in any form of trusted database (digital ledger). Mobile telephone providers (such as M-Pesa in Kenya) or BigTech platforms (such as WeChat or Facebook Pay) have also created digital repositories of value that can be used for payments.

To sum up, the digital disruption is perhaps the main challenge the banking industry is currently facing. The benefits of technology for the banking business come through different dimensions. From the revenue generation perspective, a strong technological architecture can improve customer satisfaction and increase sales through cross-selling, better pricing, faster and smarter trading, more efficient allocation of credit, an enhanced ability to launch new products, hyper-personalisation of products and customer onboarding. On the cost side, technology reduces the need for branches and personnel, enables more efficient middle and back office processes and enhances credit risk management through an improved predictive power. Thus, income growth will likely be increasingly correlated with technological intensity, and traditional banks need to undertake a significant upfront investment on innovation in order to replace outdated IT solutions.

2.2 After the COVID-19 crisis

The COVID-19 crisis has certainly acted as a catalyst to the trends already observed before the pandemic, putting further pressure on banks' income statements. In particular, some relevant pandemic related issues that have accelerated this evolution are the following:

— *Support measures:* The pandemic led to an abrupt and deep contraction in the euro area economic activity. Targeted fiscal and prudential support measures have certainly mitigated the negative effects of the pandemic on credit institutions in the short term, but they may become visible as these measures are being withdrawn. Concerning the monetary measures, interest rates have remained low for even longer than pre-COVID expectations, driven by the accommodative monetary policies and the weakened general economic outlook, further impacting the NII. Looking forward, the recent inflationary environment may urge central banks to adopt a tighter monetary policy. An adverse scenario of sudden interest

rate increases coupled with an ailing economic growth could drive financial markets volatility and abrupt market dislocations, negatively affecting the banking business. Several upside and downside effects on banks will interact depending on their specificities and even a more orderly market reaction could be foreseen in alternative, less adverse, interest rate scenarios.

— *Potential deterioration of credit quality:* In the medium term, the economic impact could trigger a generalized increase in credit risk, posing additional questions to profit generation, capital accumulation and credit supply. Even though the pandemic has not resulted in a general increase in NPLs so far, several early indicators[18] are already becoming visible and point to a potential future deterioration of credit quality. The extension of the restrictions related to the pandemic, the structural changes in the economy, and the persisting lack of adequate turnover augment the uncertainty on borrowers' ability to sustain debt servicing in the medium term. This seemed confirmed by the tightening in credit standards in 2020 broadly for all credit categories and in 2021 for loans to firms,[19] as well as the shift towards lower risk assets, such as central bank reserves and sovereign exposures. At the same time, there is evidence that the exposure to leverage lending of certain institutions is increasing.[20]

— *Acceleration of digitalisation of banking services:* Social distancing measures have impacted front and back office operations. Banks have been forced to quickly roll-out contingency plans to ensure the continuity of services by recurring to remote working, relocating some activities (e.g. outsourcing of services to third-party providers) and reorganizing teams. As for front office services, many branches have been temporarily closed and customers have been encouraged to rely on digital banking. This process will accelerate the reorganisation of the workforce in the industry. Banks will likely decrease the number of staff members involved in low-value and standardized banking services (e.g. execution and settlement of orders) in favour of specialized professionals aimed at providing more value-added advisory services focused on specific business segments, such as wealth and asset management.

— *Further regulatory intervention:* The post-COVID environment could also prepare the ground for further regulatory intervention, characterized by a

18 Examples of these indicators are the increase in Stage 2 loans, forborne operations or NPL ratios of vulnerable sectors [Enria (2021b)].

19 According to the last Bank Lending Survey released in February 2022 [European Central Bank (2022a)] credit standards for loans to firms and households showed a significant net tightening in 2020 and a slight net tightening for firms in 2021, in contrast with a moderate easing for consumer credit and other lending to households and broadly unchanged credit standards for house purchases.

20 Enria (2021a).

greater attention to improve countercyclical tools to protect the banking system from sudden events and, at the same time, mitigate potential "procyclical traps" stemming from the existing regulation.[21] In this respect, the already existing proposal to redesign the combination of prudential buffers, providing wider room for cyclical components, could gain new momentum.

In conclusion, as a consequence of the challenging trends observed in the banking industry, which have been aggravated with the COVID-19 pandemic, traditional banks are experiencing an erosion of margins and report very low profitability (RoE below CoE). They are facing increasing competitive pressure, with the threat of new entrants/substitutive products as well as more sophisticated and demanding clients. There is an urgent need to redefine their competitive strategy.

3 Adaptation of banks' business strategies

Banks will have to adapt their business models to the new environment, taking into account the challenges they are facing. We discuss here some possible strategies (Figure 2), which are, in general, not mutually exclusive.

3.1 Gain efficiency by reducing costs

In recent years, European banks have been addressing their weak profitability mainly through cost-cutting strategies, and this will likely remain one of the most important ways to regain efficiency.

The *reduction of the installed capacity* of the banking sector is a key component of the cost reduction process. A recent study by Alvarez and Marsal[22] states that a branch client is on average 13.4 times more expensive than a digital client. In this respect, the number of branches in EU has decreased by 36% from 2008 to 2020 (–8% in the last year), reflecting the swift uptake of online and mobile banking services in recent years and the catalytic effect of the pandemic. Similarly, the number of employees of credit institutions in the EU fell to only 2.25 million at the end of 2020 (–19% since 2008). The capacity reduction since the GFC has been especially sharp in Spain (–51% of branches, –38% of workers).[23] Nonetheless, there are still more than twice as many banking branches per number of inhabitants in Spain than in the euro area.

21 For instance, the effects of IFRS 9 accounting rules, the structural component of capital requirements or the MREL requirement.

22 Alvarez and Marsal (2021), Annex 2.

23 European Central Bank (2021b), Table 1.

Figure 2
POTENTIAL STRATEGIES TO ADAPT THE BANKING BUSINESS TO THE NEW ENVIRONMENT

SOURCE: Own elaboration.

The aggregate *cost-to-income* ratio of European banks was 63.6%[24] in Q1 2021 (reaching a peak of 71.7% in Q1 2020 with the spread of the pandemic). Spanish banks generally show better efficiency ratios (50.28% in Q1 2021).[25]

Market reactions to new business plans tend to be more favourable to cost reductions than to projected revenue increases, which are considered more uncertain as they also depend on the competitive pressure and the evolution of the economy. Certain changes deriving from the pandemic provide an opportunity for banks to transform into structural the "cyclical" cost reduction process by using smart working and remote distance communications, as well as relying further on digital banking rather than on traditional banking branches.

However, there are *limits to cost reduction:* 1) Share of rigid costs (variable costs can typically represent around 20-30%[26] of the total cost structure of a global bank, and their reduction can trigger a major change in business activities), 2) Specific local characteristics, such as: labour laws, population density (an important driver

24 European Banking Authority (2021).
25 Banco de España (2022).
26 Oliver Wyman and Morgan Stanley (2020).

of branch reduction), the level of adoption of digital devices (client access and the need to guarantee financial inclusion for certain segments of the population), and competition in the area served by the branch, 3) Size of the bank: the cost reduction observed during last year was basically concentrated in larger banks and smaller intermediaries usually have a lower share of total costs that can be easily compressed, 4) Investment in IT: especially smaller banks have more difficulties in undertaking the investment in new IT infrastructures, 5) Reputation: banks need to carefully monitor the perceived social responsibility of their actions, especially banks with local roots.

3.2 Benefit from economies of scale through consolidation

Scale is largely identified as one of the most important drivers of banks' profitability. However, a consolidation process also entails ambivalent implications in terms of financial stability, which need to be considered. In addition, the space for national and cross-border consolidation processes should be explored.

Positive aspects: Consolidation can help reduce inefficiencies arising from small scale (limits to cost-cutting and investment in IT), exploit cost synergies (particularly in the domestic context), share digital capabilities, improve funding conditions (access to financial markets for issuing debt and increasing capital is easier for larger players), and diversify revenues. In addition, consolidation could facilitate banks' preparation to face long-term challenges (i.e. digitalisation and transition to a low-carbon economy).

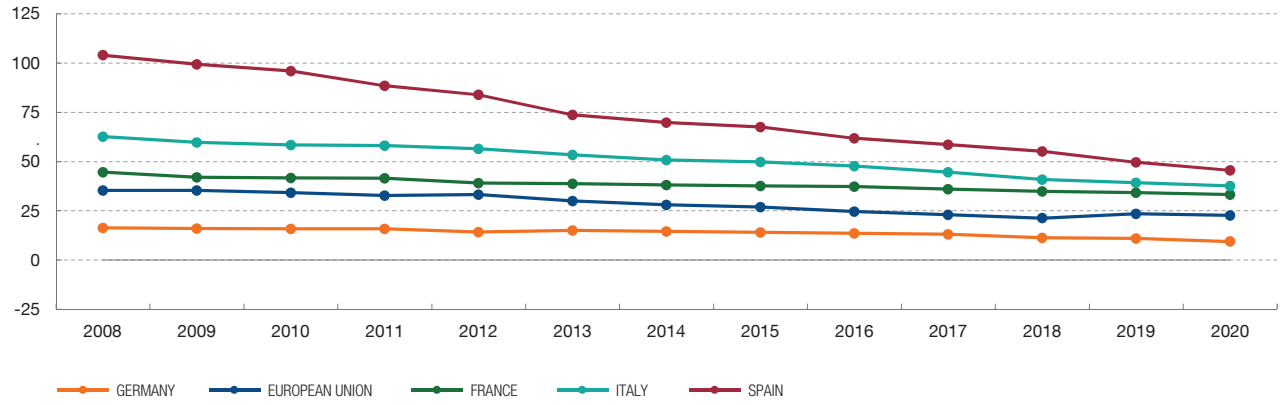
Smaller banks could be more interested in consolidation to allow for greater IT investments and cost reductions, while larger banks would primarily benefit from revenue diversification (new business opportunities) and more competitive funding costs.

Consolidation with FinTechs could be attractive in order to incorporate new digital capabilities or target new segments. However, intermediaries may adopt alternative solutions to gain efficiency, such as the creation of partnerships and joint ventures with other intermediaries to share costs and investments, or the reliance on external suppliers of business supporting activities (e.g. IT services). Consolidation with BigTechs may be more complex as it could place the consolidated business under the prudential scope of the supervisory authorities and the dilution effect generated by the low market valuations of banks compared to BigTechs could discourage banks' shareholders to accept the business combination.

Cross-border consolidations can help banks diversify risks, reducing the exposure to country-level shocks. Moreover, large non-financial corporates are becoming more global and need larger banks to assist them worldwide. In this environment cross-border consolidation could represent an important competitive advantage.

Chart 1

EVOLUTION OF THE NUMBER OF COMMERCIAL BANK BRANCHES (PER 100,000 ADULTS)



SOURCE: International Monetary Fund (2021).

Drawbacks: Consolidation may lead to concerns about promoting too-big-to-fail banks, competition problems in case of excess concentration (leading to a reduction in customer welfare in case the power in the market translates into higher prices for clients), amplification of governance inefficiencies, and challenges in the integration process.

Opportunity in Europe: There may be good consolidation opportunities at the national level and for the EU as a whole, due to overcapacity (mainly driven by overlapping physical distribution networks) or low concentrated markets.

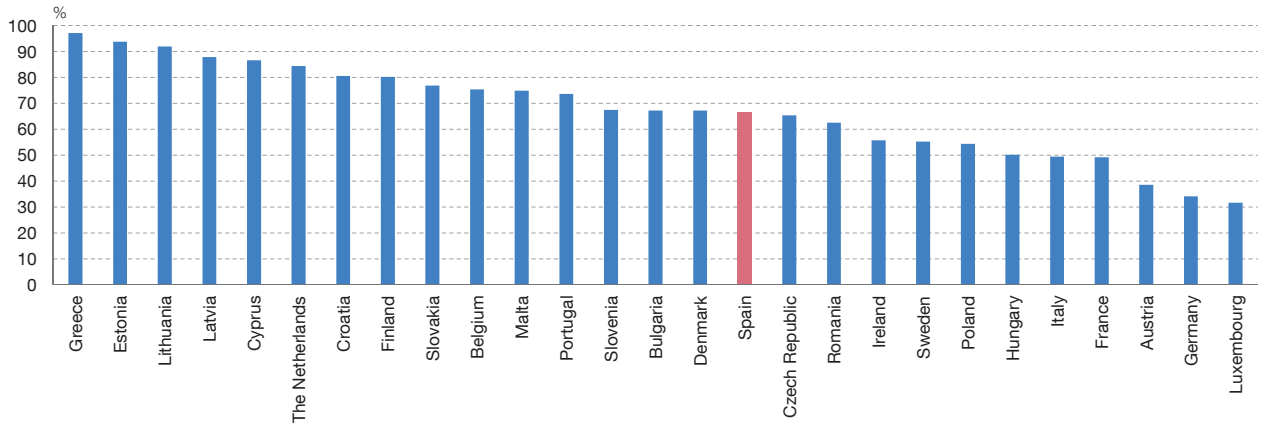
In terms of overcapacity, the Spanish banking system presented a higher number of commercial branches per capita (45.5 branches per 100,000 adults)[27] than the other three main EU markets (Germany, France and Italy) in 2020, despite a much larger reduction experienced in the last decade. The number of branches per adult in Spain amounts to twice the EU average. Chart 1 illustrates this evolution. Nevertheless, any conclusion regarding overcapacity in a jurisdiction should also take into consideration other aspects, such as the size of the branches (e.g. the number of employees per branch in Spain is well below the European average).

The Spanish market has experienced an intense concentration process after the GFC. The share of the five largest Spanish credit institutions increased from 42% to 66% between 2008 and 2020. According to this measure, concentration is higher in Spain than in the other three main EU countries (Germany, France and Italy). The share of the five largest credit institutions in 2020 widely varies from 32% in

27 International Monetary Fund (2021).

Chart 2

SHARE OF ASSETS HELD BY 5 LARGEST BANKS IN EUROPEAN UNION COUNTRIES (2020)



SOURCE: ECB Statistical Data Warehouse. EU Structural financial indicators.

Luxembourg to over 90% in Greece, Lithuania and Estonia[28] (Chart 2). Moving on to the European level, the EU (22.6 branches per 100,000 adults) shows relatively lower capacity than the US (26.7),[29] which could be explained by its smaller geographical area. In contrast, the top 5 European banks barely represent 23% of the consolidated assets in the euro banking market in 2019, compared to 43% of the 5 US banks in the US market.[30] Between 2009 and 2011 the number of banks in the US fell roughly three times as much as in Europe. In the euro area, the bank restructuring process was mainly limited to domestic consolidation, while no major cross-border consolidation took place.

Limitations to the banking consolidation process within the EU can be partially due to the low market valuations of banks and the fragmented retail markets, but also to regulatory and supervisory obstacles.

The potential need to raise new capital in order to cope with the costs of consolidation (restructuring changes) may have discouraged banks from acquiring other banks, provided that the present market valuations would excessively dilute existing shareholders' stake of the acquirer. On the contrary, market valuations under book value of the acquired institution provide the opportunity to recognise a badwill that could help face costs and strengthen the capital position of the resulting entity [Fernandez-Bollo et al. (2021)].

28 Fernandez-Bollo (2021).

29 International Monetary Fund (2021).

30 Gabrieli, Marionnet and Sammeth (2021).

Moreover, in the euro area, banking regulation, supervision, and other political obstacles to cross-border operations remain. However, steps are being taken in this regard. For instance, the ECB has recently published a guide on consolidation aimed at clarifying post-merger supervisory requirements, helping the stakeholders understand the supervisory expectations. In addition, completing the Banking Union and harmonizing local regulatory regimes (i.e. financial laws) would also pave the way for cross-border banking integration.

3.3 Review the scope of activities

Diversification and specialisation strategies by incumbents can lead to a significant reorganisation in the banking industry, with a different mix of production and distribution models likely to emerge.

Diversification: Banks already provide several services, exploiting the benefits of economies of scope (operational synergies between different business lines, sharing of staff, new technological applications…). For instance, a growing number of banks insert insurance products in their offerings. This is particularly relevant in the context of low interest rates. Bundling is a key advantage of banks with respect to competitors (e.g. FinTechs that compete in specific products), and may even give rise to banks entering non-financial products. However, benefits of diversification need to be assessed against greater organisational complexity and inefficiencies, and the capacity to reach a significant number of customers to cover costs.

Specialisation: Some banks may focus on the production of specific services, with limited direct contact with customers, in order to exploit economies of scale in the provision of those services. Other intermediaries may concentrate on the distribution stage by establishing a close relationship with customers. Outsourcing non-core activities may also allow banks to focus on their main competitive advantages.

3.4 Capitalize on relationship banking

This business model relies largely on trust and human interaction, allowing banks to form close ties with their customers through long-term cooperation and collecting soft information, which is obtained in personal interactions, is qualitative in nature and is not easy to store. Traditionally, relationship banking was the business model of small and medium-sized local banks. However, in a digital environment, relationship banking may be a way of doing business for traditional banks (including larger ones) based on human interactions and tailor-made services. The ability of banks to establish a long-term relationship with their customers will likely be a key factor to determine their performance, as it allows intermediaries to benefit from profitable cross-selling strategies and maintain a competitive advantage with respect to new market entrants.

This strategy is typically at odds with the FinTech model, which replaces long-term relationships with a "transaction oriented" perspective, relying on algorithms. Banks can leverage on client knowledge and technology to provide agile and tailor-made services. This requires investment in time and resources and is particularly suited for some types of activities, such as:

— *Lending:* Hard information cannot completely replace soft information, therefore certain segments, such as opaque borrowers (e.g. small and medium-sized enterprises) or larger commercial clients with specific needs, could still benefit from relationship lending offered by traditional banks. Additionally, during crisis periods relationship banks can protect their clients from exogenous shocks and potential liquidity shortages as part of their long-term relationship. Finally, helped by the deposit guarantee scheme, liquidity will continue to be largely managed by traditional banks, allowing them to keep a large share of market lending.

— *Provision of products and services:* Specialising in financial products and services which technology firms cannot offer and provide some specific value added, that prevent them from becoming a commodity. Relationship banking can be relevant in the wealth management business and for large customers who need more specialized services provided by human advisors.

Finally, relationship banking can partially offset the potential concentration of portfolios due to AI models, which entail risks of financial monoculture and herding behaviour stemming from their underlying similarities.

3.5 Take part in the digital transformation development

Digital transformation is a strategic priority for the overwhelming majority of credit institutions, given that they are encumbered by legacy systems, networks, and cultures. The digital transformation will most likely be the main driver of the future evolution of the industry. Banks are adopting the following strategies in order to adapt internal processes and distribution channels to the new environment:

— *Using FinTech/BigTech solutions for middle and back office* in the form of partnerships or SaaS, in order to reduce costs, allow for state-of-the-art technologies, and keep control of the interface with customers.

  Additionally, for several decades there has been a trend of offshoring back office functions. Many financial firms first shifted call and customer service centres to lower-cost jurisdictions and later application processes and IT operations. Cloud computing has accelerated this trend. Entire IT systems, including core banking systems, can now be hosted anywhere in the world.

In regions with common regulatory frameworks, the provision of some products and services can be entirely organized beyond the boundaries of the customer's country.

— *Building distribution platforms,* partnering with or acquiring FinTech firms, to provide a wide range of retail banking services and products (and also in other non-banking business areas), keeping control of the interface with customers. These players become marketplaces, leveraging on positive network externalities and client trust, with a better ability to navigate the regulatory maze. They can compete directly with BigTech firms. There are already several initiatives along these lines, with banks enabling clients from other entities to operate through their apps and creating a distinction between "clients" and "users".

— *Becoming Banking as a Service* (BaaS), also known as embedded finance. Under this model banks integrate their financial services directly into the products of other non-bank businesses (including BigTechs) through the use of APIs. In this way, a non-bank business can offer its customers digital banking services directly in its website. Through BaaS, banks can multiply their customer base but at the expense of commoditizing their business activity.

  Partnerships may be built for offering services such as credit cards (e.g. Amazon and JPMorgan Chase, Apple and Goldman Sachs) or loans (e.g. Amazon and Bank of America). In Europe, Solarisbank[31] holds a leading position in the BaaS business model. The popularity of this type of business model is accelerating and revenues generated from BaaS are expected to multiply by 10 in the next four years.[32]

— *Setting up their own digital-only banks* to compete directly with BigTechs and FinTechs. For example, making an incursion in formerly captive local markets (e.g. DBS Bank from Singapore entry to India via Digibank).

— *Contributing to the innovation progress* such as the instant payment networks, developed in coordination with the central bank. The new technology allows for instant payments, available 24/7 at very low cost (e.g. new TIPS[33] system at the ECB) and also significantly improves cross

31 Solarisbank was funded in Germany in 2016, with a banking license authorised by BaFin, and it has already expanded its activity to France, Italy and Spain. BBVA holds a majority stake on this entity. It holds a partnership with Samsung.

32 Private-equity firm Lightyear Capital anticipates embedded finance to generate USD 230 billion in revenue by 2025, up from USD 22.5 billion in 2020 [Shevlin (2020)].

33 Target Instant Payment Settlement.

border payments. SWIFT[34] has been forced to develop new digital technologies (now able to execute same-day cross-border transactions) to match much cheaper and faster processes introduced by new entrants like TransferWise.

— *Exploring new ways of exploiting* data with alternative data sources and data analysis in different dimensions, such as hyperpersonalisation or the assessment of creditworthiness. Hyperpersonalisation allows retail banks to provide tailor-made offerings that deliver personalised services, products and pricing by using real-time data and Artificial Intelligence to generate insight on relevant attributes for customers. Regarding credit risk, the typical information asymmetry problem between lender and borrower can be solved in new ways, making loans accessible to otherwise opaque borrowers, such as those with limited availability of standardized financial information. Banks would also depend less on collateral and the information collateral provides (e.g. mortgages) to assess their clientele, and they would be able to fine-tune their pricing and credit provisioning models. All these advances would eventually have a positive effect on the bank's profitability.

3.6 Exploit green finance opportunities

Supporting the climate transition process is an increasingly important factor in determining future banks' performance. Green financing volume is still modest, but it has experienced an exponential increase in recent years, especially in Europe: the market segment of global sustainable assets reached USD 35.3 trillion in the major world regions in 2020 (of these, USD 12 trillion in Europe), almost doubling in a period of just six years.[35]

From the banking sector perspective, the market driven reallocation of resources towards sustainable assets represents both an opportunity and a challenge. Banks can seize this *opportunity* through three main channels:

— Reallocate portfolios via sustainable investment strategies: The sustainable finance market will become a significant potential source of revenue with increasing investor's appetite.

— Finance directly green companies or projects: Banks may act as underwriters or issue directly green bonds. Besides satisfying rising

34 Society for Worldwide Interbank Financial Telecommunication.

35 Global Sustainable Investment Alliance (2021). The *Global Sustainable Investment Review 2020* is based on biannual data reported by Europe, US, Canada, Australia, New Zealand and Japan since 2014. Europe reported a 13% decline between 2018 and 2020 due to a change in the measurement methodology, which is explained by the review of definitions of sustainable investment in the EU.

demand, green bonds generally offer a lower cost of funding as they seem to be priced at lower rates than non-green bonds [Cardillo, Gallo and Guarino (2021)].

— Provide specialized advisory services on green finance to clients: The new low-carbon model will require a restructuring of many industries. Companies will have to deal with financial, strategic and reputational risks during the transitional period.

As for the *challenge,* banks *can be affected by* two types of risks (Transition Risk and Physical Risk)[36] that need to be taken into consideration in their overall risk assessment. Banks will need to restructure their risk management function to adequately integrate climate-related risk. The main concerns in this respect are the lack of a standardized taxonomy of activities, the difficulty to obtain reliable data to measure the new risks, and the longer forecasting horizon needed, compared to the other customary risk categories.

According to a report published by Oliver Wyman and Morgan Stanley (2020), different approaches to deal with these opportunities and challenges can lead to a difference of 2-3% in RoE of banks.

The transition to a greener economy will likely have less disruptive effects on banks' organisation than the digital transformation, at least in the short term, but banks still have plenty of work to do.

4 The supervisory approach

In general, the banking supervisor has to look after the stability of the banking system as a whole. At the individual bank level, flaws in business models and strategies are often the root causes of banks' vulnerabilities and failures.[37] The supervisor should assess the robustness, profitability and sustainability of the bank's business model to identify banks' vulnerabilities at an early stage, while remaining neutral regarding its management decisions. The supervisor has to be utterly aware of the bank's business strategy and be able to challenge it by performing an in-depth analysis of the prospective profit and loss account. Additionally, the supervisor should assess the feasibility of its implementation and its capacity to adapt to changes in the operating environment. Good quantitative and qualitative information, combined with regular dialogue with the bank and expert judgment,

36 Transition risk includes the financial losses that can directly or indirectly result from the process of adjusting to a low-carbon and more environmentally sustainable economy. Physical risk includes the financial losses that result from the changing climate, that is the more frequent extreme weather events or the gradual changes in climate causing environmental degradation, such as air, water and land pollution, water stress, biodiversity loss or deforestation.

37 Coelho et al. (2022).

are essential elements of the supervisory analysis. Several issues deserve particular attention, such as the digitalization strategy to cope with the changing competitive environment, a potential search for yield strategy increasing the risk level incurred (e.g. through leverage finance), and the robustness of the business model to shocks or deviations from central scenarios (e.g. abrupt changes in interest rates). Besides potential corrective measures, clear and transparent supervisory expectations, as well as moral suasion, can play a relevant role to encourage banks to promptly address the deficiencies identified.

Additionally, supervisory authorities should support and promote a European Single Market that allows for an adequate framework for consolidation, avoiding obstacles such as the incomplete Banking Union or regulatory hurdles.

Following is a preliminary recollection of potential supervisory approaches for the different banks' strategies analysed previously:

Cost reduction: Entities can take immediate and effective action in this area, but in doing so they should not put in jeopardy their risk control functions, their service expectations or their reputation. The three lines of defence model, developed in the past years, is certainly a good organisational measure to avoid bad risk practices. At the same time, sufficient resources and investment in infrastructure are required to guarantee a solid risk structure and the adequate provision of banking services to their client base. Supervisors should pay close attention to banks' cost reduction strategies and their implications.

Consolidation: Authorities do not necessarily need to encourage mergers as such, but they have to make possible the offering of financial services in the EU countries in an effective, efficient and competitive manner. As an example, EBA Chairman José Manuel Campa points at the convenience of concentration at a European level, but considering that concentration isn't as important as such, rather the competitiveness resulting from that concentration […] If we manage to get better operators, competitiveness will improve and that will be better for consumers too.[38]

In general, an effective supervisory framework can cope with the main concerns related to consolidation, such as a too-big-to-fail institution, governance inefficiencies or challenges related to the integration process. In this respect, the ECB Banking Supervision published in January 2021 a guide to clarify the principles underpinning the prudential supervisory approach followed by the SSM to assess consolidation projects.

As established by the guide,[39] ECB Banking Supervision examines the consolidation project from a prudential perspective to verify that the resulting entity meets all

38 Campa (2021).

39 European Central Bank (2021a).

prudential requirements and is also expected to meet them in the future. The strategy underlying the consolidation transaction will be assessed on a case-by-case basis, according to its objectives in terms of capital, strategy, profitability, and risk profile, to determine the sustainability of the consolidated entity.

In addition, the supervisor expects the governance and organisational structure of the business combination to include a strong leadership team with a proven track record, as well as a clear allocation of responsibilities and decision-making processes. An adequate remuneration scheme to set the right incentives is also required. The timely integration of the risk management and internal control framework is another key aspect to take into consideration.

The guide also clarifies the supervisory approach to key prudential aspects of the consolidation transaction, including the timing for communication, the Pillar 2 requirement and guidance, the recognition of badwill, and the use of internal models.

In terms of the Banking Union, the Single Rulebook, the SSM harmonised supervisory practices and the Single Resolution Mechanism have been significant developments to make cross-border mergers easier. However, there are still national specificities that discourage these operations in Europe, including obstacles to manage the capital and liquidity of the merged bank on a fully consolidated basis. The introduction of the European Deposit Insurance Scheme would contribute to removing local incentives. Besides, designated authorities (responsible for macroprudential tools) shall assess the systemic footprint of newly merged banks, as there are national decisions on capital buffers for systemically important institutions.

Digital transformation: The relevance of this topic from a supervisory perspective is evidenced by its selection as one of the SSM Supervisory Priorities[40] for the next three years. The supervisor will intensify its efforts to benchmark and assess banks' digitalisation strategies to ensure they have adequate arrangements to sustain their business models in the future. Closely related are the activities planned for IT outsourcing risks and cyber threats.[41] The supervisor will focus on assessing the adequacy of banks' cyber resilience, and establish a follow-up process for banks with significant vulnerabilities.

From a broader perspective, there is currently a very intense debate regarding the public policy implications of technology firms expanding into the financial services industry. Issues such as consumer protection or financial stability are being assessed against competition, innovation, efficiency or level playing field considerations. The

40 Priority 2 for the period 2022-2024: Structural weaknesses are addressed via effective digitalisation strategies and enhanced governance [European Central Bank (2021c)].

41 Priority 3 for the period 2022-2024: Emerging Risks are tackled, with deficiencies in IT outsourcing and cyber resilience as one of the vulnerabilities identified [European Central Bank (2021c)].

result of this debate will eventually shape the new regulatory landscape for the provision of financial services.

Green finance: The ECB has decided to set up a climate change centre in order to compile all the climate-related work carried out by its different business areas.[42]

ECB Banking Supervision has identified climate change as one of the key risk drivers for the European banking sector. In 2020 it has published a guide which describes how the ECB expects institutions to consider climate and environmental-related risks both in their business strategy and in their governance and risk management framework. Institutions are also expected to enhance their climate-related and environmental disclosures becoming more transparent. The guide includes a list of thirteen non-binding supervisory expectations intended to serve as a basis for the supervisory dialogue. Banks have been requested to conduct a self-assessment for climate risk and draw up action plans. Climate and environmental-related risk is also among the SSM Supervisory Priorities for 2022-2024[43] and a climate risk stress test, assessing both physical and transition risks, is being carried out in 2022.

Scope of activities and relationship banking: Regarding the scope of activities and a potential relationship banking strategy, prudential supervisors should keep a more neutral stance. Again, the supervisory activity should be focused on assessing the sustainability of the business model, as well as the governance and risk management framework. In addition, proper care should be given to the institution's conduct with clients and anti-money laundering and counter-terrorism financing (AML/CTF) issues.

5 Conclusion

The present business environment is very challenging for traditional banks, having to face both long-lasting structural difficulties (e.g. a prolonged low interest rate environment with future uncertainty and overcapacity), as well as more recently developing challenges (e.g. the digital disruption and green finance as a new paradigm of socially responsible institutions). A very demanding regulatory environment and the impact of the COVID-19 pandemic further aggravate the situation. As a result, European banks are not being able to produce enough returns to cover their cost of capital, mostly trading below book value, and with an urgent need to cope with this vulnerable situation.

Banks can adopt different strategies to deal with the new competitive landscape in a highly uncertain future for the banking industry. Further efforts are needed to

42 European Central Bank (2021d).

43 Priority 3 for the period 2022-2024: Emerging Risks are tackled, with exposure to climate-related and environmental risks as one of the vulnerabilities identified [European Central Bank (2021c)].

enhance cost efficiency and consolidation remains an area that needs to be further explored, mostly at a European level, allowing for a truly unified European banking system. Banks may also review the scope of activities they are involved in and exploit long-term relations with clients in certain business lines. Whatever the chosen competitive strategy, banks will need to adapt their processes and distribution channels to the new digital environment. Finally, the business related with green finance can become an area of opportunity in which European banks could take a leading position in the medium term.

The banking supervisor needs to understand banks' business models, assess their robustness, profitability and sustainability, and be able to challenge them from a prudential supervisory perspective, while remaining neutral regarding management decisions. Supervisory authorities should devote special attention to banks' digitalisation strategies and support the path towards a more integrated European Market.

In a nutshell, European banks need to take decisive action to cope with the deep structural changes that the banking system is undergoing. There is much work ahead, some to be dealt with in the short term (e.g. cost rationalisation), and some more likely in the medium term (e.g. a digital or a green finance strategy), but inevitably, time has come for banks to steer the transformation and redefine their competitive strategies. Supervisory authorities will have to closely monitor these processes.

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Bank fees and charges: economic analysis, legal framework and relevance for financial stability

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BANK FEES AND CHARGES: ECONOMIC ANALYSIS, LEGAL FRAMEWORK AND RELEVANCE FOR FINANCIAL STABILITY

Abstract

This article analyses recent developments in Spanish banks' fee and commission income and the related applicable legal framework. The main conclusions point to the increasing relevance of payment services, the overall rise in such income in Spain, in clear alignment with other European jurisdictions (though it still lags behind), and the role it can play in sustaining bank profits and solvency during economic downturns. There is also a trend towards the introduction of new charges. From a regulatory perspective, there are recent legislative initiatives that aim to guarantee ATM cash withdrawal services, to consider certain banking services universal, to bridge the digital gap and to ensure compliance with the statutory requirements concerning payment accounts with basic features. Nonetheless, the current legal framework does not grant the Banco de España any powers to authorise or overrule fees or charges or to limit their amount. While growing this income stream may have a positive impact on banking sector stability, it may also entail certain risks, such as the migration of customers to new digital operators, the impact on financial inclusion or the harm to credit institutions' reputations.

Keywords: bank fees and charges, banking business, financial stability, regulation.

1 Introduction

In recent years, fee and commission (F&C) income has become an increasingly important source of revenue for Spanish banks, particularly in connection with payment services. This development forms part of a process of convergence at European level, in which the gap between Spain and the European average has narrowed as such fees and charges have gradually increased.[1]

While this process of convergence has helped mitigate the downturn in banks' profitability, it has also sparked a growing public debate on the amount and design of such fees and charges and their cost for customers. Moreover, all of this is taking place in the midst of a change of model, brought about by the increasing digitalisation of services and influenced by the emergence of new financial operators.[2]

1 For instance, between 2015 and 2021, the gap between the fee and commission income-to-total assets ratio for business in Spain and the average ratio for Germany, France, Italy and the Netherlands combined narrowed by around 27%.

2 As borne out, for instance, by the 10.6% year-on-year increase in charges by banks and post offices recorded in the December 2021 consumer price index (see *2021 consumer price index, charges by banks and post offices*, Spanish National Statistics Institute (INE)).

The evidence at European level suggests that, much like net interest income, bank fees and charges are sensitive to the economic cycle. Nonetheless, while there is a degree of heterogeneity across different banking services and financial institutions, fee and commission income is generally more resilient to adverse scenarios than net interest income. Thus, in certain adverse scenarios, banks' solvency may be safeguarded where such fees or charges account for a larger share of their income.[3]

This behaviour suggests that, from a financial stability standpoint, a greater weight of F&C income in banks' revenues could, in principle, be seen as a plus, particularly where the additional profits are used to build up capital. However, these developments may also entail unwanted consequences, such as greater financial exclusion, difficulties in the use of certain means of payment or the migration of customers to other providers and services. While the likelihood and severity of such consequences are uncertain, they could ultimately exact a reputational toll on banks vis-à-vis their customers, to the detriment of long-term profitability.

With a view to contributing to the research on this subject, this article takes stock of the current situation and the future outlook for F&C income in Spain from an economic standpoint. It also analyses the current regulatory framework (which does not grant the Banco de España any powers to authorise or overrule charges or to limit their amount) and the latest developments in this regard. The rest of this article is approached from these two angles. First, the economic aspects are addressed, followed by an analysis of the regulatory features, before finishing with a brief description of how bank fees and charges have evolved. An annex with supplementary information from the econometric analysis is included at the end.

2 Economic aspects

2.1 Recent developments and current situation

Fees and charges have traditionally been a stable source of revenue for Spanish banks, albeit secondary to net interest income which is the core component of their regular income. With the downward trajectory of interest rates, in negative territory since mid-2014, and the ensuing squeeze on net interest margin, alongside the gradual process of streamlining and restructuring banks' balance sheets, earning income through bank fees and charges has emerged as one way of shoring up profits.

Chart 1.1 shows the developments in Spain in the gross F&C income-to-total assets ratio for the country's significant[4] and less significant deposit-taking institutions since the end of the downturn following the global financial crisis that began in 2008,

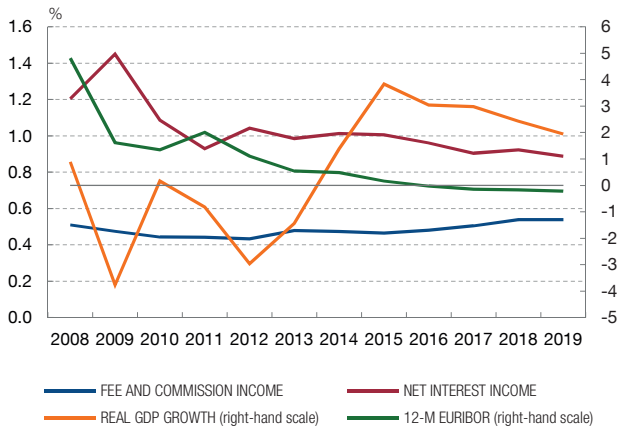
3 See European Central Bank (2016 and 2017).

4 Significant institutions are those directly supervised by the European Central Bank (Single Supervisory Mechanism).

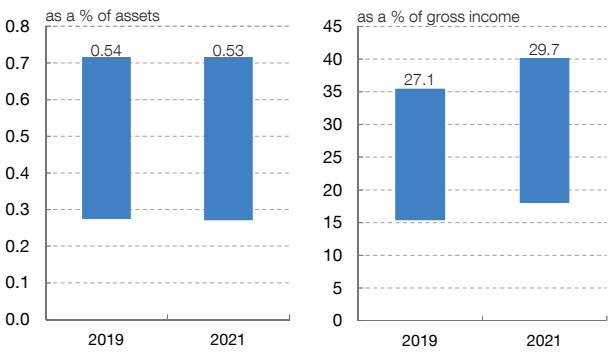
Chart 1

COMPARISON OF DEVELOPMENTS IN TOTAL GROSS FEE AND COMMISSION INCOME (a)

1 HISTORICAL DEVELOPMENTS IN GROSS FEE AND COMMISSION INCOME
Business in Spain



2 RECENT DEVELOPMENTS IN GROSS FEE AND COMMISSION INCOME
Business in Spain



SOURCE: Banco de España.

a Fee and commission income and net interest income are shown divided by total assets. The floating columns in Chart 1.2 represent the range of values between the 15th and 85th percentiles of the sample of Spanish deposit-taking institutions. The value shown above the columns is the aggregate average for all of them.

together with other key variables: net interest income-to-total assets, real GDP growth and the 12-month EURIBOR. At December 2019, before the health crisis hit, gross F&C income[5] stood at 0.54% of total assets, with an upward trend in recent years accompanied by falling interest rates and a recovery in activity. Similarly, net interest income accounted for 0.89% in 2019, trending slightly downwards in this case.

Chart 1.2 shows the change in the gross F&C income-to-total assets ratio between 2019 and 2021, which fell slightly from 0.54% to 0.53% due to the health crisis. It is nonetheless worth noting that, in gross income terms, the share of F&C income rose from 27.1% to 29.7% thanks to the greater resilience of this revenue stream to the economic downturn. This increase in the share of F&C income is a general phenomenon and can be seen across the distribution of banks, as borne out by the increase in the 15th and 85th percentiles.

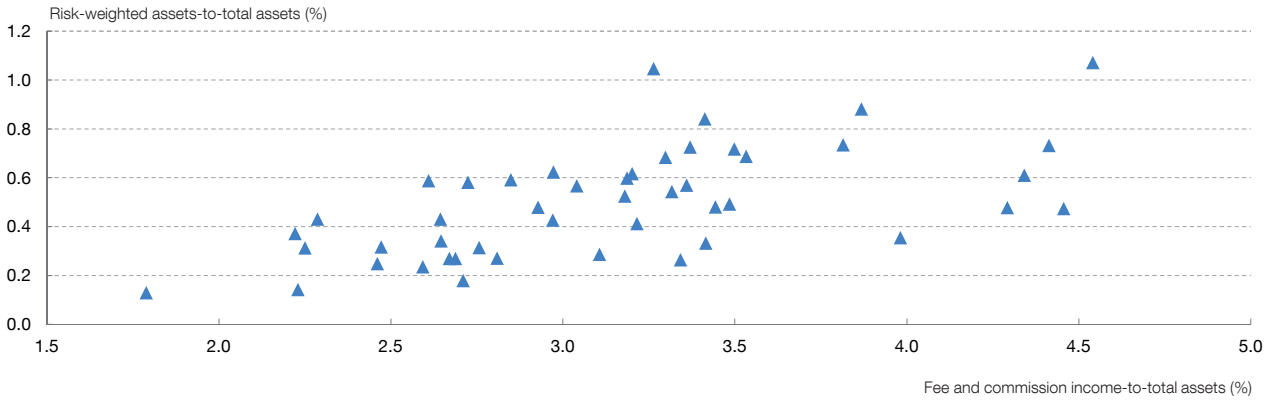
As a counterpoint to this growth in F&C income, it should be noted that certain operational risks are assumed when providing banking services. Chart 2 shows, for significant and less significant institutions alike, a positive correlation between higher F&C income and greater operational risk, the latter being measured by dividing banks' risk-weighted assets by their total assets.[6]

5 In other words, net of any fee and commission expenses incurred by banks.

6 This positive correlation is consistent with the fact that, as far as operational risk is concerned, risk-weighted assets are currently a function of gross income (which includes F&C income) under both the standardised and the basic indicator approach.

Chart 2

CORRELATION BETWEEN TOTAL GROSS FEE AND COMMISSION INCOME AND OPERATIONAL RISK (a)



SOURCE: Banco de España.

a Data at December 2021. The fee and commission income-to-total assets ratio represents business in Spain, whereas the data on risk-weighted assets are available on a consolidated basis, and therefore include business abroad. To avoid distorting the correlation, the banks most active internationally have been excluded from the chart.

F&C income can be broken down by type of underlying service; for instance, payment services, services relating to customer resources distributed but not managed (including, in particular, the marketing of third-party products, such as funds or insurance), securities management, custody services, financial advice and foreign exchange or commodity-related services, among others. At December 2021, the top two categories in terms of F&C income for Spanish banks were payment services, accounting for 31.2% of the total, followed very closely by customer resources distributed but not managed, representing 28.1% of the total.

Given its increasing public prominence in recent times, income from payment services is analysed in further detail below, before touching briefly on income from customer resources distributed but not managed at the end of the section.

Payment services-related fee and commission income is of particular interest for several reasons. First, the payment services operating model is currently undergoing a significant change thanks to increasing digitalisation.[7] How customers respond to this new model poses the biggest challenge, particularly given the emergence of new digital operators (fintech and bigtech),[8] precipitated by the liberalisation envisaged in the second EU Payment Services Directive (PSD2).[9] While the role of

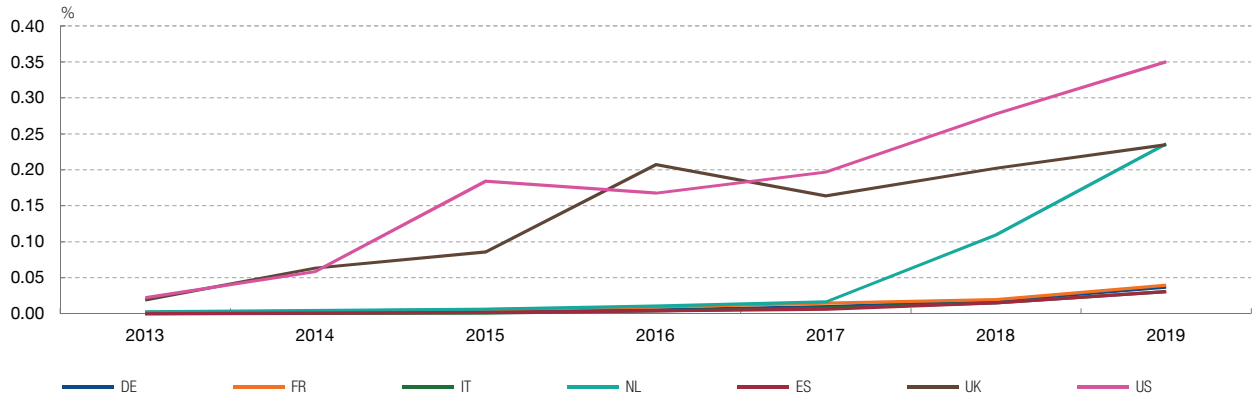
7 Indeed, new technological capacities may give rise to the design of new business models. See Martínez Resano (2021).

8 In layman's terms, fintech refers to institutions that use new digital technologies to offer innovative financial services, whereas bigtech refers to large technological corporations with a strong presence in the regular, widespread use of digital devices and services.

9 Transposed into Spanish law in 2018, the Directive obliges banks to allow other payment service providers to access their customers' payment accounts.

Chart 3

DEVELOPMENTS IN BIGTECH AND FINTECH CREDIT (a)



SOURCE: Cornelli et al.(2020).

a The chart shows, at consolidated level, the lending by fintech and bigtech operators as a percentage of the traditional financial sector's total lending to non-financial corporations. Data available up to 2019. DE: Germany; FR: France; IT: Italy; NL: The Netherlands; ES: Spain; UK: United Kingdom; US: United States.

these new competitors in lending activity in Spain's neighbouring economies remains anecdotal (see Chart 3), they are seeing sustained growth, and their business model is characterised by the ability to offer payment services at a lower cost thanks to a more efficient technical infrastructure and potential monetisation of their customer user data.

Moreover, the emergence of new digital payment mechanisms, such as instant transfers (which are increasingly commonplace in Spain and could soon also be used in retail in place of credit card payments), is likely to bring about an overhaul of the payments model itself, which would naturally cross over to the model for collecting the associated fees and commissions. Particularly noteworthy is the possible issuance of a digital euro by the European Central Bank (ECB), which in July 2021 gave its approval for a study of the viability, design, risks and operating and legal requirements of such a currency, starting in October 2022 and set to last two years.[10] Depending on the final design, this payment instrument, which would also include transactions between individuals and retailers, could have a sizeable impact on fee and commission income.[11] The manner and extent to which traditional banks will be affected by such innovations remains unclear, but it seems reasonable

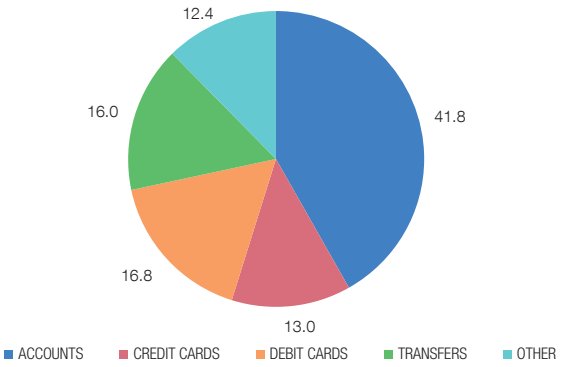
10 See European Central Bank (2020 and 2021).

11 The creation of a personal digital wallet in which to keep digital euro, unrelated to any particular bank, could have a considerable impact on the financial system, particularly in a very low interest rate setting. According to the latest Spanish Survey of Household Finances (2017), 93.8% of Spanish households hold an account or deposit from which payments can be made, with an average balance of €4,100 (€2,000 in the case of the under-35s). Such deposits could be converted, at least partially, into digital euro, which could have a major impact not only on bank fees and charges but also in areas such as monetary policy transmission or the prevention of money laundering. See Box 2.3 of the *Financial Stability Report*, Spring 2021.

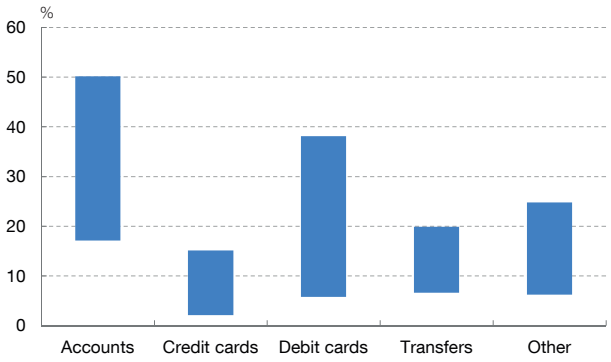
Chart 4

COMPOSITION OF GROSS FEE AND COMMISSION INCOME IN SPAIN FROM PAYMENT SERVICES (a)

1 BREAKDOWN OF FEE AND COMMISSION INCOME BY TYPE OF PAYMENT SERVICE
Business in Spain, %



2 DISPERSION IN THE WEIGHT OF FEE AND COMMISSION INCOME, BY PAYMENT SERVICE



SOURCE: Banco de España.

a Data at December 2021. The floating columns in Chart 4.2 represent the range of values between the 15th and 85th percentiles of the sample of Spanish deposit-taking institutions.

to expect that the business of earning income from the provision of payment services will have to adapt to a substantial operational change.[12]

Payment service charges are also notable for the significant volume of complaints and claims they generate from the average bank customer,[13] as well as their direct impact on aspects such as financial exclusion or preferred means of payment.

Chart 4 shows a breakdown of the gross fee and commission income associated with payment service charges for the significant institutions sampled, based on data at December 2021.

Overall, current account-related charges account for the largest share (41.8% of the total), followed by charges on debit cards (16.8%), transfers (16%) and, lastly, credit cards (13%). "Others" accounts for the remaining 12.4%. The dispersion in the different services across banks is notable, testifying to the wide range of commercial approaches. Particularly noteworthy is the heterogeneity in the share of both debit and credit cards, as a result of the various customer loyalty reward strategies on the market.

12 See Senabre, Soto and Munera (2021) for an analysis of some of the challenges associated with this operational transformation.

13 For instance, in recent years the Banco de España's Institutions' Conduct Department has seen a significant rise in the number of claims concerning fees and charges on financial services, mainly deriving from fees and charges on the provision of current account-related services. Thus, while 1,545 cases relating to such issues were processed in 2019, this number rose to 2,964 in 2020 (a 91% increase on the preceding year), while the provisional figure for 2021 H1 stands at 2,226 (which, extrapolated to an annual figure, represents, in turn, an increase of 50% on 2020).

Finally, it is worth recalling that payment services also generate an array of operating costs for banks,[14] due to the need to use the financial market infrastructures that manage and operate the systems used by banks to exchange, clear and settle transfers and direct debits. These systems set their own operating rules, including the costs to be borne by banks for using them and for settling transactions.[15] Moreover, to exchange transactions, banks have to use financial communication networks and technical service providers[16] that connect them to such networks and to their correspondent banks in the payment chain.

Lastly, the two main sources of income from customer resources distributed but not managed are the marketing of funds (55.9% of the total) and of insurance (40.2%). With a share of total revenue very similar to that of income from payment services, these are significant income streams for Spanish banks. In addition, at least initially, they are less likely to be affected by the emergence of new digital competitors, since it is precisely the traditional banks' commercial networks, together with the cross-selling of other banking products, that essentially generate the sizeable returns from these types of fees and charges. Nonetheless, over the longer term, if the new operators are able to secure a larger customer base, they will also be able to compete for these types of marketing services and the associated revenue.

2.2 Stylised empirical facts

This section analyses the relationship between F&C income and both the economic cycle and bank characteristics from an empirical standpoint. To this end, a panel of significant institutions has been considered, for annual periods running from 2000 to 2019, with a view to capturing developments over a sufficiently long time window that includes expansionary and recessionary periods. The panel stops at 2019 to ensure that the effects of the COVID-19 pandemic (a contraction in economic activity over a single year without precedent in recent times, together with the simultaneous roll-out of an ambitious package of support measures) do not distort the findings.

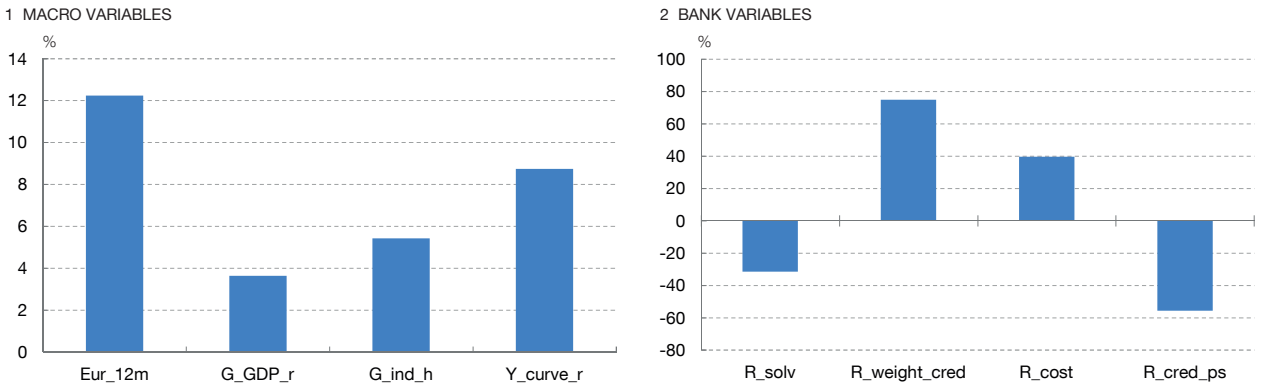
14 The costs can vary from bank to bank depending on whether they opt to settle transactions directly or indirectly via a settlement agent, on the volume of transactions settled and on other considerations.

15 In Spain, most transfers and direct debits are processed using the National Electronic Clearing System (SNCE, by its Spanish initials), currently managed by Iberpay, with the exception of "on-us" transactions in which the payer and payee have the same bank and which are therefore settled directly on its books. The SNCE also has gateways connecting to other European infrastructures for cross-border SEPA transfers, such as STEP2, RT1 or the TARGET 2 TIPS service. Another alternative are urgent transfers (OMF, by their Spanish initials) or "Banco de España transfers", which are settled in TARGET 2. International and foreign currency transfers are processed via the correspondent banking networks established by each institution by entering into contracts for services, which may be reciprocal or otherwise.

16 Examples of such providers include SWIFT, Movistar and SIA. SWIFT is one of the network service providers on the leading European payment systems, such as TARGET2 (TIPS), STEP2 and the SNCE itself (together with Movistar). SWIFT is also the network used by banks to send foreign currency transactions to their correspondent banks.

Chart 5

ELASTICITIES OF THE FEE AND COMMISSION INCOME-TO-TOTAL ASSETS RATIO WITH RESPECT TO THE KEY VARIABLES IN THE EXPLORATORY ANALYSES OF STYLISED FACTS (a)



SOURCE: Banco de España calculations.

a Marginal elasticities obtained separately in each exercise. All the variables are statistically significant (p-value <0.1). In the case of the analysis of bank variables, these are lagged by one period in the model. The following variables are considered: Eur_12m, twelve-month EURIBOR; G_GDP_r, real GDP growth; G_ind_h, growth in the house price index; Y_curve_r, yield curve: spread between ten-year bonds and the twelve-month EURIBOR; R_solv, own funds-to-total assets; R_weight_cred, credit-to-total assets; R_cost, financial costs-to-financial liabilities; R_cred_ps, average rate of lending to the private sector.

The left-hand variable of the regressions is the total gross F&C income, expressed as a percentage of total assets to approximate the average unit fees and charges. The data come from supervisory financial reporting and refer to business in Spain. Two analyses are considered: one of the effect of the macro variables and the other of the effect of the bank variables. Chart 5 shows the elasticities[17] of the most relevant variables in the two exercises, whose main findings are addressed below. Further information can be found in the annex.[18]

With respect to the first exercise, the right-hand side of the regression includes variables that capture changes in economic activity, in order to study the cyclical sensitivity of gross F&C income, an area of interest from a financial stability standpoint. A bank fixed effects variable is also included to capture differences in banks' business models.[19]

The results reveal the markedly cyclical behaviour of F&C income in Spain. Positive and statistically significant coefficients are thus obtained for real GDP growth,

17 In other words, the relative increase in the dependent variable (F&C income-to-total assets) in the event of a given relative increase in a particular explanatory variable, holding all other variables stable, measured in terms of the relative increase in the latter. For instance, an elasticity of 25% means that the dependent variable will increase by one fourth of the increase in the explanatory variable, in line with the above considerations.

18 Alongside the results of the regressions that consider all of the independent variables (full models), which are analysed in this section, the annex also includes the results of additional regressions with a subset of independent variables (reduced models).

19 The estimation has been made using the ordinary least squares (OLS) method robust to heteroscedasticity and autocorrelation.

Madrid stock market growth and house price growth, while the unemployment rate has no significant impact.

As for the effect of interest rates, the coefficient is positive and significant in terms of both the short-term interest rate, represented by the 12-month EURIBOR, and the slope of the yield curve, represented by the spread between the 10-year rate and the 12-month EURIBOR. This suggests that, historically, at any given point in the economic cycle, this is the setting in which banks can accommodate higher prices for such services, thereby earning higher returns.

Lastly, there is a statistically significant and negative correlation with aggregate domestic credit growth. Once controlled for the position in the cycle and the level of interest rates, this probably reflects the more stable nature of F&C income[20] and the fact that credit is the core component of Spanish banks' assets, and any decline in the former therefore immediately triggers a decline in the latter (which is the denominator in the ratio analysed).

The second empirical analysis conducted on this panel seeks to study which bank characteristics are correlated with gross F&C income. To this end, a regression including some of the most relevant bank characteristics (solvency, liquidity, risk, profitability and business profile) is used, together with bank and time-fixed effects so as to isolate the cyclical conditioning factors.[21]

The results obtained reveal various aspects of interest. Solvency has a statistically significant negative effect, suggesting that weaker banks tend to focus on charging fees and commissions, possibly as a means to shore up profits and solvency. The effect is also significant (positive in this case) for the share of credit as a proportion of total assets, suggesting that institutions more geared towards traditional banking are better able to generate F&C income.[22] Conversely, the distribution of bank lending between retail and wholesale customers has no significant impact.

In terms of profitability, while return on assets (ROA) has no significant effect, probably because it includes other non-regular income, the same cannot be said of two profitability metrics more closely linked to traditional banking. Thus, banks earning higher returns from lending to the private sector tend to earn more F&C income. There is also a significant correlation (positive in this case) with the cost of liabilities, meaning that banks with higher costs also tend to earn higher returns from

20 For instance, the regular demand for payment services from a bank's customers is not severely affected by any moderate increase or decrease in their credit exposure to the institution.

21 As above, the estimation has been made using OLS robust to heteroscedasticity and autocorrelation.

22 This finding regarding credit tallies with the previous one (where the effect was negative) bearing in mind that, in this case, the comparison is between banks at a given point in time, meaning that those most active in lending also earn the highest returns from fees and commissions. Nonetheless, at aggregate level and over time, given the more stable nature of F&C income, a fall in lending, all else being equal, leads to a rise in the F&C income-to-assets ratio.

fees and commissions. The combination of the two sensitivities may reflect a commercial strategy that seeks to strike a balance between the net interest margin earned from credit intermediation and the F&C income earned from the provision of banking services.

Meanwhile, the number (relative to volume of credit) of employees reveals a positive and significant coefficient, consistent with the fact that this probably reflects a larger commercial network, making it easier to provide some banking services and thus earn the associated fees and commissions.

Lastly, the liquidity position does not have a significant effect, nor does growth in individual credit at each bank, once fixed effects are used to control for aggregate cyclical movements.

2.3 International comparison

A comparison of bank fees and charges in Spain and in other European countries is useful, in particular to identify any distinguishing characteristics. However, the international information available is at consolidated level for all of the banking groups and individual institutions of each country (and therefore includes F&C income from foreign subsidiaries).[23]

That said, Chart 6 compares net F&C income as a percentage of total assets (Chart 6.1) and of gross income (Chart 6.2) for a sample of the main euro area economies, as well as for the region overall, for December 2015 and December 2021, with a view to capturing the recent developments in these metrics up to and including the health crisis.

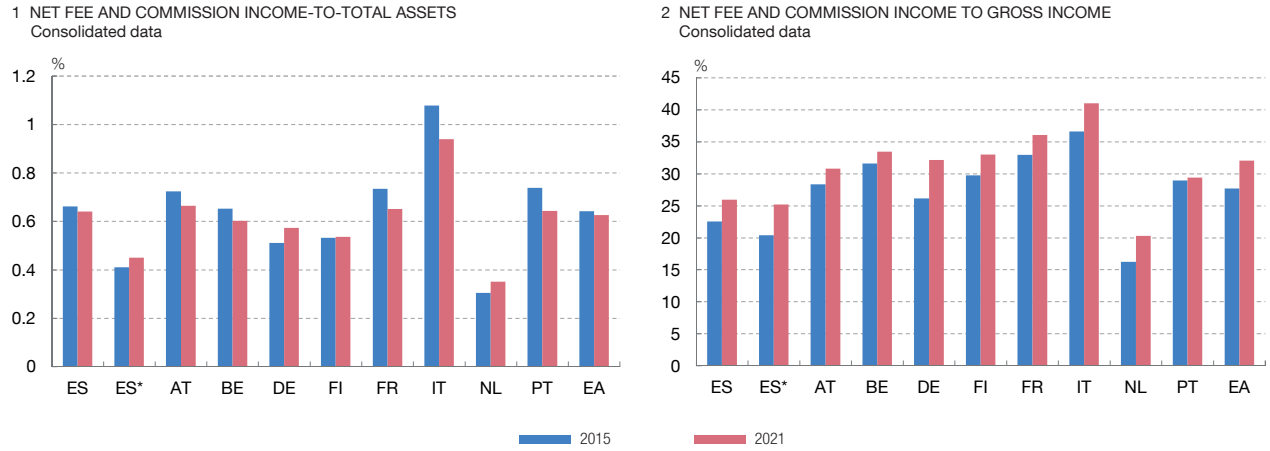
In terms of fee and commission-generating capacity, Chart 6.1 shows the changes in F&C income between 2015 and 2021. Prior to the pandemic, Spain (0.64%) was at the euro area average, albeit trailing neighbouring countries such as Italy (0.94%), France (0.65%) and Portugal (0.65%). In any event, it is important to note that these figures also include international business. If only business in Spain is considered, the Spanish ratio stands at 0.45%, which indicates that international business generates significantly more F&C income than business in Spain. Indeed, in this sample, only the Netherlands trails Spanish banks in domestic business.

In terms of share of gross income, a clear upwards trend can be seen in most countries, as well as in the euro area overall, which is consistent with the strength of this revenue stream in a low-interest rate environment. In Spain, this share rose from 22.5% to 26% between 2015 and 2021, though it still lags significantly behind most

23 The following national identifiers are used in the international comparison: AT: Austria; BE: Belgium; DE: Germany; ES: Spain; ES*: business in Spain; FI: Finland; FR: France; IT: Italy; NL: The Netherlands; PT: Portugal; EA: Euro Area.

Chart 6

TOTAL NET FEE AND COMMISSION INCOME FOR THE MAIN EURO AREA COUNTRIES (a)

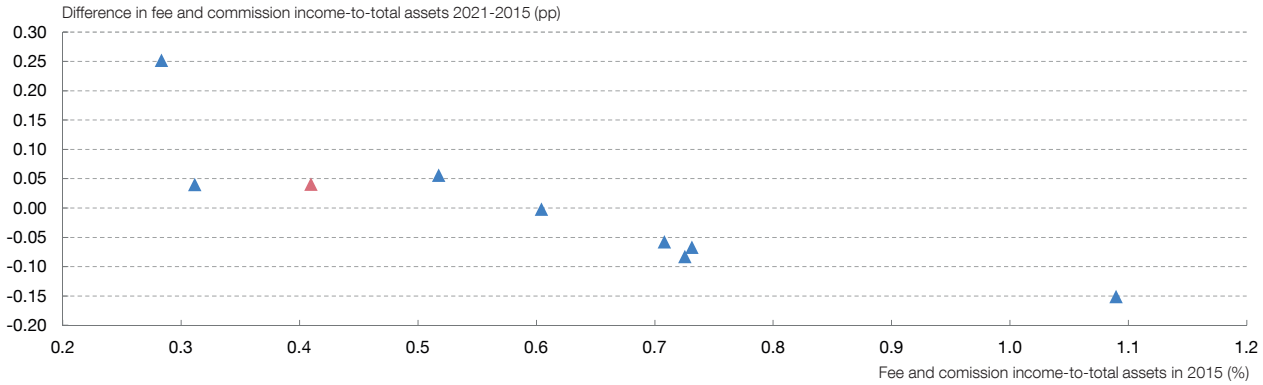


SOURCES: Statistical DataWarehouse, ECB.

a ES: Spain; ES*: business in Spain; AT: Austria; BE: Belgium; DE: Germany; FI: Finland; FR: France; IT: Italy; NL: The Netherlands; PT: Portugal; EA: Euro Area.

Chart 7

CONVERGENCE IN NET FEE AND COMMISSION INCOME-TO-TOTAL ASSETS IN THE EURO AREA (a)



SOURCE: Statistical DataWarehouse, ECB.

a The horizontal axis shows the level of net fee and commission income-to-total assets in 2015, while the vertical axis shows the difference in that metric between 2015 and 2021. All figures are at consolidated level, save for Spain, for which the aggregate of domestic business is shown. The red triangle denotes Spain.

euro area countries, where the overall share stood at 32% at end-2021. In terms of business in Spain, the Spanish ratio stood at 25.2% in 2021.

Despite the gap between countries shown in Chart 6 for 2021, the period since 2015 has also seen a degree of convergence, even despite the effects of the pandemic, as borne out by Chart 7, which compares net F&C income-to-total assets in 2015

(horizontal axis) with the difference in that metric between 2021 and 2015 (vertical axis) for the set of countries included in the previous chart (only domestic business has been considered for Spain).

3 Regulatory aspects

3.1 General legal framework

In addition to the analysis of the economic features set out in the preceding section, it is also important to examine the legal framework currently in force in Spain in relation to the fees and charges levied by credit institutions in connection with the provision of banking services, including, for these purposes, payment services.

This regulatory framework is based on credit institutions' freedom to establish fees and charges with their customers[24] (save in very specific cases where fees and charges on particular banking transactions or services are expressly limited),[25] provided they are for services requested or expressly accepted by the customer and effectively rendered by the credit institution. Moreover, credit institutions can also charge any expenses they incur when providing a service. The freedom to establish fees and charges is intrinsically linked to the freedom to conduct a business enshrined in Article 38 of the Spanish Constitution, and has taken its place alongside other legitimate rights and interests in competition law.[26]

In this respect, credit institutions are subject to certain transparency requirements,[27] with a particular focus on the pre-contractual and contractual information to be provided to customers when entering into or amending existing contracts, including, for such purposes, any specific fee and commission-related clauses.

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24 See Article 5(1)(b) of Law 10/2014 of 26 June 2014 on the regulation, supervision and solvency of credit institutions; Article 3 of Ministerial Order EHA/2899/2011 of 28 October 2011 on transparency and customer protection in banking services, and Banco de España Circular 5/2012 of 27 June 2012 to credit institutions and payment service providers on the transparency of banking services and responsible lending (Spanish versions only).

25 As with any right, the freedom to conduct a business is not absolute or unconditional, but rather it is subject to any statutory regulations the public authorities may enact with respect to different business activities (see, by way of example, Constitutional Court Judgment 18/2011 of 3 March 2011 (Spanish version only)) .

26 The Constitution's recognition of a market economy, as the necessary framework for the freedom to conduct a business, and the undertaking on the part of the public authorities to safeguard this right, call for action specifically tailored to upholding such constitutional aims. One such action consists of preventing any practices that might affect or seriously harm an element as crucial to the market economy as is competition between businesses. Thus, competition protection emerges as a necessary safeguard for (as opposed to a restriction on) the freedom to conduct a business and the market economy, which would otherwise be threatened were the natural tendencies of the latter given free rein (see Legal Ground 4 of *Constitutional Court Judgment 88/1986 of 1 July 1986* (Spanish version only)). Meanwhile, Spain's membership of the European Union and the EU's fundamental freedoms (i.e. free movement of persons, services, goods and capital) are essential to the development of free competition and underpin this principle. In particular, Title VII (articles 101 et seq) of the Treaty on the Functioning of the European Union sets out the bases for the numerous EU competition regulations.

27 For the purposes of the transparency regulations, the term "customers" is understood to refer to natural persons (see Article 2(1) of *Ministerial Order EHA/2899/2011 of 28 October 2011 on transparency and customer protection in banking services* (Spanish version only)).

In other words, in general terms, bank fees and charges are set freely under the general legal framework. The Banco de España does not authorise bank fees and charges, nor may it overrule them or limit their amount. Yet it supervises the institutions within its remit and sanctions any breaches of the transparency and customer protection regulations in the area of banking services, payment services included.

Furthermore, the Banco de España is tasked with handling any complaints from financial services users and with settling any claims deriving from possible infringements of the transparency and customer protection regulations or of good financial practices.[28]

From a legal perspective, the final decisions issued by the Banco de España's Institutions' Conduct Department, which settles any complaints lodged by banks' customers, are not binding, nor deemed administrative decisions subject to appeal. Nonetheless, in early 2022 the Ministry of Consumer Affairs announced that measures would be approved requiring that institutions abide by any Banco de España decisions and rulings that find in favour of credit institutions' customers.[29]

Examples of the general transparency requirements in fees and charges on banking[30] and payment services[31] are set out in Table 1.

Moreover, the rules on cross-border payments within the European Union require that any fees and charges levied by a payment service provider on a payment service user in respect of cross-border payments must be the same as the fees and charges

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28 See *Ministerial Order ECC/2502/2012 of 16 November 2012 regulating the procedures for the filing of complaints with the complaints services of the Banco de España, the National Securities Market Commission (CNMV) and the Directorate General for Insurance and Pension Funds* (Spanish version only). In 2020, the Banco de España processed a total of 21,320 complaints. Current accounts and deposits accounted for 4,192 complaints, notable examples including those concerning fees charged to accounts (1,147 due to maintenance fees and 987 to other fees and charges).

29 According to the Governor of the Banco de España, the fact that the Banco de España's decisions are not binding on banks "constrains the effectiveness of the complaints system and […] should be given consideration in any future amendment" to the current regulations (see P. Hernandez de Cos (2021), *"Bank governance and conduct. Keys for the reputation and sustainability of banks' business models in Spain"). Specifically, this issue is addressed in the Draft Bill of the Law for the creation of an Independent Administrative Authority for the Protection of Financial Customers, open for public consultation until 12 May 2022, which seeks to centralise within one single body the current complaints services of the Banco de España, the CNMV and the Directorate General of Insurance and Pension Funds, whose decisions will be binding on financial institutions for complaints amounting to €20,000 or less.*

30 See *Ministerial Order EHA/2899/2011 of 28 October 2011 on transparency and customer protection in banking services* (Spanish version only).

31 See Articles 29 and 33 of *Royal Decree-Law 19/2018 of 23 November 2018 on payment services and other urgent financial measures*; Chapter IV of *Royal Decree-Law 19/2017 of 24 November 2017 on payment accounts with basic features, payment account switching and the comparability of fees*; Article 14 of *Ministerial Order ECE/1263/2019 of 26 December 2019 on transparency of the disclosure terms and conditions and requirements applicable to payment services*; and *Banco de España Circular 2/2019 of 29 March 2019 on the requirements of the Fee Information Document and the Statement of Fees, and of payment account comparison websites* (Spanish versions only).

Table 1
TRANSPARENCY REQUIREMENTS

	Banking services	Payment services
Information	On the fees and charges habitually applied/expenses passed through, in a standardised format per the Banco de España rules	On terms and conditions relating to the payment services provided, including the associated expenses
		This information forms part of the content of the framework contract. Handover of the "Fee Information Document" or ("FID") with the fees and charges applicable to the most representative services associated with the payment account
Services via distance communication/ATMs/similar devices	Details of the applicable fees and charges and the expenses to be passed through immediately prior to providing the service	Not applicable
Pre-contractual information	Presentation of fees in a manner that is clear, appropriate, sufficient, objective and not misleading	The fees and charges included in the pre-contractual (and contractual) documentation must match the FID in terms of concept and amount
Contract amendments	The contract must provide for the credit institution's rights and obligations as regards the modification of the fees and charges/relevant expenses, as well as the customer's rights where such amendments are made	
	Any amendment to the terms and conditions of a contract must be notified beforehand, at least one month in advance (provided the initial contract term is longer), unless it is more favourable to the customer in which case it may be applied immediately	Any amendment to the terms and conditions of a framework contract must be notified individually to customers beforehand, at least two months in advance of the date on which the proposed amendment enters into force
		Customers may accept or reject the amendments to the framework agreement before the date proposed for their entry into force, by the same means with which they were notified. Customers may terminate the contract where they disagree with the amendment
		Any amendments that unequivocally benefit payment service users may be applied immediately

SOURCE: Devised by authors.

levied by that payment service provider on national payments of the same value and in the same currency.[32]

Lastly, alongside the sectoral regulations specific to banking and payment services referred to above, such services are also affected by the general consumer and user protection regulations,[33] an area in which a range of public authorities and bodies with different remits come into play, at central and regional government level. While an analysis of such regulations falls outside the scope of this article, it should be highlighted that, as companies, financial institutions are also subject to certain

32 See Article 3(1) of *Regulation (EC) No 924/2009 of the European Parliament and of the Council of 16 September 2009 on cross-border payments in the Community and repealing Regulation (EC) No 2560/2001*.

33 The parties to which the general consumer and user protection regulations apply are different from those subject to the transparency regulations. Specifically, "consumer" or "user" refers to natural persons acting for a purpose unrelated to their commercial or business activity, trade or profession, and legal persons and entities without independent legal status acting on a not-for-profit basis in an area unrelated to a commercial or business activity (see Article 3 of *Royal Legislative Decree 1/2007 of 16 November 2007 approving the consolidated text of the General Consumer and User Protection Law and other supplementary laws*) (Spanish version only).

requirements as regards their business practices and offerings, as well as to the legal framework governing what are known as "clauses not negotiated individually" – specifically, in terms of accuracy, clarity, simplicity and good faith – and unfair contract terms, which are null and void as a matter of law.

Indeed, the Spanish Supreme Court[34] has repeatedly ruled that the consumer protection authorities have the power to sanction any unlawful administrative act consisting of the insertion of unfair terms in contracts executed with consumers, without any need for a prior civil court ruling.

Elsewhere, on 15 January 2021, within the Conferencia Sectorial de Consumo (Sectoral Consumer Affairs Body),[35] the Ministry of Consumer Affairs and the regional governments agreed by consensus on a single criterion whereby credit institutions may not unilaterally modify the terms of a contract with a view to charging fees and commissions where the commercial offer included the expressions "fee-free" or "zero commissions". Thus, any unilateral amendment of contract terms must be provided for in the contract. Furthermore, before making any changes to a contract, the credit institution must give a "valid reason" (a vague legal concept that is interpreted restrictively in favour of consumers) and notify the consumer as soon as possible. In any event, the customer is entitled to cancel the contract immediately and without incurring any penalties whatsoever.[36]

3.2 Some examples of exceptions to the general legal regime

As noted above, under the legal regime there are some exceptions to the principle whereby fees and charges may be freely established. See Table 2 for a summary of notable examples.

3.3 Current account contracts, developments in maintenance and administration fees and other recent trends

A current account contract is an unregulated or atypical management contract, for what are known as "cash services", which can be classified in Spanish law under the general framework governing commercial agency or mandate agreements.[37] These

34 See, by way of example, *Supreme Court Judicial Review Chamber Judgment 1582/2019 of 13 November 2019* (Spanish version only).

35 The Conferencia Sectorial de Consumo is the body tasked with cooperation and coordination on consumer affairs between the central government, the regional governments and the autonomous cities of Ceuta and Melilla.

36 See Ministry of Consumer Affairs (2021), *Report on the unilateral modification by financial institutions of the terms and conditions applicable to current and savings accounts, charging fees and commissions not previously charged on those advertised as "fee-free, zero commission accounts"*, January (Spanish version only).

37 See, by way of example, *Supreme Court Civil Division Judgment 7021/1997 of 21 November 1997* (Spanish version only).

Table 2
EXCEPTIONS TO THE GENERAL REGIME

	Characteristics
Payment accounts with basic features (a)	
Ordinary	Subjective scope: persons resident in Spain, asylum seekers and persons without a residence permit who cannot be forcibly removed
	Maximum monthly fee/charge: €3
	Services: opening of the account, deposit of funds, cash withdrawal in euro from bank offices or ATM machines in the EU, payment transactions with debit or prepaid cards and up to 120 payment transactions (i.e. direct debits, transfers and standing orders) per year in the EU
Free of charge	Subjective scope: persons in a situation of particular vulnerability or at risk of financial exclusion (b)
	Maximum fee/charge: free of charge
	Services: the same as the ordinary payment account with basic features
Payment account switching (c)	Fee/charge: free of charge for the costumer and the recipient payment service provider
Real estate loans with natural person borrowers (d)	Opening fee: may only be levied once and must encompass all of the costs of analysing, processing and extending the loan and other similar inherent expenses occasioned by the grant of the loan, as well as any foreign exchange fee for loans denominated in foreign currencies
	Early partial or total repayment fees are limited
Subrogation and modification of mortgage loans (e)	Early repayment fees and charges for extending the term of the loan are subject to specific limitations

SOURCE: Devised by authors.

a See Directive 2014/92/EU of 23 July 2014 on the comparability of fees related to payment accounts, payment account switching and access to payment accounts with basic features; Royal Decree-Law 19/2017 of 24 November 2017 on payment accounts with basic features, payment account switching and the comparability of fees; Royal Decree 164/2019 of 22 March 2019 establishing a no-charge regime for payment accounts with basic features for individuals in a situation of vulnerability or at risk of financial exclusion, and Ministerial Order ECE/228/2019 of 28 February 2019 on payment accounts with basic features, payment account switching procedures and requirements for comparison websites.
b In other words, persons whose gross annual economic income per family unit does not exceed certain thresholds (two times the Multipurpose Public Indicator of Income for persons not pertaining to any family unit; two and a half times for persons pertaining to family units with less than four members; or three times in the case of family units with four or more members, large families or families including a person with a level of disability of 33% or more), without any of the family members owning or holding any in rem rights over properties (with the exception of their principal residence) or business entities.
c See Article 9(1) of Ministerial Order ECE/228/2019.
d See Law 5/2019 of 15 March 2019 regulating real estate credit agreements.
e See Law 2/1994 of 30 March 1994 on subrogation and modification of mortgage loans.

services have traditionally encompassed a range of services on the part of credit institutions, which execute the instructions of their customers, who in return pay certain fees and charges.

Specifically, such current account contract-related services have generally been remunerated in the form of maintenance and administration fees. Maintenance fees are charged for holding an account and for the basic cash service, as defined in each bank's in-house policies. Meanwhile, credit institutions generally charge an administration fee on account activity, in the form of a fixed amount for every entry recorded in each settlement period (usually monthly). Nonetheless, some credit institutions occasionally waive such fees on a certain number of entries, generally those concerning the most typical transactions included in the basic cash service.

Recent trends point to a rise in new bank fees and charges on traditionally fee-free services, as well as a new approach to existing fees and charges. Thus, services

that were once understood to form part of a whole, such as the basic cash service, are now increasingly independent and have their own specific differentiating features. This also renders them increasingly independent for contractual purposes, as the link to the traditional underlying service is gradually broken.

Lastly, various proposals have been put forward in the public arena (including in the Spanish Parliament), which seek to modify the current legal regime applicable to bank fees and charges. Some of these proposals expressly include among their aims the need to prevent financial exclusion and enhance consumer protection, above all for the most vulnerable consumers. Analysis and assessment of these proposals fall outside the scope of this article.

Of particular interest are several motions tabled by various parliamentary groups, calling on the Government: i) to look into measures to guarantee access to ATM withdrawal services, particularly in rural areas;[38] ii) to incorporate provisions whereby certain banking services, such as access to cash, are deemed a "universal service"; iii) to eliminate the fees and charges applied to transactions where the customer is physically present in the bank;[39] and, with respect to the so-called "digital gap", iv) to broaden the range of services offered by post offices, ensuring that such services are accessible to elderly people who live in municipalities with less than 5,000 inhabitants and are at clear risk of financial exclusion; v) to prepare reforms to ensure that the elderly have easy access to face-to-face customer service from banks;[40] and vi) to guarantee access to payment accounts with basic features and the documentation evidencing the terms and conditions of access to such accounts.[41]

3.4 International comparison

The legal regimes governing the different types of bank accounts differ substantially in the European Union, particularly in connection with payment accounts with basic features, and as regards the treatment of fees and charges.[42]

Overall, there is a lack of harmonisation among the different Member States in terms of the level of fixed charges associated with payment accounts (i.e. the fees charged for holding the account itself and for having a debit card). This suggests that payment

38 See "Parliamentary motion on the adoption of measures to regulate the price of ATM cash withdrawal services", *(2021) Official Parliament Gazette, series D, No 271,* May (Spanish version only).

39 See "Parliamentary motion on effective measures to guarantee face-to-face services from the financial sector and the public administration", (2022) *Official Parliament Gazette, series D, No 396*, February (Spanish version only).

40 See "Parliamentary motion to prevent the financial exclusion of the most vulnerable Spaniards", (2022) *Official Parliament Gazette, series D, No 396,* February (Spanish version only).

41 See "Parliamentary motion on measures to guarantee access to payment accounts with basic features for those eligible" and "Parliamentary motion on payment accounts with basic features", (2022) *Official Parliament Gazette, series D. No 423,* March (Spanish version only).

42 See European Commission (2020), *Study on EU payment accounts market: final report,* April.

accounts are a matter for each individual state. There are also significant differences within Member States between the lowest and highest fees and charges levied on the opening and maintenance of payment accounts.[43]

Payment accounts with basic features are available in all EU Member States. Nonetheless, while they are offered in some countries as part of a "standard" account, in others banks have opted to create a specific individual product in order to meet the requirements under European legislation.

Member States have also adopted different approaches in connection with the fee levels linked to accounts with basic features. This is essentially because the transposed EU legislation only requires that basic payment accounts be offered at no cost or in exchange for reasonable fees and charges, leaving each Member State discretion to determine what it understands by "reasonable" in light of its specific national circumstances.

Thus, while the levying of fees and charges is prohibited outright in some cases, elsewhere parameters have been set on how they should be calculated so as to be deemed reasonable for such purposes, with varying degrees of involvement (generally limited) on the part of the competent authorities of each Member State.

Meanwhile, the most important topical consumer issues identified in the period 2018-2019[44] in relation to the provision of banking services at European level notably included the fees and charges applied to payment accounts, payment services and loans. Most of these concerned transparency and pricing related issues, including the mismatch between the services rendered and the fees and charges levied.

Furthermore, one of the most common reasons for consumers' complaints received by the competent authorities between 2018 and 2019 were fees and charges, particularly in relation to mortgage and consumer loans, the provision of payment services (especially charges on ATM cash withdrawals using foreign cards) and payment accounts (in relation to administration fees or the introduction of new charges).

Specifically, several national and EU consumer associations reported a steady increase in the payment account and payment service-related fees and charges applied to consumers by credit institutions. Differences in the fees and charges applied have also been observed depending on the channel through which the services are provided (i.e. branches vs. alternative digital channels), being notorious the trend of lower banking costs for users of digital banking services.

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43 See Figure 5 (p. 33) in European Commission (2020), *Study on EU payment accounts market: final report,* April.

44 For further information on these matters, see European Banking Authority (2021), *Consumer Trends Report 2020/21,* March.

Issues concerning banking service charges are among the regulatory and supervisory priorities of the different competent authorities of the EU Member States, most of which have a specific national regulatory framework in relation to fees and charges.

4 Possible future outlook and general conclusions

The increase in fee and commission income and the changes in the way such income is contractually provided for suggests that credit institutions may be leaning towards a framework in which costs are passed through more directly and on a service-by-service basis. This seems to be borne out by the emergence of new types of fees and charges, or new ways of applying such fees and charges to specific services that previously fell under broader categories, driven in some cases by technological considerations.

In this regard, as noted in previous sections of this article, Spanish credit institutions have traditionally used a general fees and charges model, in which prices were not broken down for each specific service. This commercial strategy may have conveyed the impression that the banking services enjoyed by customers were free.

However, this model may be undergoing a transformation, with credit institutions passing through the cost of banking services (particularly payment services) in a more direct and granular fashion. Thus, as an increasingly relevant source of income, individualised service fees and charges are likely to grow, and this trend could serve to highlight the value added by banking operations, while also facilitating new mechanisms to enhance customer loyalty.

The need to boost profitability appears to be one of the reasons behind this transformation. Moreover, in the case of payment services, the developments in the way the model itself operates represent one notable factor for potential change, with the rise of digital platforms, the advent of alternative means of payment based on such platforms and the emergence of new competitors able to offer services at a lower cost.

From a financial stability perspective, at least two implications emerge.

First, all of this could mean that fee and commission income will make a greater contribution to banks' profits and, by extension, their ability to withstand periods of stress. This, combined with the role of fees and charges as a possible counterweight to deteriorations in solvency, as well as the fact that they are less vulnerable to cyclical swings, could point to this revenue stream's increasing relevance as an additional factor to be borne in mind when assessing financial stability.

Second, this also appears to bring with it new risks, both for credit institutions and their customers, which may arise to varying degrees and may have an uneven impact across banks, and even on the stability of the system.

Thus, a trend towards individualised fees and charges could lead to a greater source of conflict for banks, where customers (or some of them) take the view that these fees and charges are unjustified or disproportionate or overlap with other services for which credit institutions already apply fees and charges. Managing such disputes (whether in court or otherwise) could generate costs, while also affecting credit institutions' reputations. While both aspects are hard to quantify, they could ultimately prove significant, particularly if the courts repeatedly find against credit institutions.

Any change in the fees and charges model could also make the services provided by new financial operators (with a decidedly digital approach) or the basic account service (originally designed to enhance financial inclusion) more attractive. Moreover, depending on how the model develops and is designed, it could have an adverse impact on some segments of the population, particularly those most vulnerable to the so-called "digital gap". In this regard, and despite the growing use of digital tools that facilitate remote banking services, the geographic dimension of the services offered may be a factor to be considered, given the potentially significant number of customers and types of service that require a face-to-face channel, as may the key role that location may play in the prices and types of some payment services.[45]

In short, the analysis of bank fees and charges has identified four key aspects, all of them relevant: i) customers, taking in factors such as transparency in services, consumer protection, the goal of preventing financial and technological exclusion, the need to safeguard access to a competitive market of financial products and services, etc.; ii) credit institutions, with regard to considerations such as the remuneration of services and costs, profitability, the need to adapt the business model in a low-interest rate digital environment, etc.; iii) financial stability, macroprudential policy and the structure of the financial sector; and iv) the regulatory framework, based on the freedom to conduct a business and the way this freedom is understood and balanced against other rights, and on the distribution of competences among the different public administrations.

45 See Ho and Ishii (2011).

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Table A.1

ANALYSIS OF STYLISED EMPIRICAL FACTS (a)

	Full model	Reduced model
Eur_12m	0,354**	0,178
	(0,124)	(0,113)
G_GDP_r	0,123***	0,318***
	(0,0345)	(0,0532)
Unem_rate	-0,0256	
	(0,0264)	
G_mar_s	0,00455*	
	(0,00225)	
G_ind_h	0,0988***	
	(0,0165)	
Y_curve_r	0,253**	0,254**
	(0,0827)	(0,0853)
G_cred	-0,0545***	
	(0,00944)	
Constant	4,347***	4,040***
	(0,559)	(0,426)
Bank fixed effects	Yes	Yes
Time fixed effects	No	No
R^2	0.47	0.32

Robust standard errors in parentheses

*** p<0,01, ** p<0,05, * p<0,1

	Full model	Reduced model
L.r_liq_ass	-2,631	
	(6,214)	
L.r_liab	0,890	
	(2,081)	
L.r_solv	-19,76***	-18,15***
	(5,441)	(5,152)
L.r_prof	2,075	
	(5,429)	
L.r_def	-9,556	
	(6,504)	
L.r_hous_cred	0,207	
	(1,523)	
L.r_cred	5,975***	5,967***
	(1,410)	(1,692)
L.r_emp	1,061***	1,282***
	(0,198)	(0,230)
L.r_cost	104,0**	109,0**
	(40,77)	(39,94)
	(1,019)	
L.r_cred_ps	-0,783**	-0,765*
	(0,306)	(0,378)
Constant	1,673	0,157
	(2,833)	(2,206)
Bank fixed effects	Yes	Yes
Tine fixed effects	Yes	Yes
R^2	0.28	0.24

Robust standard errors in parentheses

*** p<0,01, ** p<0,05, * p<0,1

SOURCE: Devised by authors.

a The dependent variable, fee and commission income-to-total assets, has been multiplied by one thousand to make it easier to interpret the coefficients. Macro variables: Eur_12m, twelve-month EURIBOR; G_GDP_r, real GDP growth; Unem_rate, unemployment rate; G_mar_s, Madrid stock market growth; G_ind_h, growth in the house price index; Y_curve_r, yield curve: spread between ten-year bonds and the twelve-month EURIBOR; G_cred, growth in credit. Bank variables: r_liq_ass, liquid assets-to-total assets; r_liab, deposits-to-total assets; r_solv, own funds-to-total assets; r_prof, ROA; r_def, default rate; r_hous_cred, household credit-to-total credit; r_cred, credit-to-total assets; r_emp, number of employees-to-total credit; r_cost, financial costs-to-financial liabilities; g_cred_ind, growth in credit; r_cred_ps, average rate of lending to the private sector. "L." indicates first lag of the variable.

Wholesale financial markets and digital currencies: making headway in the tokenisation of central bank money

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WHOLESALE FINANCIAL MARKETS AND DIGITAL CURRENCIES: MAKING HEADWAY IN THE TOKENISATION OF CENTRAL BANK MONEY

Abstract

The interest taken by central banks, and by society at large, in central bank digital currencies (CBDCs) has grown notably in recent years. Although the greatest efforts have focused on studying and experimenting on a new class of monetary liability with universal access (i.e. retail), a second variant, namely a wholesale or interbank CBDC, is gaining ground by leaps and bounds. Specifically, almost 20 monetary authorities are already actively exploring this field with the aim of determining whether or not wholesale CBDCs can enhance the efficiency, flexibility and security of the clearing and settlement process for payments and securities (including in cross-border transactions) and of the associated risk management procedures. These experiences, in turn, highlight the numerous practical and legal challenges that have yet to be resolved and illustrate a possible path for taking full advantage of them. This article analyses the characteristics of the initiatives that have made the most progress to date, placing particular emphasis on the most important lessons learnt.

Keywords: wholesale CBDCs, blockchain, tokenisation, cross-border payments, monetary system.

1 Introduction

To date, 73 central banks[1] in both emerging countries and more developed economies have launched projects relating to central bank digital currencies (CBDCs), focusing chiefly on retail or universal access CBDCs (see Kosse and Mattei (2022)). Although this is the largest group of initiatives, it coexists with a second set of CBDCs that is limited to the interbank arena and intended for executing large-value transactions. These are frequently dubbed "wholesale CBDCs" or "w-CBDCs".

The motivations behind this second class of CBDC are far more consistent. In general, they respond either to an attempt to adapt financial market infrastructures to the needs of the digital economy or to the search for new tools that facilitate the conduct of certain macro-financial policies. In this respect, in addition to individual efforts, w-CBDCs provide fertile ground for international cooperation between central banks, given their potential for contributing to improving ever-increasing cross-border financial flows.

1 In jurisdictions representing 74% of the world's population and 96% of global output.

This article first examines in depth the potential consequences of such digital currencies and goes on to offer a comprehensive view of the most noteworthy projects to date, setting out the key characteristics, objectives and challenges.

2 Possible implications of w-CBDCs

There are multiple design options for a wholesale CBDC. Some of them entail the w-CBDC being practically indistinguishable from the electronic reserves that commercial banks currently hold with the monetary authority. Others, conversely, confer distinctive features upon the w-CBDC. This article solely covers those w-CBDCs that are: i) represented through tokens,[2] and ii) registered and exchanged using blockchain technology.[3]

This latter class of w-CBDC promises to transform key organisational aspects of the financial markets. For example, they enable a financial transaction to be executed with the involvement of fewer parties. Similarly, they allow for continued automation of many of the processes underpinning the w-CBDC, thanks to what has been termed "programmability".[4] Moreover, as a settlement asset, and in contrast to private crypto-assets, w-CBDCs do not entail issuer's credit risk as they are, at all times, a monetary liability of a central bank. Consequently, it is precisely the clearing and settlement of both large payments and securities where the most progress is to be expected, especially in cases where several jurisdictions are involved (see Bech and Garatt (2017)).

Specifically, the introduction of a w-CBDC could lead to a distributed architecture being rolled out, either at the behest of the central bank itself or with third-party cooperation. This will depend on the w-CBDC's effective capacity to bring about a general improvement in operational resilience by avoiding unique points of compromise, but also on the extent to which its implementation can facilitate interoperability with a broad range of payment instruments, including newly developed ones. Similarly, a w-CBDC helps to extend current operating hours more easily, insofar as the use of smart contracts/programmability fosters more autonomous operations, with a minimum level of human intervention. In addition, it is more than likely that it can contribute to the shortening of the intermediation chain

2 For these purposes, the concept of token refers both to the form of representation of the settlement asset provided by the central bank and to the mechanism used to verify the transaction. In these cases, as occurs with cash, it is the object itself that is validated, not the identity of its holder. However, this does not prevent an identity layer from being deployed on the transmission circuit (Committee on Payments and Market Infrastructures (CPMI) (2019)).

3 Please note that these characteristics are not exclusive or essential to w-CBDCs. What is certainly specific to them is the fact that they are a central bank digital liability whose use is restricted to financial or similar institutions.

4 In this context, programmability refers to the existence of mechanisms embedded in the technical infrastructure that enables the settlement asset (central bank money) to respond to predefined events, without the need for human intervention, in certain circumstances.

as there will be less of a need to resort to correspondent banks for executing international payments. A w-CBDC may also reduce the potential dependence on certain classes of validators, usually associated with more centralised structures (see Demmou and Sagot (2021)).

Overall, these two factors would help shorten transaction execution times – particularly in operations involving securities or that are cross border –, thereby releasing liquidity and limiting the time that positions remain open with counterparties. This would reduce credit and liquidity risks – which arise so frequently in such transactions and may, by extension, jeopardise settlement – and lead to an appreciable decrease in current collateral needs (see Fernández de Lis and Gouveia (2019)). These benefits appear all the more pronounced, the lower the degree of standardisation of the underlying financial instruments, e.g. those traded on over-the-counter (OTC) markets which are settled in commercial bank money.

Further, in a purely cross-border setting, w-CBDCs may prompt the arrangement of new and modern global payment platforms (or of a framework of common technical conditions), thereby overcoming existing connectivity problems. Consequently, the accessibility and transparency of international payment circuits may also be improved (see World Bank (2021) and CPMI (2021)). The viability of these approaches depends, in turn, on the mutual trust between the central banks involved and on the effectiveness of the monitoring and control mechanisms they are provided. Promoting cooperation between such institutions is therefore essential.

Insofar as w-CBDCs are equivalent to having a digital, risk-free, settlement asset, they could make a greater impact in areas in which there was previously no room for central bank money.[5] This would open the door to further contain the factors that could give rise to systemic risks on the payment operations side. Conversely, it would pose other challenges, such as those stemming from allowing broader participation of agents who may have a lower technical and financial solvency than that of banks. Nevertheless, the opportunities offered by w-CBDCs in this respect, together with the greater transparency and automation of operations, would lead to a knock-on adjustment in compliance costs, provide greater stability to the economic and financial system and, at the same time, provide a flexible space for innovation.[6]

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5 Mainly those entities, such as payment institutions and electronic money institutions, that provide financial services and rely on bank money to make their payments, as they do not have access to a central bank's books. Despite there being notable exceptions, it is more common for this type of agent to be prevented from opening an account at a central bank. This measure is designed to contain the size of the risks to which the balance sheet of these entities would be exposed. Conversely, tokenising monetary liabilities would provide an alternative channel for accessing this settlement asset, overcoming part of the obstacles mentioned.

6 One illustrative example of the possibilities that w-CBDCs open up is that of conditional payments. Insofar as they prove to be technically able to support programmability, they will be able to establish ex ante rules for the automatic execution of payments. This would, for example, allow the current delivery-versus-payment (DvP) mechanisms to be extended beyond national borders or to infrastructures that, because they are supported by technologies not compatible with traditional large-value payment systems, currently do not have access to liquidity in central bank money.

Also, as with retail CBDCs, a w-CBDC may impact monetary policy, boosting the mechanism whereby monetary impulses are transmitted to interest rates of other financial markets, or be used as a tool for tackling the so-called zero lower bound problem. Although it appears unlikely that a w-CBDC could compromise its current operational framework, it has useful implications for both its definition and its implementation (see CPMI and Markets Committee (2018)).[7] The greater or lesser impact will ultimately depend on the degree to which w-CBDCs are finally accepted and whether or not they incorporate features to make them more appealing compared with other money market instruments. Against this backdrop, many authorities have included in their analytical agenda topics such as using them for meeting the reserve requirement, the potential emergence of a specific intraday market, changes in overnight demand for central bank money, as well as the risk of a potential fragmentation of the money market and the possibility of monetary policy being executed in real time (see Swiss National Bank, Bank for International Settlements (BIS) and SIX Group (2022)).

In addition, given that the launch of a w-CBDC could alter both the structure and the functioning of financial markets, it will also likely have consequences for financial stability. However, there are as yet very few papers on this subject, and many of them are not conclusive. Some authors argue that implementing a w-CBDC could help contain the rollover risk of private debt. Others, however, are more concerned about potential distortions to the repos or short-term public debt markets, since, by expanding access to central bank money, demand for high-quality liquid assets would be affected. However, to calibrate these effects, specific details must be known about how the w-CBDC is implemented. Indeed, the implications of an introductory phase, in which access is limited, may differ from those that could arise in more advanced stages where this is not the case. Likewise, liquidity fragmentation across several classes of central bank money could make its management more complicated (see Swiss National Bank, BIS and SIX Group (2020)).

On the international front, w-CBDCs simultaneously emerge as a formula for pressing forward in market integration, helping to mitigate foreign exchange risk and expanding the investment and risk coverage opportunities accessible through such markets. This may, in turn, help reduce the current levels of fragmentation typical of international markets. Nevertheless, in the absence of appropriate control tools, greater prominence of w-CBDCs may also increase capital flow and exchange rate volatility, exacerbate contagion risk or foster greater business cycle synchronisation (see Ferrari, Mehl and Stracca (2020) and International Monetary Fund (2020)). For this reason, their design aspects, as well as the review of the regulatory and control framework, are a key part of central banks' ongoing considerations.

7 The cited publication mentions, for example, the upward pressure that a remunerated w-CBDC could place on the short-term sovereign yield curve, to ensure demand from institutional investors.

Among the broad range of implications, the most immediate ones pertain to payment circuits, which is precisely where greater headway has been made in experimentation. The knowledge thus accumulated is also enriching the debate on retail CBDCs, insofar as it illustrates their respective similarities and differences as well as their specific problems.[8] Without prejudice to the details of these experiences, which are set out in the following section, it is worth making a number of general considerations beforehand that could help explain why the payments segment has become so relevant for this discussion.

In general, a payment system can be understood as a series of instruments, procedures and rules intended to facilitate the exchange, clearing and settlement of funds transfer orders between participating agents (see Committee on Payments and Market Infrastructures and Technical Committee of the International Organization of Securities Commissions (IOSCO) (2012)). Along with the systems conceived for settling the purchase/sale of financial assets, these infrastructures play an essential role in the normal course of economic and financial activity. Of all their possible representations, those with systemic implications prompt greater interest among authorities.

In response to these concerns, central banks not only closely monitor and control payment systems, but they also occasionally assume an operating role and act as provider of the related settlement asset. This is often the case with circuits that present greater risks or whose functioning provides singleness to the currency, guaranteeing full convertibility, at par, between its different forms of representation (see Committee on Payment and Settlement Systems (2003)).

To meet these objectives, central banks must periodically update the infrastructures they manage, with a view to preserving their usefulness and preventing new value proposals from potentially relegating them to a secondary role. Hence, w-CBDCs and the various underpinning technological alternatives are particularly appealing as a possible response to the challenges posed to these infrastructures by the digital transformation. A notable example is that of stablecoins,[9] which in certain spheres — such as that of international transfers or decentralised finance — threaten to overshadow either the infrastructure service offerings typically associated with central banks or the settlement assets under their exclusive control.

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8 For example, the debate about settlement models (centralised versus decentralised) bears very strong parallels with wholesale and retail CBDCs. By contrast, the value that offline operations could potentially provide appears to be a matter of greater interest for those environments involving consumers and a physical presence than for those cases only involving exchanges between large financial institutions. The same occurs with considerations relating to privacy levels.

9 Where the pace of modernisation of the payment infrastructures offered by central banks does not meet market expectations, stablecoins may be considered an alternative for accessing many of the new functionalities inherent to digital assets. This would erode central bank money's core role as a settlement asset. In this respect, some private entities, either individually or through the creation of consortia (e.g. Fnality), are exploring the issuance of proprietary stablecoins backed by the balances in their reserve accounts with the central bank, as an alternative formula to directly using a w-CBDC.

As mentioned above, compared with the status quo, w-CBDCs may offer a differential value in both efficiency and transparency terms and may help uncouple access to central bank liabilities from the need to open an account at that central bank. Consequently, they may safeguard central bank money's core role in the economy, extending the benefits of trust and security to the area of digital assets (be they native or tokenised)[10] (see Marqués Sevillano (2022)). These types of considerations are all the more pressing given the scope of possibilities emerging as a result of the legislative proposal for a regulation of the European Parliament and of the Council for a pilot regime for market infrastructures based on distributed ledger technology (DLT).

3 Key projects: objectives, characteristics and current status

In contrast to universal access CBDCs, there are barely more than 20 jurisdictions with wholesale projects. Nevertheless, as shown by Figure 1, their regional impact is considerable. In the developed countries, interest in this field of research primarily stems from its capacity to make cross-border payments more efficient.[11] Conversely, in the emerging market economies – especially in those that lack sound and modern financial market infrastructures (FMI) – the primary objective is to bring about a general improvement to the channels supporting financial transactions (see Boar, Holden and Wadsworth (2020)).

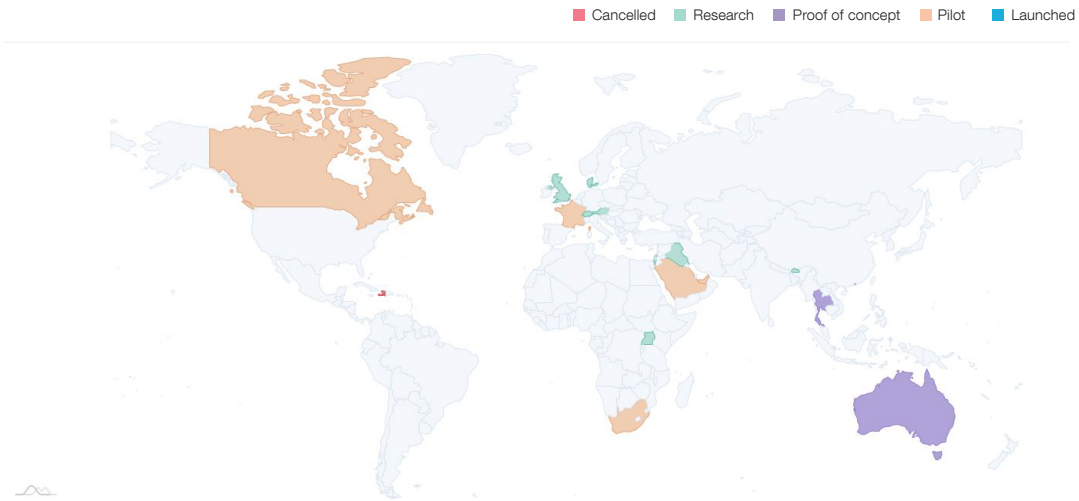
These projects include most notably, on the one hand, those of Singapore and Canada (projects Ubin and Jasper, respectively) and, on the other, those of Thailand and Hong Kong (projects Inthanon and LionRock), which later converged into a bilateral joint effort that, ultimately, turned out to be critical for broadening their scope of action. Also of note are the Helvetia Project, developed by the BIS Innovation Hub with the participation of the Swiss National Bank and the SIX Group, and the nine lines of work promoted by the Banque de France for 2020-2021.[12] The

10 To this end, several configurations are possible. Without seeking to be exhaustive, from a strictly theoretical perspective, consideration could be given to the link between different DLT platforms (some for cash and others for another type of financial instrument) or the integration of both types of tokens in a single decentralised infrastructure, be it managed by either a central bank or by a private agent.

11 Indeed, they are considered to be one of the possible ways of attempting to address the problems regarding slowness, cost and insufficient transparency that currently weigh on cross-border payments and are defining the priorities of the G20 (see Financial Stability Committee (2020)).

12 Each of these clusters is devoted to a specific dimension of the w-CBDCs, ultimately providing a broader vision of the existing possibilities. Despite the importance of each individual experiment, the "Jura" project is particularly interesting. By capitalising on elements of Helvetia, it explores the potential benefits of a w-CBDC in the settlement of cross-border payments where multiple currencies are involved. To this end, based on a platform managed by a third party, Jura allows for direct transfers between non-resident institutions of tokens representing central bank money that are issued by the central banks of France and Switzerland, respectively. These tokens play an exclusively transactional role; they do not constitute a new central bank monetary liability. As such, they are only available temporarily (intraday), meaning that, owing to the restrictions of the current legal framework, the effective finality of transactions may only be achieved through the real time gross settlement system (the case of France).

Figure 1
GLOBAL STATUS OF W-CBDC INITIATIVES AS AT APRIL 2022



SOURCE: https://cbdctracker.org/.

Eurosystem and the Bank of Japan's Stella Project is one of the most notable examples of international cooperation.

The experiments underlying these initiatives are generally organised by phases or components that are deployed sequentially. This helps lay down the necessary building blocks to move on to the next stage. The complete life cycle of a transaction, from the issuance of different types of assets on the new platform to their exchange, clearing, settlement and redemption, is replicated through the use of blockchain technology and the tokenisation of financial instruments and official currencies.

In terms of scope, the road map typically commences with testing the performance of interbank payments within national borders and subsequently explores their synchronisation with securities transactions. In the final phases – usually in collaboration with various central banks – dimensions like delivery versus payment (DvP) and/or payment versus payment (PvP),[13] both on the international front and in real time,[14] are further analysed. Additionally, trials are carried out on a series of

13 Settlement procedures that ensure the simultaneous transfer of securities against funds or across the different currencies that are being transacted. To this end, several formulas were tested. For instance, in the case of Jasper/Ubin and Stella, Hash Time Locked Contracts (HTLCs) were used. These are cryptography-based protocols that coordinate the various processes into which a transaction involving different networks can be broken down. These protocols determine whether the transaction is either carried out or revoked. However, in the case of Inthanon/LionRock, a corridor was set up as a bridge between the respective national DLTs, allowing for direct settlement through wallets.

14 Three conceptual models advocated by Auer, Haene and Holden (2021) are used for this purpose, either in isolation or in parallel.

functionalities common to traditional FMIs, such as those relating to liquidity optimising mechanisms, managing different aspects of the life cycle of bonds (corporate actions), increasing the traceability of transactions and preserving their privacy.

These exercises also cover other particularly interesting aspects, such as interconnecting one or several DLTs[15] with traditional infrastructures and allowing central bank money to circulate either outside the issuing jurisdiction or between counterparties that have traditionally not had access to central bank accounts. As regards international payments, the architecture usually embeds automated currency exchange procedures (again, with atomic settlement)[16] that happen seamlessly prior to actual value transfer. In all cases, conducting these exercises requires collaborating with private-sector firms, including both financial institutions and technology suppliers.

Aside from certain discrepancies regarding the preference of a specific blockchain platform over another (e.g. Corda or Hyperledger), the main difference between the projects of Singapore, Canada, Thailand and Hong Kong[17] and the others lies in the nature of the w-CBDC. Rather than a central bank monetary liability, the token used by the former set of projects is a digital representation of a right (depository receipt) to claim ownership over an already created monetary liability; in short, over central bank money that has been blocked previously on behalf of its user in a transitory account.[18] Therefore, the underlying central bank money is the actual settlement asset.

The former variant is sometimes called "w-CBDC indirect access model" to distinguish it from that used by the other central banks. Evidently, the legal implications of the two differ. This poses a series of practical challenges as regards their possible status as a support for a systemically important payment circuit that should comply with certain internationally accepted risk management principles (see CPMI and Technical Committee of IOSCO (2012)). As regards local and regional specificities, some of the exercises also addressed compliance with certain legal obligations[19] through functionalities directly provided by the related blockchains.

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15 Distributed ledger technologies, which provide replicated, shared and synchronised digital databases geographically spread across multiple sites, countries and/or institutions.

16 A process consisting of interlinking the transfer of two assets such that the delivery of one occurs only upon delivery of the other one. Otherwise, the transaction is not completed. This concept can be extended to unidirectional transactions involving several agents or legs (e.g. an issuer, a recipient and two intermediaries). In these cases, the transaction (for instance, a payment) will only be deemed completed if each and every party performs their respective tasks as expected. Otherwise, the payment does not go through.

17 As regards this special feature, Project Jura also forms part of this group of initiatives.

18 Insofar as the correspondence between the token and the blocked central bank money is one to one, the monetary base remains unchanged. Also, for simplicity, the accrual of interest is not considered. In turn, there are technical differences between the projects.

19 Both regulatory reporting and exchange rate obligations (for instance, to prevent speculation against the Thai currency).

Table 1 summarises the most notable features of the projects mentioned above and of others with similar characteristics.

Overall, these initiatives helped provide evidence about the level of maturity that blockchain technology had reached and, by extension, they also demonstrated its potential feasibility in connection with future developments in wholesale settlement infrastructures. Among other aspects, distributed platforms were found to be able to reduce costs and financial risks,[20] especially in the case of on-ledger money, i.e. where a w-CBDC is issued directly on a blockchain (see Romero Ugarte et al. (2021) and Bank of Canada (2018)). However, this type of CBDC poses the greatest operational, governance and policy challenges.

The tests also proved that blockchain[21] could successfully address the elements putting liquidity under strain and that, despite the features of this architecture, privacy need not be compromised, thanks to the use of different techniques.[22] Other differential advantages emerged in terms of resilience, the system's overall security[23] and its potential for both accelerating migration to a 24/7 environment and for integrating different networks, even where these are not formally interconnected, without comprising their independence.

In this light, the experiments helped underscore the desirability of leveraging w-CBDCs as a pivotal element for clearing and settlement in order to further promote integration.[24] As a result, it should help to shore up the role of central bank money as an anchor of the financial system and be conducive to an orderly development of tokenised financial instruments markets, minimising their adverse consequences for financial stability.

Lastly, this experience also revealed a potential roadmap to ensure that authorities maintain, at all times, effective control over developments surrounding this new type of monetary liability. Specifically, they showed that objectives such as preserving

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20 For instance, by automating post-trade processes through the use of smart contracts, giving access to better exchange rates and reducing the number of intermediaries or processes required to complete a transaction; in other words, by combining trading, payment and settlement. By way of illustration, in one of the projects coordinated by the Banque de France, consisting in the purchase of a national financial asset with a foreign currency, the number of intermediaries required decreased by 45%.

21 By setting up a sort of queue when the balance available is insufficient to carry out a transaction immediately. These queues act autonomously, have their own multilateral optimisation mechanisms and offer functionalities which are typical of centralised systems, such as setting priorities and freezing or cancelling transactions.

22 For example, zero-knowledge-proof, private bilateral channels, confidential identities and shared information under the principle of necessity, limiting who has access to it. Likewise, the experiments proved that privacy is not incompatible with providing the pertinent authorities with the information they may require in a swift, reliable and efficient manner.

23 For example, through the use of self-executing contracts – applicable even to anomalous situations, such as errors or breaches by any of the parties –, or sharing secrets (or hashes), duly coded and off-chain, among a transaction's counterparties, enabling them to substantiate claims to their respective rights.

24 The Stella Project proved that, although atomic settlements can be completed with assets from different infrastructures, it adds complexity and gives rise to new risks requiring management.

Table 1

SALIENT FEATURES OF DIFFERENT W-CBDC PROJECTS

Name	Participants	Technological partners	Duration	Scope	Other aspects of interest
Ubin (Singapore)	Monetary Authority of Singapore Association of Banks in Singapore, Singapore Exchange and 12 private banks	Accenture, BCS Information Systems, ConsenSys, Deloitte, IBM, Microsoft, R3	2016-2020 (5 phases)	– Interbank payments – Liquidity optimisation mechanisms – Domestic and cross-border DvP – Cross-border PvP – Connectivity with other blockchain networks / other cases of use	– Tokenised central bank money and securities – Anquan, Corda, Fabric, Quorum – Zero-Knowledge-Proof (ZKP) and other
Jasper (Canada)	Bank of Canada and Payments Canada TMX Group and 7 private banks	Accenture, Microsoft, R3	2016-2019 (4 phases)	– Interbank payments – Liquidity optimisation mechanisms – Domestic DvP – Cross-border PvP	– Tokenised central bank money and securities – Corda, Ethereum – Credit to brokers
Blockbaster (Germany)	Bundesbank and Deutsche Börse AG	Amazon Web Services, IBM	2016-2018 (1 phase)	– Interbank payments – Domestic DvP – FoP settlement of securities – Coupon issuance, redemption and payment	– Tokenised central bank money and securities – Fabric – W-CBDC redemption at end of day
Inthanon (Thailand)	Bank of Thailand 8 private banks	ConsenSys, Microsoft, R3	2018-2020 (a) (4 phases)	– Interbank payments – Liquidity optimisation mechanisms – Domestic DvP – Issuance, redemption, margin calls and payment of coupons – Reconciliation and automation of regulatory compliance – Cross-border PvP	– Tokenised central bank money and securities – Corda – Raft and Practical Byzantine Fault Tolerance (PBFT)
LionRock (Hong Kong)	Hong Kong Monetary Authority 3 private banks		2016 (1 phase)	– Interbank payments	– Corda
Stella (Eurosystem and Japan)	Eurosystem and Bank of Japan	DG Lab, IBM, R3, W3C	2016-2020 (4 phases)	– Interbank payments – Liquidity optimisation mechanisms – Domestic DvP – Cross-border PvP – Confidentiality and auditability in DLT	– Corda, Elements, Fabric – Practical Byzantine Fault Tolerance (PBFT) – Interledger Protocol – Privacy Enhancing Techniques (PET) (b)

SOURCE: Devised by authors, drawing on the public reports of the different projects.
NOTE: See the References section at the end of this article to obtain further details about the similarities and differences between these projects.

a Remains open. In 2020 the joint initiative Inthanon-LionRock was renamed Multiple CBDC (m-CBDC) Bridge Project, also welcoming the People's Bank of China and the Central Bank of the United Arab Emirates.
b Although different variants were analysed (concealment, segregation and disconnection), the experiments focused on two specific implementations: i) Pedersen commitment and ii) hierarchical deterministic wallets.

Table 1
SALIENT FEATURES OF DIFFERENT W-CBDC PROJECTS (cont'd)

Name	Participants	Technological partners	Duration	Scope	Other aspects of interest
Khokha (South Africa)	South African Reserve Bank JSE Limited and 8 private banks	Accenture, Adhara, Block Markets Africa, ConsenSys, Deloitte, Microsoft	2018-2021 (a) (2 phases)	– Interbank payments – Domestic DvP	– Tokenised central bank money and securities – Quorum – Istanbul Byzantine Fault Tolerance (IBFT) – ZKP, Pedersen – Phase 2 includes DvP against delivery of private stablecoins
Helvetia (Switzerland)	Swiss National Bank BIS Innovation Hub and Six Group		2020-2021 (2 phases)	– Interbank payments – Domestic DvP	– Tokenised securities
w-CBDC experiments (France)	Banque de France Monetary Authority of Singapore, Swiss National Bank, Central Bank of Tunisia, BIS Innovation Hub, Iznes, European Investment Bank, Euroclear France, LuxCSD, SIX Digital Exchange, Treasury, 19 private banks, 2 institutional investors and 1 asset manager	Accenture, ConsenSys, IBM, Nomadic Labs, ProsperUs, SG Forge, R3	2020-2021 (9 experiments)	– Liquidity optimisation mechanisms – Domestic DvP – Coupon issuance, redemption and payment – FoP in accordance with the Conditional Delivery of Securities – Cross-border PvP – Migrant remittances	– Corda, Fabric, Quorum, SETL – IBFT – ZKP

SOURCE: Devised by authors, drawing on the public reports of the different projects.
NOTE: See the References section at the end of this article to obtain further details about the similarities and differences between these projects.

a Phase 2 announced.

issuance management, limiting the type of counterparties with access to a w-CBDC and restricting its use to specific purposes or periods of time can be achieved by combining several design factors. In particular, by: i) conferring central banks an exclusive capacity to validate w-CBDC transactions (notary nodes); ii) providing them with continuous visibility over the blockchains' records (observer node) so as to be able to perform reconciliation tasks; and iii) deploying smart contracts.

As for the drawbacks, the experience was useful to illustrate the limitations of different configurations regarding scalability and latency. It also revealed new sources of risk, such as those associated with liquidity fragmentation and the loss of principal owing to network coordination or technology failures, all of which are being analysed in depth. In particular, the growing importance of cloud computing services and the challenge posed by ensuring a timely control framework and an acceptable level of interoperability were noted. The experience also stressed the need to reflect

on how to exert effective governance over the components of a blockchain and how they technically evolve, as well as the importance of exploring the legal dimension of both these platforms and w-CBDCs, including the question of finality.

4 Conclusions

Experimentation around CBDCs is one of the areas that is currently eliciting the most interest among central banks. Although CBDCs with a wholesale scope have in many cases been the raison d'être for these initiatives, in comparison with those aiming at offering universal access, they are much less known by the public at large. This is an expected outcome given their higher level of specialisation and the limited number of parties involved. However, this does not detract from the scope of their potential contributions, compared with those of a retail CBDC, as evidenced by the wide range of projects showing promising results in terms of enhancing international payment circuits and, in general, modernising and adapting financial market infrastructures to avoid their becoming a source of transmission of shocks to the entire financial system.

Therefore, w-CBDCs are complementary to universal access ones, spurring a reciprocal debate about common points of interest and, in turn, posing a series of differential challenges which call for an independent line of research. Aware of this circumstance, a growing number of monetary authorities are developing a strategy around w-CBDCs and openly committing to promoting international cooperation as a way of exploring their full potential.

As shown in previous sections, this cooperation is proving particularly intense with regard to the wholesale payment circuits, especially those whose management falls, albeit not exclusively, to central banks. Ongoing efforts attempt to determine the effective capacity of this new type of monetary liability to respond to many of the challenges raised by the growing digitalisation of the economy's assets. They also intend to shed some light as to how w-CBDCs can help overcome the obstacles that have to date made cross-border payments expensive, opaque, inefficient and insecure. Fortunately, the path ahead seems full of opportunities.

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Sectoral indicators for applying the Banco de España's new macroprudential tools

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SECTORAL INDICATORS FOR APPLYING THE BANCO DE ESPAÑA'S NEW MACROPRUDENTIAL TOOLS

Abstract

Since December 2021 the Banco de España has three new macroprudential tools (Circular 5/2021): the sectoral component of the countercyclical capital buffer, limits on sectoral concentration, and limits and conditions on loan origination. The new sectoral instruments will allow it to address the risks that are concentrated in specific sectors, for which the aggregate macroprudential tools would be less effective, as they are applied equally across all sectors. In order to apply these tools, any potential vulnerabilities building up in the different sectors must be previously identified by means of adequate indicators. This article analyses the battery of sectoral indicators proposed in the circular, which may be useful for activating these new macroprudential tools. Their calculation methodology is similar to that used for the general countercyclical capital buffer indicators. In addition, a study of their predictive power is conducted, which shows their efficiency in identifying risks early. According to these indicators, on data up to 2021 Q3, no warning signals have been observed suggesting that these new tools should be activated.

Keywords: macroprudential policy, systemic risk, early warning indicators, sectoral component of the countercyclical capital buffer, limits on sectoral concentration.

1 Introduction

One of the responsibilities of central banks and the supervisory authorities is to promote the stability of the financial system as a whole. To this end, it is necessary to ensure not only the solvency of each financial institution individually through microprudential supervision, but also that the financial system as a whole is stable. The latter task is the main objective of macroprudential policy. This is a paradigm shift with respect to the microprudential supervision approach, which is one of the most significant advances introduced in the wake of the international financial crisis.[1] Macroprudential policy supplements the traditional microprudential approach to increase the financial system's resilience and prevent the build-up of the cyclical and cross-sectional dimensions of systemic risks. In particular, systemic risk builds up as financial imbalances increase and materialises when financial instability becomes so widespread that it hampers the proper functioning of the system to the extent that economic growth and the welfare of the population are adversely affected.[2]

1 In Spain, since 2014 the Banco de España is the national designated authority responsible for implementing the macroprudential policy instruments provided for in the legislation on the supervision of credit institutions (Law 10/2014 on the regulation, supervision and solvency of credit institutions). Also, the Spanish macroprudential authority (AMCESFI) is mandated to regularly analyse systemic risks.

2 This definition of systemic risk is based on that of the European Central Bank (ECB) (see ECB (2009)). Although there is no consensus as to what constitutes systemic risk, this is one of the most commonly accepted definitions.

For each economic policy target there must be at least one policy tool (see Tinbergen (1952)).[3] Therefore, instruments different from those used by monetary and fiscal policy will be necessary for macroprudential policy to prevent the build-up of systemic risks. However, the objective of macroprudential policy, i.e. financial stability, is broader than that of other policies, owing to the multi-dimensional nature of systemic risk. Accordingly, the authorities will need to have a wide range of tools to enable them to address this risk on all fronts.

These considerations justify why the competent authorities continue to work on developing and perfecting the tools available to them. In this spirit, the macroprudential toolkit available to the Banco de España has expanded recently. Specifically, Circular 5/2021 amending Circular 2/2016[4] implements three new macroprudential instruments in Spanish legislation: (1) a sectoral component of the countercyclical capital buffer (SCCyB); (2) sectoral concentration limits (SCLs); and (3) limits and conditions on loan origination and other transactions, known as borrower-based instruments (BBIs).

Until the approval of this circular, the Banco de España only had at its disposal the macroprudential tools implemented in European legislation. These basically consisted in capital tools, including most notably the countercyclical capital buffer (CCyB), the buffers for global and domestic systemically important institutions, and the systemic risk buffer (SyRB). The latter is the only one that can be applied to specific sectoral portfolios and to cyclical and structural risks, provided these risks are not being simultaneously addressed through the CCyB or the buffers for systemically important institutions. However, European legislation does not currently propose indicators for monitoring sectoral vulnerabilities. In this connection, the new sectoral tools developed in Circular 5/2021 supplement the macroprudential tools set out in European legislation through a more transparent framework for monitoring risks in sectoral credit portfolios and for activating such tools, in the event systemic imbalances are detected. Additionally, the circular introduces the possibility of introducing limits on institutions' terms and conditions on loans, a tool that was not available under European legislation.

Any increase in the number of macroprudential tools, such as that deriving from the new circular, must always be accompanied by an adequate and transparent risk identification and monitoring framework. Thus, having a set of indicators of proven efficiency will facilitate the early detection of potential threats to financial stability, which will help to address them by means of the most adequate macroprudential policy tools. Also, good communication on risk identification enhances transparency, while contributing to reducing uncertainty (see Oosterloo and De Haan (2004)). Although the correct identification of risks is a prerequisite for the adequate

3 As explained by Santos (2022), the Tinbergen rule requires as many instruments as targets, regardless of whether or not these instruments are used independently.

4 The full text of Circular 5/2021 is available on the Banco de España website.

application of macroprudential policy instruments, a comprehensive framework of indicators of sufficiently proven efficiency is still lacking (see Mencía and Saurina (2016)). This is because macroprudential policy is still in its early stages. Therefore, analysing the capacity of the indicators associated with the different instruments to identify risks early provides important insight in this area.

This article focuses on analysing the sectoral indicators that may be useful for informing the need for activating the new tools implemented in Circular 5/2021. After describing the new macroprudential toolkit available to the Banco de España, various sectoral indicators that may be used to identify risks are listed. Lastly, an exercise for analysing these indicators' predictive power is proposed, which confirms their efficiency in identifying sectoral systemic risks.

2 The new macroprudential tools available to the Banco de España

Macroprudential policy is a relatively recent field where there is still limited information about the functioning and effectiveness of the macroprudential tools available. As this knowledge increases, more and improved macroprudential tools become available to the competent authorities. This is the case of those developed under Circular 5/2021, which refer to specific sectors (SCCyBs and SCLs) and to the limits and conditions on loan origination (BBIs).

The first two tools of the new circular enable the Banco de España to apply measures on specific sectors. The SCCyB allows for the introduction of a surcharge on the capital requirements applicable to credit exposures to a specific sector. This tool seeks, first, to strengthen the banking system in the face of systemic shocks arising in that sector and, second, to discourage the growth of credit in the sector by increasing the relative cost, in terms of regulatory capital, of lending to the sector involving a greater systemic risk. SCLs are more coercive and seek to directly limit the sectoral concentration of banks' credit exposures. The limits will be triggered when the ratio of sectoral exposure to common equity tier 1 (CET1) exceeds a specific threshold. These limits do not represent a quantitative restriction in absolute terms to exposures; instead, they will only be triggered when the ratio exceeds said threshold. Therefore, the main difference between the SCCyB and the SCLs is that the activation of the latter would have an immediate effect on the sectoral credit concentration (via the "quantity" effect). However, raising the capital requirements in a specific sector using the SCCyB would increase the cost of the exposure to that sector compared with the rest, by changing the relative yields of the different credit portfolios to the disadvantage of the sector generating the systemic risk. In other words, the SCCyB would indirectly discourage the concentration of credit in this sector (via the "price" effect).[5]

5 See Trucharte (2021) and Estada and Castro (2021) for a more detailed description of the two sectoral tools (SCCyB and SCLs) and for a quantitative analysis of the impact of their potential activation.

The use of sectoral tools is justified by the fact that, when systemic risks are concentrated in specific sectors (as occurred in the Spanish real estate sector during at least the initial phase of economic growth between 2000 and 2008), the activation of general macroprudential tools might be less effective. Thus, in the face of a systemic crisis of sectoral origin, increasing the capital requirements through the general CCyB would keep the relative cost of the exposures to the sectors where the risks are concentrating constant. This may even encourage institutions to increase their exposure to the riskiest sector, for which they obtain a higher expected yield. However, if the CCyB only increases for exposures to the sector in which the risks originate, institutions will have to assume a greater relative cost for such exposures compared with the other sectors, which could contribute to inhibiting their growth. In other words, the application of sectoral tools may be more efficient to tackle sectoral risks; in any event, their use should be complemented by a comprehensive analysis of the possible effects on other sectors.

Finally, the third new macroprudential tool developed in Circular 5/2021 is the limits and conditions on loan origination (BBIs). This instrument would only affect the flow of new lending, while the two sectoral tools would affect both the existing transactions and the new ones. The expected effect of this third instrument would be a reduced implicit risk for each new transaction. This tool is based on the empirical evidence that the non-performance levels of loans extended under stricter standards in terms of capital or maturity, among others, are lower than those extended under laxer standards (see Galán and Lamas (2019)). Therefore, when it is detected that banks do not internalise correctly that their lending standards might be too lax and that they may be contributing to a future systemic crisis, the Banco de España may react by tightening such lending standards. This would make future defaults less likely, while preserving the banking system's solvency and mitigating systemic risk. Specifically, the circular allows limits to be set on the loan-to-value ratio, the debt service-to-income ratio, the debt-to-income ratio and the maturity of the loan, among others.

3 Sectoral indicators for identifying risks

In order to determine whether the sectoral macroprudential tools should be applied, the Banco de España will regularly monitor the composition of the different categories of exposures by sector, as well as a series of indicators capable of issuing warnings about the build-up of systemic risks. According to the circular, credit exposures to the following four sectors will be monitored periodically to identify potential vulnerabilities:

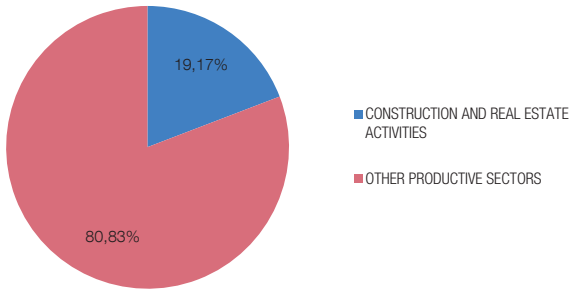
1 Loans to non-financial corporations (NFCs) and sole proprietors engaged in construction and real estate activities.

2 Loans to NFCs and sole proprietors not engaged in construction and real estate activities.

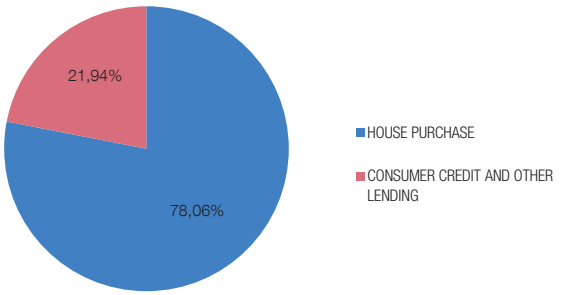
Chart 1

BREAKDOWN OF LENDING TO FIRMS AND HOUSEHOLDS

1 LOANS EXTENDED TO FINANCE FIRMS' PRODUCTIVE ACTIVITIES (a)



2 LOANS TO HOUSEHOLDS, BY TYPE OF SPENDING (b)



SOURCE: Banco de España.

a Lending to other productive sectors comprises lending for agriculture and fishing, industry (excluding construction and real estate activities) and the services sector, which includes trade and repairs, hospitality, transport and storage, financial intermediation (except in credit institutions) and other services (excluding real estate activities). The data have been obtained from Chapter 4.18 of the Statistical Bulletin and are updated as at September 2021.

b Credit to households for house purchase comprises loans for both house purchase and renovation. Consumer credit includes consumer durables. Other lending includes loans for the purchase of land and rural property, securities and current goods and services not considered consumer durables (e.g. loans for financing travel expenses) and loans for sundry purposes not included in the above. The data have been obtained from Chapter 4.13 of the Statistical Bulletin and are updated as at September 2021.

3 Loans for house purchase and renovation.

4 Other loans to households (primarily consumer loans).

Chart 1 shows the breakdown of loans to NFCs and households, on data as at September 2021. Most of the loans extended to finance productive activities are granted to firms not engaging in the real estate sector (around 81%), especially the services sector (58%). More than 78% of loans to households are for house purchase, which gives an idea of the importance of the real estate sector in the Spanish economy.

Also, the circular itself includes a list of the possible indicators that the Banco de España should analyse periodically to assess sectoral systemic vulnerabilities and thus steer sectoral tool decisions. These tools could be activated when the indicators forming part of the risk identification framework point to sector-specific imbalances which the Banco de España considers might threaten the stability of the financial system as a whole. The list includes four groups of metrics, although it is open to the inclusion of any additional quantitative or qualitative information deemed significant:

(i) Loans to the sectors mentioned above in absolute value, in both nominal and real terms, and in relative terms as a percentage of GDP, disposable income and gross value added (GVA) in each sector.

(ii) Growth of the indicators mentioned in point (i) above and deviation from their long-term trends.

(iii) Indicators on the degree of financial imbalance in the sectors analysed, including variables such as the debt-to-disposable income or debt-to-GVA ratios, among others.

(iv) Level of, changes in, and deviation from, the long-term trend of asset prices relevant for monitoring cyclical imbalances in each sector, such as purchase and rental prices in the real estate market.

This article focuses on the first three indicator categories. The fourth group of metrics, which relates to the assessment of possible real estate market risks, has already been dealt with extensively by the Banco de España (see, for instance, Banco de España (2020)).

4 Methodology for calculating sectoral indicators

The methodology for analysing sectoral credit cycles is similar to that used for the Spanish economy's overall credit cycle in the general CCyB decisions.[6] The activation of the CCyB is related to the identification of periods of excessive credit growth. Therefore, the credit growth rates themselves are insufficient to determine whether or not such growth is excessive. The benchmark indicator for steering decisions on the general CCyB is the credit-to-GDP gap. The rationale behind this indicator is based on the fact that deviations from its long-term behaviour tend to be corrected and that, the greater and more persistent the deviation, the more likely and sharper such correction will be. Consequently, credit booms that push the credit gap above its long-term trend are a sign of imbalance.[7]

The credit-to-GDP gap, known as the "Basel gap", is calculated in accordance with the guidelines of the Basel Committee on Banking Supervision (BCBS) (see BCBS (2010)) and is the deviation of the credit-to-GDP ratio from its long-term trend, using an adjusted one-sided Hodrick-Prescott filter with a smoothing parameter equal to 400,000. However, this standard gap is not appropriate for countries such as Spain, with a shorter historical duration of the credit cycle. To better reflect this empirical evidence, the Banco de España also regularly calculates an adjusted gap with a smoothing parameter equal to 25,000 (see Galán (2019)).

To calculate sectoral gaps, which measure the difference between sectoral credit ratios and their long-term trend, a methodology similar to that used for the credit-

6 As specified in Article 61 of Royal Decree 84/2015, although the Banco de España calculates the percentage in accordance with criteria deemed appropriate by it for identifying risks arising from excessive credit growth, it should use as a basis the deviation of the credit-to-GDP ratio from its long-term trend.

7 Several papers relate credit growth to subsequent financial crises. See, for example, Schularick and Taylor (2012).

to-GDP gap is employed (see BCBS (2019)). Specifically, each sector's credit gaps measure the difference between several sectoral debt indicators and their equilibrium values, estimated as long-term trends by means of statistical filters. As in the case of the adjusted credit-to-GDP gap, a smoothing parameter equal to 25,000 is used to calculate the sectoral gaps. As regards indebtedness metrics, the most significant sectoral credit ratios are used to assess sectoral imbalances. Thus, while the credit-to-GDP ratio is the main benchmark for analysing the level of indebtedness of the economy as a whole, for specific sectors, a series of more accurate measures regarding the contribution of the sector's activity to the economy are used as denominators, together with GDP. For example, the ratios of sectoral credit to the sector's GVA or gross fixed capital formation (GFCF) are considered in the case of firms. For loans to households, disposable income is used.

As in the case of the general CCyB, the information provided by the sectoral gaps is complemented by additional indicators.[8] For example, as proposed in Circular 5/2021, simple indicators, such as each sector's volume of credit in absolute value and credit ratios, are analysed. These ratios are calculated based on the denominators used to calculate the sectoral credit-to-GDP gap accumulated in the last four quarters.

In addition, indicators such as credit intensity, the debt service ratio and price imbalances in the real estate sector, among others, are used. Specifically, the total credit intensity indicator is defined as the ratio of the annual change in aggregate credit to cumulative GDP for the same period. Unlike credit gaps, which are defined based on the ratios of the balance of credit to a flow variable, intensity is conceptually more consistent, as it evaluates the ratio between two flow variables. Similarly, in the case of the sectoral toolkit, credit intensity is calculated as the ratio of the annual change in each sector's credit (as the numerator) to the annual cumulative GVA, disposable income or GFCF (as the denominator).

Table 1 summarises the main indicators proposed to steer the possible activation of sectoral tools. The scant evidence available in connection with these sectoral indicators makes it difficult to assess their relative importance. Since a methodology similar to that used for the overall credit cycle has been used for analysing sectoral credit cycles, in principle credit gaps are considered the main indicator. The other indicators (mainly credit ratios and intensities) are complementary. As with the general CCyB metrics, these complementary indicators may gain importance during periods of sharp falls in the ratios' denominators, when the gaps may increase without this being construed as a warning sign.

8 In the case of the general CCyB, the use of additional indicators follows Recommendation of the European Systemic Risk Board (ESRB) ESRB/2014/1 of 18 July 2014 providing guidance for setting countercyclical buffer rates.

Table 1
INDICATORS PROPOSED TO PROVIDE REGULAR GUIDANCE FOR THE POSSIBLE ACTIVATION OF SECTORAL TOOLS

	Households	Non-financial corporations and sole proprietors
Credit in absolute value	Loans to households	Loans to NFCs
Credit ratio	Ratio of household lending to GDP	Ratio of NFC lending to sectoral GVA
	Ratio of household lending to disposable income	Ratio of NFC lending to GFCF
Gaps	Deviation of the ratio of household lending to GDP from its long-term trend	Deviation of the ratio of NFC lending to sectoral GVA from its long-term trend
	Deviation of the ratio of household lending to disposable income from its long-term trend	Deviation of the ratio of NFC lending to GFCF from its long-term trend
Credit intensity	Annual change in household lending relative to GDP	Annual change in NFC lending relative to sectoral GVA
	Annual change in household lending relative to disposable income	Annual change in NFC lending relative to GFCF

SOURCES: Circular 5/2021 and devised by authors.

Additionally, the lack of empirical evidence on sectoral indicators makes it more difficult to interpret them. For example, in the case of gaps it is analysed whether there is a significant deviation from their long-term trend. However, while a 2% threshold was set for the overall credit-to-GDP gap above which activation of the buffer is recommended,[9] no such threshold has yet been set for sectoral gaps. As for the other indicators, credit intensities well above zero could be interpreted as a sign of risk, as could continued increases in the ratios. Nevertheless, as in the case of sectoral gaps, no alert thresholds have been set.

Lastly, although the main indicators informing decision-making about the sectoral tool are those mentioned above, the Banco de España has discretion to use other additional variables that may help to identify imbalances. These include most notably the debt service ratio (DSR), which is the proportion of interest and principal payments relative to aggregate disposable income. It is constructed using a standard formula for calculating the present value of a term loan (based on the aggregate stock of credit, and average interest rate and term) and dividing it by the disposable income.[10] Lastly, as in the case of the general CCyB, indicators for price imbalances in the real estate sector can also be used to steer sectoral tool decisions.[11]

9 This 2% benchmark level for the activation of the general CCyB follows the guidelines of the Basel Committee on Banking Supervision (see BCBS (2010)) and of Recommendation of the European Systemic Risk Board ESRB/2014/1.

10 The DSR used by the Banco de España to identify risks was first proposed by Drehmann and Juselius (2012) as an early warning indicator for financial crises and is currently considered one of the main benchmark indicators for the general CCyB, together with the credit-to-GDP gap.

11 In the case of the general CCyB, four indicators are assessed which seek to capture deviations of real estate sector prices from their long-term level, thus providing information on the build-up of systemic risks stemming from excessive credit growth. Specifically, these four indicators are: (i) the house price gap; (ii) the gap of the ratio of house prices to disposable income; (iii) the house price imbalance owing to long-term trends in disposable income and mortgage rates; and (iv) the long-term house price imbalance owing to past prices, disposable income, new mortgage rates and fiscal variables. The first three indicators are calculated from gaps with respect to long-term trends using the same statistical filter as for the credit-to-GDP gap. The last indicator is obtained using econometric models.

5 Recent developments in sectoral indicators

The recent developments in the proposed sectoral indicators are analysed below, on data as at September 2021. For illustration purposes, the main indicators informing decisions regarding sectoral tools have been selected. This set of metrics comprises simple indicators based on the volume of credit and credit ratios for each sector, together with credit intensities for both households and firms.

5.1 Lending to non-financial corporations

Lending for construction and real estate activities has declined since the global financial crisis, in both absolute and relative terms, although it stabilised after the onset of the COVID-19 crisis (see Chart 2.1). In the rest of the productive sectors, credit was more stable before the outbreak of the pandemic, but it subsequently rebounded slightly owing to the economic support measures that were put in place. This trend was also reflected in the credit ratios (see Chart 2.2), which declined for construction and real estate activities, although they stabilised after the outbreak of the pandemic owing to the fall in GVA and GFCF. In the sectors not related to the real estate sector, the ratios increased at the beginning of the pandemic because of the support measures and the sharp fall in their corresponding GVA.

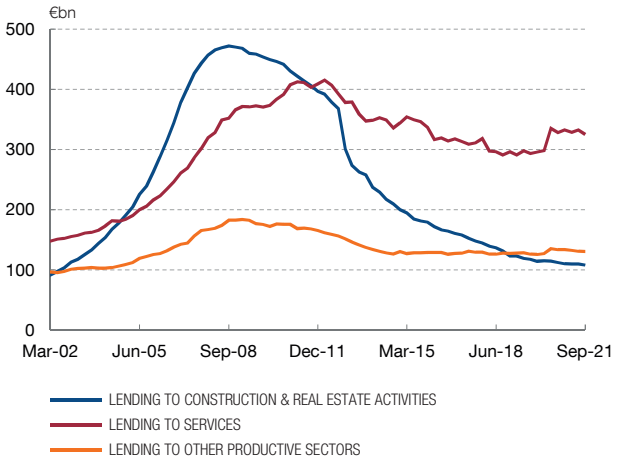
Credit gaps and intensities show similar trends. As with the credit gap used to set the general CCyB, sectoral credit gaps increased across the board after the outbreak of the health crisis, particularly in sectors other than construction and real estate activities (see Chart 2.3). This increase owes mainly to the sharp fall in the GVA included in the denominator of the ratios, which has also influenced credit intensity (see Chart 2.4). These gap developments should therefore not be construed as an early warning, insofar as no excessively large credit build-up can be seen in any NFC sector. In this regard, the rebound in the gaps for sectors other than real estate has partially corrected as GVA recovered over the past year. The temporary widening of the gaps in these sectors reflects the higher impact of the pandemic on some of these activities and the support measures for credit to these segments (particularly State-guaranteed loans).

As for the construction and real estate sector credit gap, it was already on an upward trend before the pandemic and its growth has not yet reversed. However, this development is due to a decline in the trend of this credit category calculated using a statistical filter, while the ratios for credit to construction and real estate relative to GVA or GFCF have remained stable. Chart 3.1 shows this breakdown into ratio and trend for the case of the gap with respect to sectoral GVA. The contributions of the gap's components to its variation show that their recent increase is due only to changes in the trend (see Chart 3.2). In other words, once again, the changes in the gaps are not due to imbalances.

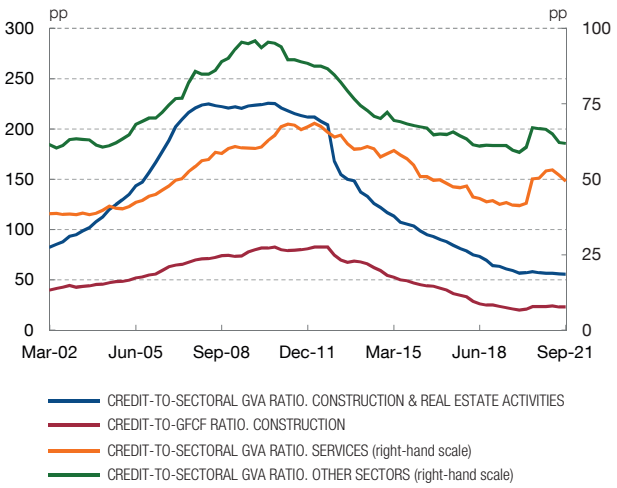
Chart 2

INDICATORS FOR ANALYSING NON-FINANCIAL CORPORATIONS' CREDIT CYCLE (a)

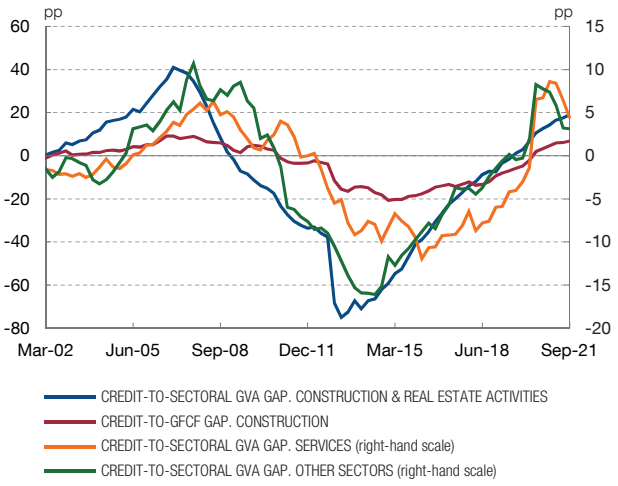
1 VOLUME OF LENDING TO FINANCE FIRMS' PRODUCTIVE ACTIVITIES



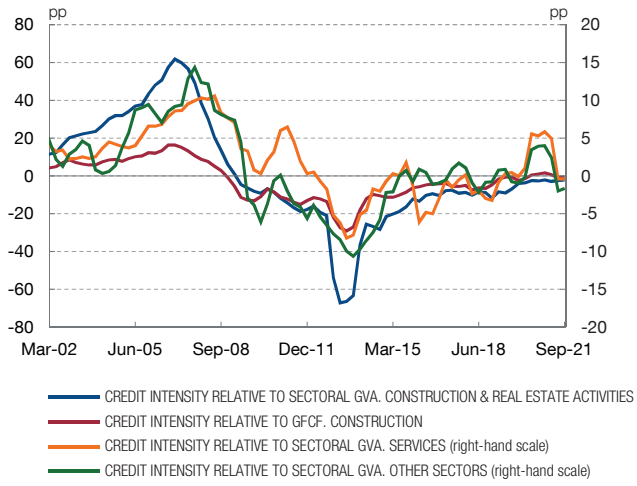
2 CREDIT RATIO OF FIRMS' PRODUCTIVE ACTIVITIES



3 CREDIT GAP OF FIRMS' PRODUCTIVE ACTIVITIES



4 CREDIT INTENSITY OF FIRMS' PRODUCTIVE ACTIVITIES



SOURCES: Banco de España, INE and own calculations.

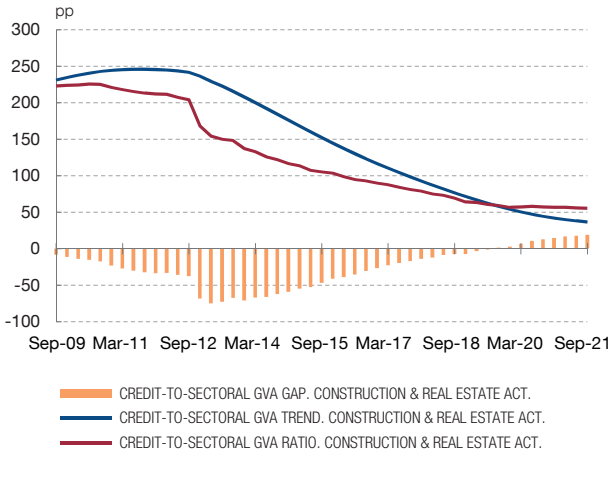
a Data available up to September 2021.

This absence of warnings relating to lending to NFCs is most clearly seen in the changes in sectoral credit intensities (see Chart 2.4), where all series remain close to zero and generally at negative values. The only relevant exception is the temporary increase in the credit intensity series for NFCs other than construction and real estate. As in the gaps, this temporary increase reflects the higher impact of COVID-19 on these types of activities (which include the sectors most vulnerable to the pandemic) and the credit support measures introduced in this segment to mitigate it.

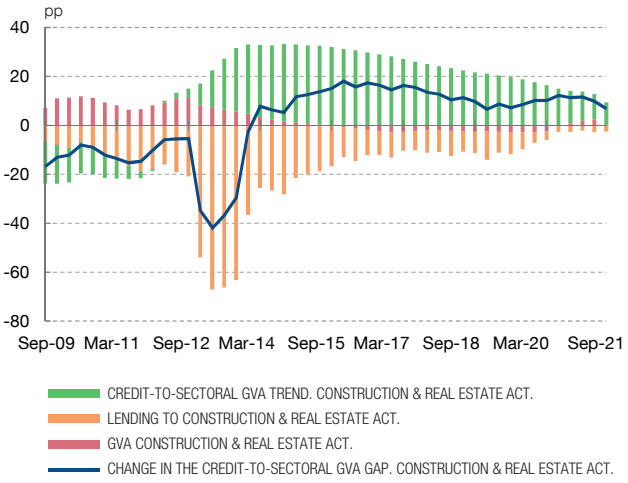
Chart 3

CREDIT-TO-GVA AND CREDIT-TO-GFCF GAPS AND ESTIMATED TREND FOR THE CONSTRUCTION AND REAL ESTATE ACTIVITIES SECTOR (a)

1 CREDIT RATIO, GAP AND TREND FOR CONSTRUCTION AND REAL ESTATE ACTIVITIES



2 CHANGE IN THE CREDIT GAP FOR CONSTRUCTION AND REAL ESTATE ACTIVITIES, BY COMPONENT



SOURCES: Banco de España, INE and own calculations.

a Data available up to September 2021. The credit trend is calculated using a Hodrick-Prescott filter with a smoothing parameter of 25,000.

5.2 Loans to households

Lending to households remains stable after declining during the financial crisis, less intensely in consumer credit than in loans for house purchase (see Chart 4.1). Chart 4.2 shows that, at the onset of the pandemic, credit ratios picked up somewhat in the case of loans for house purchase, again owing to the sharp fall in GDP and disposable income. However, this increase started to reverse in the wake of the economic recovery that began at end-2020. Meanwhile, consumer credit was not as affected by the pandemic and its ratios remained stable.[12] However, the decline in consumer credit resulted in a slight reduction in the figure for 2021 Q3.

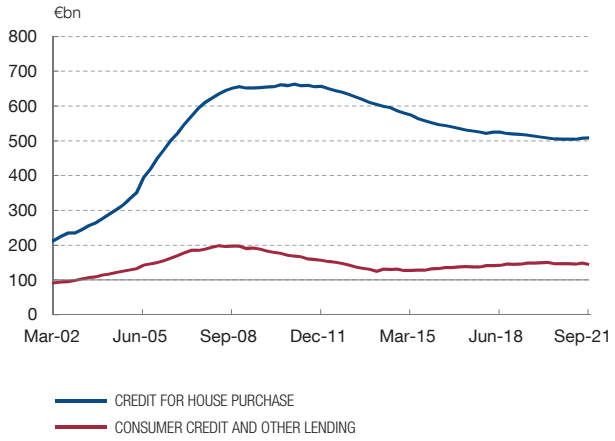
In the case of households, the credit gaps most affected by the pandemic were those related to loans for house purchase (see Chart 4.3). As in the productive sectors, credit gaps picked up sharply owing to the fall in GDP and disposable income, which has already started to correct. Consumer credit gaps are more stable, although they narrowed in 2021 Q3, given the decline in consumer credit, which is included in the numerator of the ratios. Finally, households' credit intensities (see Chart 4.4) increased slightly at the onset of the health crisis for both types of spending, after the downward trend and subsequent stabilisation

12 The consumer credit series has a significant seasonal component, so a preliminary seasonal adjustment has been made.

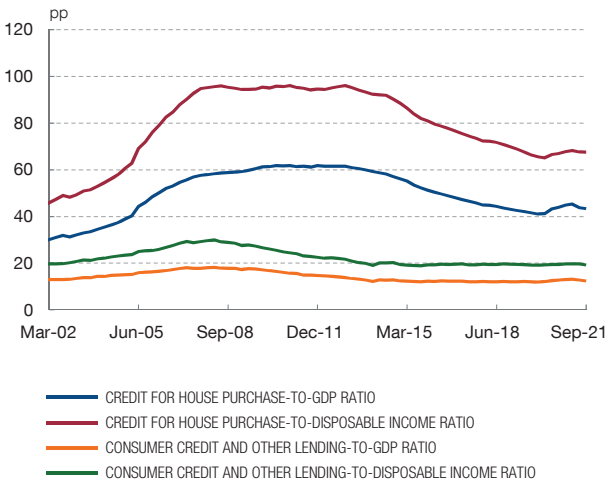
Chart 4

INDICATORS FOR ANALYSING THE HOUSEHOLD CREDIT CYCLE (a)

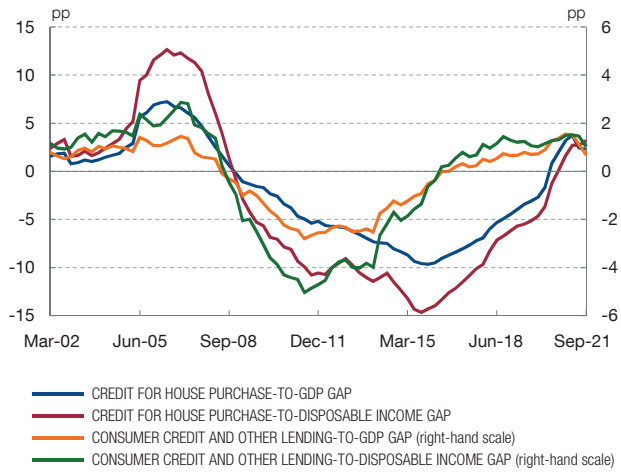
1 VOLUME OF LENDING TO HOUSEHOLDS BY TYPE OF SPENDING



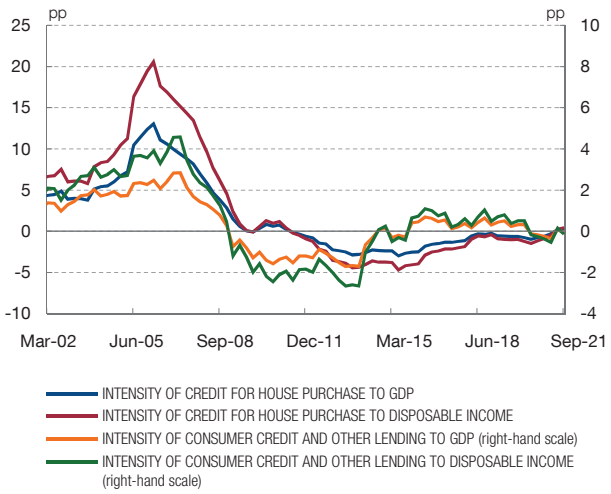
2 HOUSEHOLD CREDIT RATIO BY TYPE OF SPENDING



3 HOUSEHOLD CREDIT GAP BY TYPE OF SPENDING



4 HOUSEHOLD CREDIT INTENSITY BY TYPE OF SPENDING



SOURCES: Banco de España, INE and own calculations.

a Credit for house purchase includes both house purchase and renovation. Data available up to September 2021.

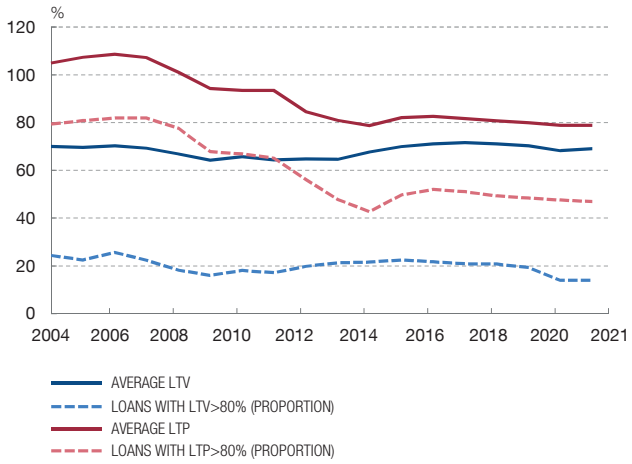
following the financial crisis. As with NFCs, these credit intensities are close to zero and largely in negative territory. This indicator therefore points to an absence of systemic risks.

In sum, the analysis of the four types of sectoral indicators, for both NFCs and households, suggests that there are no warning signs of a build-up of systemic risks. Thus, there is no need to activate any of the new macroprudential tools for the time being.

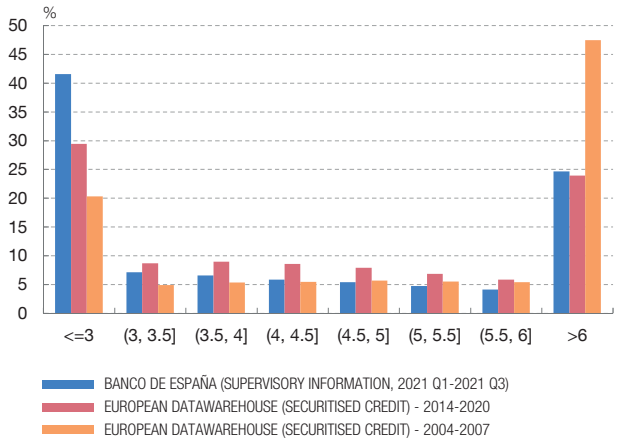
Chart 5

CHANGES IN CREDIT STANDARDS FOR NEW HOME MORTGAGES

1 LOAN-TO-VALUE (LTV) AND LOAN-TO-PRICE (LTP) RATIOS (a)



2 LOAN-TO-INCOME (LTI) RATIO, DISTRIBUTION (b)



SOURCES: Registrars Association of Spain, Banco de España and European DataWarehouse.

a In the LTV ratio, the denominator is the appraisal value of the house, while in the LTP ratio the denominator is the price of the house recorded in the real estate registry. The LTP ratio is calculated for a representative sample of loans. Indicators obtained from the Registrars Association. Data available up to September 2021.

b When supervisory information is used, the denominator of the LTI ratio is the borrowers' annual disposable income, while in the case of securitised credit the denominator is the main mortgagor's gross annual income. Data up to 2020 obtained from European DataWarehouse. Data for 2021 obtained from the Banco de España's supervisory information.

6 Additional indicators

The sectoral indicators presented above contain useful information to determine the appropriateness of setting limits and conditions on new loans, but they are not the most important to decide whether to activate these tools. In particular, other additional indicators need to be analysed to activate these tools, such as, for example, institutions' credit standards. In fact, recent literature has shown that these metrics are a good leading indicator (see, for example, Campbell and Cocco (2015) or Haughwout et al. (2008)). There is a wide range of credit standards, referring to both the value of the property and the borrower's income.[13] By way of illustration, Chart 5.1 shows the ratios of the loan amount to the appraisal value of the home (loan-to-value or LTV ratio) and to the recorded purchase price (loan-to-price or LTP ratio). Before the financial crisis, mortgages were granted with very high initial indebtedness (around 100% on average), particularly as measured by the LTP ratio. Chart 5.2 shows the distribution of the ratio of the loan amount to mortgagors'

13 Circular 5/2021 mentions: (1) the loan-to-value (LTV) ratio, i.e. the ratio of the loan amount to the appraisal value; (2) the loan-to-price (LTP) ratio, i.e. the ratio of the loan amount to the value of the real estate transaction; (3) the loan-to-income (LTI) ratio, i.e. the ratio of the loan amount to income; (4) the loan service-to-income (LSTI) ratio; (5) the debt-to-income (DTI) ratio; (6) the debt service-to-income (DSTI) ratio; (7) the interest coverage ratio (ICR); (8) the loan-to-rental income (LTR) ratio; (9) the loan-to-total assets (LTA) ratio for NFCs; and (10) the debt-to-total assets (DTA) ratio for NFCs.

income (loan-to-income or LTI ratio), evidencing that credit standards were loose before the financial crisis and have tightened in recent years.

7 Predictive power of sectoral indicators

The predictive power of these sectoral indicators is analysed below. This analysis is key to assessing the effectiveness of the proposed indicators in providing early warning signs of economy-wide crises, and in alerting to sectoral vulnerabilities. Specifically, this analysis focuses on comparing the predictive power of the different sectoral credit gaps presented above to the general credit-to-GDP gap, as this is the benchmark indicator that determines the activation of the CCyB (see BCBS (2010)). While the effectiveness of the general credit-to-GDP gap as a leading indicator of systemic crises has been widely demonstrated in the literature (see Drehmann et al. (2010), Detken et al. (2014) and Drehmann and Tsatsaronis (2014)), that of sectoral indicators has barely been studied.[14] Although this analysis is based on gap developments, it can be made extensive to the other sectoral indicators discussed in this article.

The predictive power of indicators is assessed using a metric known as AUROC (Area Under the Receiver Operating Characteristics Curve), which is a useful method for analysing the performance of early warning indicators. The AUROC, which takes values between 0 and 1, measures the accuracy of each indicator for each probability threshold of a logit model. This statistical procedure makes it possible to measure the performance of each indicator in terms of the proportion between correct signals (correctly predicting crises and absence of signals in non-crisis periods) and incorrect signals (i.e. false alarms or unidentified crises). It therefore roughly quantifies the probability that the model's forecasts are correct. This metric is the standard methodology used to assess the appropriateness of the indicators commonly used to steer the activation of the CCyB, particularly the credit-to-GDP gap (see Galán (2019) and Castro et al. (2016)).[15]

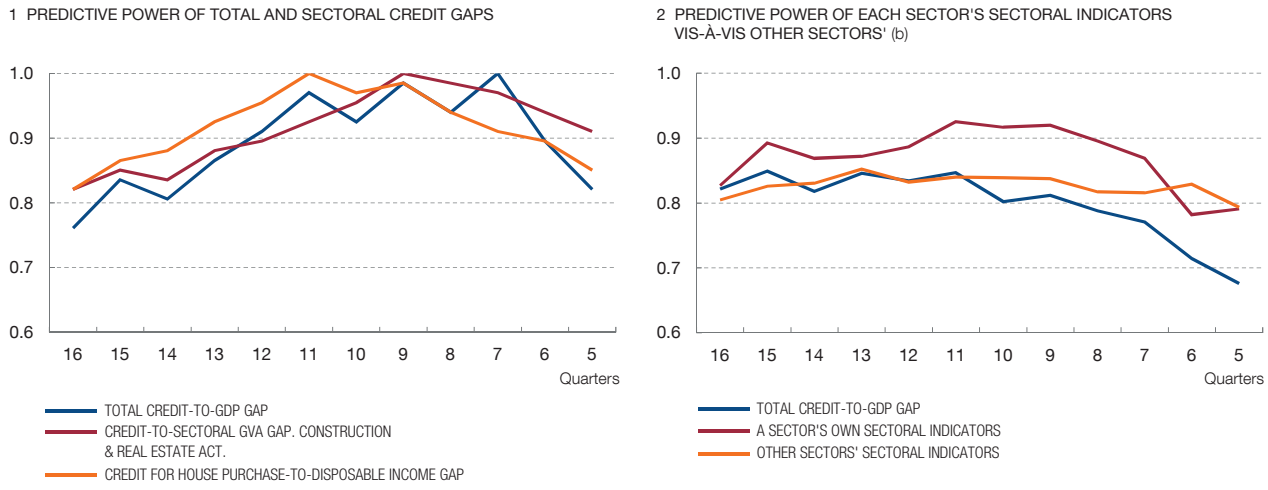
Specifically, to assess the predictive power of the sectoral indicators using AUROCs, univariate logit regressions have been estimated where the dependent variable is binary. This variable is 1 in the case of a systemic event and 0 otherwise, and the explanatory variables are the different sectoral gaps. This model has been used to analyse the ability of sectoral gaps to warn of a systemic crisis 16 to 5 quarters before it materialises, based on a historical sample from December 2001 to

14 Among these few empirical contributions, see, for example, Ferrari and Rovira Kaltwasser (2019) and Fiori and Pacella (2018) for an analysis of the relationship between sectoral credit cycles and systemic risk in the United States and Italy, respectively.

15 An AUROC value of 1 suggests that the indicator provides perfect forecasts, while a value of 0.5 indicates that the indicator has no predictive power, as it would predict crises randomly.

Chart 6

PREDICTIVE POWER OF SECTORAL INDICATORS (a)



SOURCES: INE and Banco de España.

a Predictive power is measured using AUROCs. This measure represents the ratio of the false positive rate to the true positive rate for all possible binary classification thresholds of a logit model. An AUROC of 1 would indicate that the indicator makes perfect forecasts. The horizontal axis represents the number of quarters prior to the occurrence of the crisis. The range between 16 and 5 quarters is considered appropriate for policy purposes, allowing sufficient time to assess whether macroprudential measures could be activated. Data available up to September 2021.

b The credit gap of the sector itself is the average AUROC of the sectoral gaps in predicting the NPL ratio of the corresponding sector. The credit gap of other sectors is the average AUROC of the sectoral gaps in predicting the NPL ratios of the other sectors.

September 2017,[16] where the only systemic event is the global financial crisis that began in 2009 Q1 (see Lang et al. (2019)).[17]

Chart 6.1 shows the predictive power of sectoral credit gaps versus the credit-to-GDP gap in different quarters before the materialisation of the systemic crisis. The results show that, for this particular episode, the general gap is less able to predict crises than the sectoral gaps over much of the projection horizon. Therefore, monitoring the new sectoral indicators could be useful to identify fresh systemic imbalances earlier than if the economy's overall credit cycle is monitored. It should be noted, however, that this exercise is based on a single crisis event. These results will therefore have to be confirmed as more experience becomes available and more information is analysed.[18]

16 Given the forward-looking nature of AUROCs, the last 16 quarters (between 2017 Q4 and 2021 Q3) are excluded from the analysis.

17 In the case of Spain, the global financial crisis led to a systemic banking crisis between 2009 Q1 and 2013 Q4. Although the crisis triggered by the COVID-19 pandemic can also be considered systemic, the methodology used in this exercise cannot predict this type of event, as it originated outside the financial system.

18 To address the limitation of this exercise having only one crisis event, the analysis should be extended to include prior systemic crises. However, detailed sectoral credit information is only available from December 1992 onwards, making it impossible to analyse its predictive power for the 1979-1985 and 1993-1994 crises. Another alternative would be to exploit evidence of systemic crises in other countries. Although this possible extension of the analysis is beyond the scope of this paper, it could be a hypothetical area for future work, which would make it possible to increase the number of systemic crises available in the sample.

Additionally, it is important to study whether sectoral indicators are useful to identify imbalances in their own sector and whether they provide leading information on the future materialisation of losses. To this end, instead of analysing the ability to predict systemic events (such as the onset of the global financial crisis), what is studied is each indicator's ability to predict an increase in the sectoral NPL ratio relative to the historical average of that sector.[19] The results indicate that the sectoral gaps have a greater predictive power for the future materialisation of defaults in their own sector than gaps in other sectors (see Chart 6.2), confirming the importance and usefulness of detailed monitoring of different sectoral credit cycles. These sectoral gaps are also better at anticipating a rise in late payments in their sector than aggregate measures such as the credit-to-GDP gap.

8 Conclusions

The article presents a series of useful indicators for assessing the possible build-up of systemic risks that would require activating the new sectoral macroprudential tools set out in Circular 5/2021. The Circular itself lists a series of indicators that the Banco de España should analyse for this purpose, corresponding to four sectors. This paper also shows the methodology for calculating these indicators, which is largely inspired by that currently used to identify the risks that guide the decision on the CCyB.

As in the case of the general CCyB, the behaviour of the indicators during the pandemic has been influenced by the sharp fall in GDP and the support measures introduced by the authorities. These developments should therefore not be construed as a warning sign for the build-up of systemic risks. On the basis of this evidence, it is concluded that no sectoral macroprudential tool needs to be activated for the time being.

Lastly, the predictive power of the new sectoral indicators is analysed. The evidence suggests that they tend to be better at providing early warning signs of systemic crises compared to the indicators relating to the overall economic cycle. Moreover, the results indicate that sectoral gaps have a higher predictive power for the materialisation of future defaults in their own sector than gaps for other sectors. This suggests that it is important to monitor the different sectoral credit cycles in detail. In any event, given that this analysis of predictive power is based on the occurrence of a single systemic crisis (the global financial crisis), going forward it will be necessary to confirm this result using aggregate and sectoral indicators in future systemic crises as more information becomes available.

19 For the logit models based on sectoral NPL ratios, the different risk thresholds have been determined for each sector using the averages of these ratios. In other words, the binary variable has been defined as 1 in the quarter in which the NPL ratio exceeds its historical average.

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The first ten years of the European Systemic Risk Board (2011-2021)

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BANCO DE ESPAÑA

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Abstract

The European Systemic Risk Board was established in the wake of the global financial crisis as the authority responsible for the macroprudential oversight of risks to the stability of the European Union financial system. In its first decade, the European Systemic Risk Board's activity has been marked by the challenges posed by the operationalisation of the macroprudential tools incorporated into European Union banking legislation, the euro area sovereign debt crisis, the United Kingdom's withdrawal from the European Union and the outbreak of the COVID-19 global pandemic. During this period, the European Systemic Risk Board – of which the Banco de España is a member institution – has worked tirelessly to achieve its mission and objectives, helping identify and analyse systemic risks and vulnerabilities and advise on and coordinate national macroprudential policy measures. It has also issued reports on various reforms to European Union financial legislation.

Keywords: macroprudential, systemic risk, financial stability, institutions.

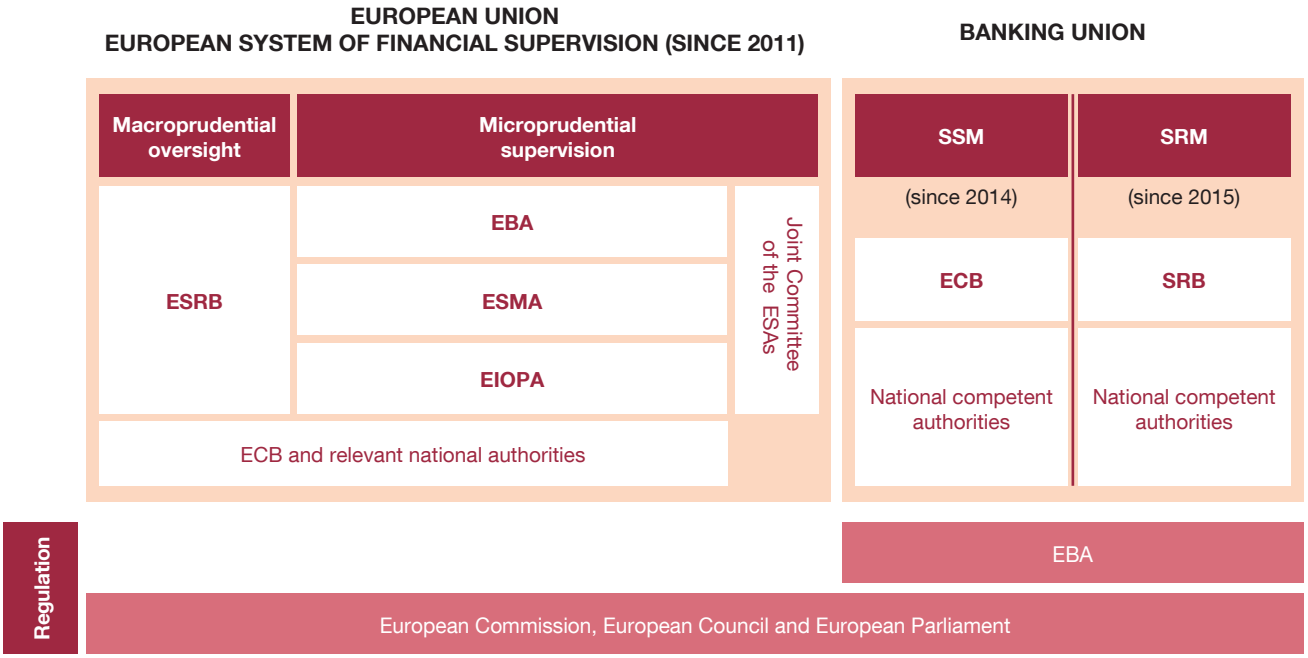
1 Origin and context of the creation of the European Systemic Risk Board

The 2008 global financial crisis prompted a review of financial regulation and institutional architecture worldwide. The global financial crisis led governments and authorities around the world to rethink financial stability policy frameworks, strengthen international, European and national financial regulation, review the consequences of financial integration and adjust the institutional arrangements for supervising and overseeing the sectors comprising the financial system. Against this background, the European Commission created the High-Level Group on Financial Supervision in the EU – chaired by Jacques de Larosière[1] and including another seven renowned experts in this field – to analyse the causes of the crisis and provide recommendations for improving the regulatory and supervisory frameworks in the European Union (EU). The High-Level Group published its findings in February 2009 (see De Larosière (2009) and a detailed description in Field and Pérez (2009)).

In 2009 the de Larosière report recommended setting up a "European Systemic Risk Council". One of the report's 31 recommendations (Recommendation 16) stated that "a new body called the European Systemic Risk Council (ESRC), to be

1 Jacques de Larosière had been Governor of the Banque de France and Managing Director of the International Monetary Fund (IMF). The Group's other members were Leszek Balcerowicz, Otmar Issing, Rainer Masera, Callum McCarthy, Lars Nyberg, José Pérez (former Director General Banking Supervision of the Banco de España) and Onno Ruding.

Figure 1
THE ESRB IN THE EU INSTITUTIONAL FRAMEWORK



SOURCES: ESRB and devised by author.

chaired by the ECB President, should be set up under the auspices and with the logistical support of the ECB". This recommendation was part of a wider set of proposals geared towards reviewing the institutional framework underpinning the Lamfalussy process[2] for the adoption of EU financial services law. The de Larosière report proposed the creation of three EU microprudential sectoral supervisory authorities – the European Banking Authority (EBA), the European Securities and Markets Authority (ESMA) and the European Insurance and Occupational Pensions Authority (EIOPA) – based on three pre-existing committees (the Committee of European Banking Supervisors, the Committee of European Securities Regulators and the Committee of European Insurance and Occupational Pensions Supervisors, respectively), which would bring together the national supervisory authorities responsible for these sectors (see Figure 1).

The European Systemic Risk Council (or Board, as it ultimately came to be known) would be a new authority with a mandate to ensure financial stability and mitigate adverse impacts on the internal market and the real economy. One of the lessons from the global financial crisis was that the traditional

2 Baron Alexandre Lamfalussy chaired the Committee of Wise Men on the Regulation of European Securities Markets between 2000 and 2001. Lamfalussy was the first President of the European Monetary Institute (the predecessor of the European Central Bank) and General Manager of the Bank for International Settlements. Luis Ángel Rojo (former Governor of the Banco de España) was a member of that committee.

microprudential supervisory approach (institution by institution) did not by itself suffice to ensure the stability of the financial system. It needed to be supplemented with a macroprudential approach focusing on aggregate and dynamic (cross-sectional and over time) developments to identify the risks and vulnerabilities that, while not evident at individual institution level, become apparent when considered collectively.[3] Thus, it was acknowledged that, for example, global risk to the system can arise from: (i) many financial institutions all being exposed to the same risk factors (even though each of these institutions may be immaterial individually); (ii) possible spillovers between sub-sectors and from some institutions to others due to their interconnections; and (iii) widespread institution-level countercyclical dynamics in the event of adverse changes in the macro-financial environment. The new macroprudential approach justified the creation of a committee with a specific mandate comprising all authorities with financial stability mandates, not just the supervisory authorities.

Regulation (EU) No 1092/2010, which established the European Systemic Risk Board (ESRB), was adopted on 24 November 2010. Faithful to the de Larosière Group's proposal, the new authority became responsible for the macroprudential oversight of the EU financial system and the prevention and mitigation of systemic risk for financial stability, thereby avoiding – insofar as possible – episodes of widespread financial shocks and contributing to the smooth functioning of the internal market. The ESRB was ultimately tasked with ensuring the financial sector made a sustainable contribution to economic growth in the EU.

From a competence standpoint, the ESRB is, strictly speaking, an authority with no regulatory or prudential powers. This is the result of the European co-legislators agreeing that Member States should retain macroprudential powers, given the typical asynchrony of national financial cycles. The ESRB can issue, on its own initiative, opinions, warnings and recommendations on manifold issues related to risk analysis and macroprudential policy measures (potentially) addressed to a wide range of institutional recipients (including the governments of Member States). Although they are not binding, ESRB recommendations are considerably effective as (i) their recipients are subject to the general principle of "comply or explain" and (ii) the ESRB regularly verifies and publicly grades the relevant authorities' compliance with its recommendations.[4] The ESRB also publishes a large number of documents detailing its work to deliver on its mandate.

From an organisational perspective, the ESRB has a dedicated secretariat which is hosted by the ECB in Frankfurt am Main. Regulation (EU) No 1096/2010 confers a series of tasks on the ECB so that it provides administrative, analytical,

3 For the rationale behind this paradigm shift associated with the "fallacy of composition", see Brunnermeier et al. (2009).

4 The methodology for these exercises is included in the *Handbook on the assessment of compliance with ESRB recommendations*, April 2016.

statistical and logistical support to the ESRB in the performance of its functions. The scope of the support provided by the ECB to the ESRB spans internal arrangements[5] (funding, human resources, information systems) and communication.[6] The organisational model is comparable to that of the global committees housed under the roof of the Bank for International Settlements (BIS) in Basel.[7] The ESRB, together with EBA, ESMA and EIOPA, is integrated into the European System of Financial Supervision (ESFS) and has members from all the relevant national and EU authorities. The Regulation establishing the ESRB stipulated that it should be chaired by the President of the ECB, initially for a five-year term. It was subsequently determined that the President of the ECB should chair the ESRB on a permanent basis (see Box 1).

The ESRB was established during a period (2009-2011) of regulatory and institutional upheaval in Europe and worldwide. At international level, the Financial Stability Board (FSB), the successor to the Financial Stability Forum (FSF), was established in 2009 to foster international financial reform. The Basel Committee on Banking Supervision (BCBS), which was engaged in the review of international banking standards (that would result in Basel III), analysed and agreed on the introduction of new specifically macroprudential solvency requirements: (i) the countercyclical capital buffer (to address temporary imbalances over the course of the multi-year credit cycle)[8] and (ii) the capital buffers for systemically important institutions (to mitigate the "too big to fail" phenomenon).[9] The Dodd-Frank Act was passed in the United States in 2010 and established the Financial Stability Oversight Council (FSOC) – a new inter-agency body whose design resembles that of the ESRB.

The European institutional setting in which the ESRB initially pursued its mandate was later supplemented and strengthened by the two pillars of the banking union (2013-2014). These two pillars – the Single Supervisory Mechanism (SSM), coordinated by the ECB, and the Single Resolution Mechanism (SRM), led by the Single Resolution Board (SRB) from Brussels – are reflected in the organisational structure of the ESRB, via (i) the involvement of ECB Banking Supervision and SRB officials in its working bodies and (ii) their inclusion in the group of potential institutional addressees of formal ESRB communications.

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5 The ESRB Secretariat is integrated into the organisational structure of the ECB as another business area, as proven by its inclusion in the documents *"List of ECB Managers"* and *"Distribution of responsibilities among the Members of the Executive Board of the ECB and the Chief Services Officer"*.

6 The ESRB's press releases typically include the contact details of an ECB press officer.

7 For example, the Basel Committee on Banking Supervision or the Committee on the Global Financial System.

8 Inspired by the countercyclical provisions introduced by the Banco de España from 2000 (see Saurina and Trucharte (2017)).

9 Another of the lessons from the global financial crisis was the perception that institutions above a certain size would be bailed out by the taxpayer in their country of origin should their difficulties threaten their viability. This notion proved to be completely inappropriate as it led to moral hazard and risk management asymmetries in the financial system.

Box 1

THE 2019 EUROPEAN SYSTEMIC RISK BOARD REVIEW

In 2010, the Regulation[1] establishing the European Systemic Risk Board (ESRB) stipulated that, no later than December 2013, the European Parliament and the Council should, on the basis of a report from the European Commission, examine the mission and organisation of the ESRB and determine whether they needed to be reviewed, paying particular attention to the modalities for the designation or election of the Chair of the ESRB.

The process of this review culminated at the end of 2019 with the publication of Regulation (EU) 2019/2176, which includes various adjustments and amendments to provisions on the functioning of the ESRB.[2] Specifically, the following amendments were made to the ESRB's governance arrangements:

(i) The General Board shall be permanently chaired by the President of the ECB (it was initially to be chaired by the President of the ECB during the ESRB's first five years).

(ii) The General Board shall be consulted in the assessment of short-listed candidates for the position of Head of the ESRB Secretariat.

(iii) ECB Banking Supervision and the Single Resolution Board (SRB) may each send a representative (without voting rights) to the General Board.

(iv) The Member States may choose to reassign their voting rights on the General Board to a representative from a national authority other than their respective central bank.[3]

(v) To avoid political influence, no member of the General Board should hold office in a Member State's central government.

(vi) The number of European Commission representatives on the Advisory Technical Committee was reduced from two (as stipulated in the original Regulation) to one.

In terms of communication and transparency, the following changes, inter alia, were adopted:

(i) The General Board may, should it so decide, publish an account of its quarterly meetings and hold press conferences.

(ii) The ESRB, through the Advisory Technical Committee and the Advisory Scientific Committee, shall organise public consultations on its work, where appropriate.

(iii) The ESRB must now inform, not only the European Council and the European Commission, as per the 2010 Regulation, but also the European Parliament of its warnings and recommendations in advance.

Another noteworthy change was that the scope of the group of potential addressee institutions for ESRB warnings and recommendations was extended to include the ECB (as competent authority for the prudential supervision of credit institutions), the SRB and the national resolution authorities.[4]

Several of the above-mentioned changes to Regulation (EU) 2019/2176 resulted in the ESRB's Rules of Procedure[5] being updated in order for them to be effectively operationalised.

The package of amendments to the Capital Requirements Directive (CRD V)[6] also incorporated significant changes for the ESRB relating to:

— Strengthening the ESRB's role as a hub for sharing information on macroprudential measures between national and EU authorities.

— Greater oversight over the sufficiency and consistency of national macroprudential policies.

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1 Regulation (EU) No 1092/2010 of the European Parliament and of the Council of 24 November 2010 on European Union macro-prudential oversight of the financial system and establishing a European Systemic Risk Board.

2 Regulation (EU) 2019/2176 of the European Parliament and of the Council of 18 December 2019 amending Regulation (EU) No 1092/2010 on European Union macro-prudential oversight of the financial system and establishing a European Systemic Risk Board.

3 This power has been exercised by one Member State, Sweden, which reassigned the voting rights to Finansinpektionen, the national financial supervisory authority.

4 As a result, in the case of Spain, the Spanish executive resolution authority (FROB) and the Banco de España as the preventive resolution authority may now receive ESRB recommendations. This change actually meant that, for the first time, Recommendation ESRB/2020/12 of 24 September 2020 on identifying legal entities was also addressed to resolution authorities.

5 Decision ESRB/2020/3 of 20 March 2020 amending Decision ESRB/2011/1 adopting the Rules of Procedure of the European Systemic Risk Board.

6 Directive (EU) 2019/878 of the European Parliament and of the Council of 20 May 2019 amending Directive 2013/36/EU as regards exempted entities, financial holding companies, mixed financial holding companies, remuneration, supervisory measures and powers and capital conservation measures.

2 ESRB governance and members

One of the ESRB's defining characteristics is its wide range of institutional members. Officials from national central banks and banking, securities, markets and insurance and pension funds supervisory authorities from all of the Member States[10] (together with the EU authorities responsible for financial stability and supervision (the ECB, European Commission, EBA, ESMA, EIOPA, SRB and the EU's Economic and Financial Committee)) participate in the ESRB. At present, a total of 74 authorities are ESRB members, making it one of the European authorities with the largest number of members[11] (see Table A.1 in the Annex for the full list). The number of authorities that participate in the ESRB per country depends on its national supervisory framework. Three Spanish authorities – the Banco de España (central bank and banking authority), the National Securities Market Commission (CNMV) and the Directorate General of Insurance and Pension Funds (DGSFP) – are members of the ESRB.

The ESRB General Board is its main decision-making body. The General Board is chaired by the President of the ECB (Christine Lagarde, since November 2019). Its other members are the central bank governors and heads of different EU supervisory authorities (in total, 36 members with voting rights) and high-level officials from all the national authorities (without voting rights). The General Board's governance structure is completed by two Vice-Chairs: one held by the governor of a national central bank outside the Eurosystem (at present, Stefan Ingves, Sveriges Riksbank) and the other which switches yearly between the chairs of EBA, ESMA and EIOPA. The General Board's main decisions are adopted by a qualified majority of two-thirds of its members with voting rights. Below the General Board there is a Steering Committee, which brings together a sub-set of the Board members.

One of the ESRB's key standing bodies is the Advisory Technical Committee (ATC), which helps prepare General Board meetings. The ATC reviews and discusses the work submitted by the ESRB's technical working groups on manifold matters concerning the analysis of financial stability risks and vulnerabilities, the design of macro-financial scenarios for stress testing exercises and technical proposals for financial regulatory reform, among others. The same institutions that sit on the General Board make up the ATC, generally via representatives of a level equivalent to director of the financial stability area at their respective authorities.

10 Including three countries (Iceland, Liechtenstein and Norway) that are not part of the EU but do belong to the European Economic Area (EEA).

11 Even exceeding international committees such as the FSB or the BCBS. This means that the ESRB, especially its General Board, virtually functions as an assembly (see the keynote speech by Jean-Claude Trichet, first Chair of the ESRB, at the fifth ESRB annual conference, 8 December 2021).

The ATC is currently chaired by the Governor of the Banco de España. Pablo Hernández de Cos was appointed Chair of the ATC by the ESRB General Board in mid-2019.[12] As Chair of the ATC, he is an ex officio member of the ESRB's Steering Committee. The ATC has previously been chaired by Stefan Ingves, Governor of Sveriges Riksbank, and Philip Lane, former Governor of the Central Bank of Ireland. The ATC also has a Vice-Chair, which Claudia Buch, current Vice-President of the Deutsche Bundesbank, has held since 2020. See Table A.3 in the Annex for further details on the chairs of the ESRB's standing bodies since 2011.

The ESRB has an Advisory Scientific Committee (ASC) consisting of fifteen independent academics and experts. The ASC contributes to the ESRB's work through research that complements work by the public authorities. The ASC has its own work programme and collaborates with the ATC through joint working groups. A sign of the ASC's independence is the fact that its publications are typically signed by its members and do not necessarily reflect the position of the ESRB General Board. The Chair of the ASC attends ATC and Steering Committee meetings and, together with the two Vice-Chairs of the ASC, the ESRB General Board meetings. One of the current members of the ASC is Javier Suárez, professor at Centro de Estudios Monetarios y Financieros (CEMFI), who has alternated between being Chair and Vice-Chair of this committee in recent years. Another Spaniard, José Luis Peydró, professor of Economics at Universitat Pompeu Fabra, was a member of the ASC between 2015 and 2019.

The ASC has made significant contributions to the ESRB's work. It has focused on areas such as the European banking sector's possible overcapacity[13] (possibly the report that has had the biggest impact to date), climate change transition risks (which was one of the first reports to be published on this subject), the macroprudential policy stance, the systemic risks of exchange-traded funds and the global dimension of macroprudential policy (see Table A.5 in the Annex for the full list).

The ESRB holds regular quarterly meetings. The ESRB's technical and thematic working groups are coordinated by the ATC (through the Analysis Working Group (AWG) and the Instruments Working Group (IWG)) and by the ASC, catering to its annual work programmes and priorities and any other conjunctural needs that might arise. The ESRB General Board's regular meetings are typically held in March, June, September and December, on the same dates as the meetings of the ECB General Council (the ECB's decision-making body that comprises all the governors from the European System of Central Banks).[14] Between meetings, numerous work matters are addressed continuously via written procedures.

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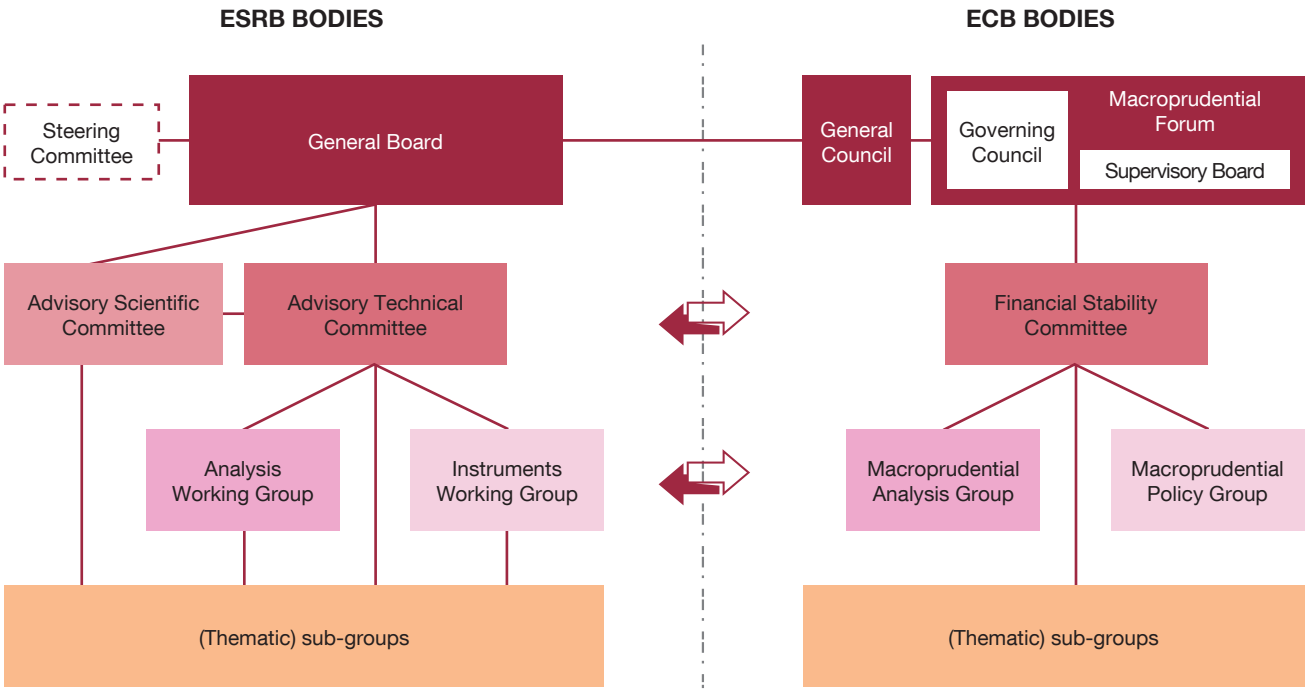
12 See Banco de España (2019).

13 "Is Europe Overbanked?", *ASC Report* No 4, June 2014.

14 See *Schedules for the meetings of the Governing Council and General Council of the ECB and related press conferences*.

Figure 2
CORRESPONDENCE BETWEEN ESRB AND ECB BODIES



SOURCES: ESRB, ECB and devised by author.

The ESRB cooperates closely with the ECB. In accordance with its financial stability mandate as a central bank and the macroprudential tasks conferred on it since 2014 as a banking supervisor, the ECB has a Macroprudential Forum and a Financial Stability Committee (FSC) in which representatives of different levels from national central banks and banking supervisory authorities from banking union countries participate.[15] The symmetry and coordination between the ESRB's and ECB's bodies (see Figure 2) are intended to avoid overlapping and boost synergies, particularly in matters affecting macroprudential policy for the banking sector.

The Regulation establishing the ESRB was amended in 2019 to incorporate several adjustments to its organisation, governance and transparency. As part of the periodic process to review and improve the ESRB, at the European Commission's proposal the European co-legislators approved various tweaks to the ESRB's configuration. These are summarised in Box 1 and highlight how smoothly the ESRB had functioned up to that point. Work on the next review of the ESRB's mission and organisation is scheduled to start in late 2024, and could lead to more extensive changes than those implemented in the latest review.

15 At present, the 19 euro area countries, plus Bulgaria and Croatia which have voluntarily joined the SSM.

3 Key ESRB macroprudential work

In its early years (2011-2013), the ESRB focused on operationalising its activity and setting the foundations for a common macroprudential culture. In its first year of operation, the ESRB approved its Rules of Procedure on matters relating to its organisation, functioning and governance. That same year, it issued recommendations on risks associated with lending in foreign currencies (ESRB/2011/1) and with US dollar denominated funding of European credit institutions (ESRB/2011/2), and on the macroprudential mandate of national authorities (ESRB/2011/3). These were followed, in 2012, by a recommendation on funding of credit institutions (ESRB/2012/2). In 2013 the ESRB issued a recommendation on intermediate objectives and instruments of macroprudential policy (ESRB/2013/1), which together with other ESRB initiatives (such as the Flagship Report on Macro-prudential Policy in the Banking Sector) helped establish an incipient macroprudential culture in the EU on the use of instruments and early alerts for the credit institution sector.[16]

From the start, the ESRB asked the EU Member States to establish authorities with macroprudential powers over the financial system overall, which led, in several countries, to the creation of national committees encompassing the various sectoral authorities responsible for financial stability. In the case of Spain, in response to Recommendation ESRB/2011/3, and in line with similar recommendations from the IMF,[17] the Spanish macroprudential authority AMCESFI[18] was created in 2019, replacing the Financial Stability Committee (CESFI)[19] established in 2006. AMCESFI groups together the Banco de España, the CNMV, the DGSFP and the Ministry of Economic Affairs and Digital Transformation, to coordinate macroprudential analyses and actions. In accordance with Recommendation ESRB/2011/3, another 13 EU/EEA countries have established a similar authority or body[20] (see Table A.2 in the Annex). This ESRB recommendation also triggered the expansion of the set of macroprudential instruments available to Spain's three sectoral authorities.[21]

The entry into force from 2014 of the EU capital requirements legislation (CRR/CRD) was a catalyst for the ESRB's work for the banking sector. Regulation (EU) No 575/2013 (CRR) and Directive 2013/36/EU (CRD) contain a set of macroprudential instruments for the banking sector that cover those envisaged under the Basel III

16 In this respect, see Mencía and Saurina (2016) for a description of the Banco de España's initial analytical framework for its macroprudential policy implementation.

17 "Spain - Financial System Stability Assessment", IMF Country Report 17/321, October 2017.

18 For more information on AMCESFI, see the latest annual report, available on its website (www.amcesfi.es) and Royal Decree 102/2019 of 1 March 2019 (Spanish version only) whereby AMCESFI was created, its legal framework was established and certain aspects relating to macroprudential tools were developed.

19 For more details on CESFI, see Vegara (2006).

20 In other countries it was not necessary to create a committee of this kind, owing to the specific characteristics of their institutional framework and the concentration of responsibilities at one single authority.

21 For more details, see Royal Decree-Law 22/2018 of 14 December 2018 (Spanish version only) establishing macroprudential tools.

framework (the countercyclical capital buffer (CCyB) and capital buffers for systemically important institutions), along with others specifically developed in the EU (such as the systemic risk buffer and the "flexibility package" under Article 458 of the CRR for addressing systemic risks). The CRR and the CRD issue the ESRB with a range of advisory tasks (for issue of opinions on national proposals for the use of certain instruments) and coordination tasks (for receipt and dissemination of notifications on national measures). The ESRB's opinions, together with those issued by EBA, play a fundamental role in the authorisation of national measures by the European Commission and the Council.

The CRD is the legal basis through which, via recommendations, the ESRB has operationalised the CCyB. Specifically, the ESRB has issued recommendations on countercyclical buffer rates for domestic exposures (ESRB/2014/1) and for exposures to third countries (ESRB/2015/1). These recommendations are in line with the BCBS 2010 Guidelines on countercyclical buffers. In the case of exposures to third countries, the ESRB conducts an annual exercise to identify the economies that it considers to be "material third countries" for the EU banking system as a whole (10 countries in 2021:[22] Brazil, China, Hong Kong, Mexico, Russia, Singapore, Switzerland, Turkey, the United Kingdom and the United States). It has also developed a framework for monitoring their national macro-financial situation, to assess the appropriateness of the CCyB rates set by each national authority. Should the CCyB rate set in any of these countries be deemed insufficient, in view of cyclical systemic risk developments, the ESRB has the power to issue a recommendation inviting the EU national authorities to set a higher CCyB rate for their credit institutions' exposures to the country in question. So far, the ESRB has not used this power.

The ESRB plays a key role for application of the voluntary reciprocity framework relating to Member States' national macroprudential measures. Apart from automatically recognising CCyB rates, EU legislation envisages, for certain macroprudential measures – mainly the flexibility package (Article 458 of the CRR) or the systemic risk buffer (Article 133 of the CRD) – that a national authority may ask the ESRB to issue a recommendation to the other Member States for adoption of a reciprocal temporary macroprudential measure. The aim is to boost the effectiveness (and reduce the possible arbitrage) of the original measure by extending its application to banks which, by virtue of their type of establishment (branches of banks with a parent in other countries) or activity (cross-border lending), contribute to the risk which the measure addresses but fall under the jurisdiction of other national authorities.

The ESRB resolves voluntary reciprocity requests favourably through amendments to its Recommendation ESRB/2015/2. Between 2014 and 2021 it

22 The list of material third countries identified by the ESRB since 2015 can be found here: List of material third countries. For the Spanish banking system, Brazil, Chile, Colombia, Mexico, Peru, Turkey, the United Kingdom and the United States are all material third countries. The Banco de España disseminates this information on its website in the Countercyclical capital buffer section.

has recommended – at least once – reciprocity for macroprudential measures adopted by Belgium, Estonia, Finland, France, Luxembourg, Norway and Sweden. To provide guidance on the adoption of reciprocal measures, the ESRB establishes, on a case-by-case basis, materiality thresholds in terms of the volume of national banks' exposures to the banking system of the country adopting the measure in question. The Banco de España has adopted the ESRB Recommendation and examines each reciprocity request from other Member States individually. Based on ESRB criteria, so far requests for the introduction of reciprocal macroprudential measures in Spain have been rejected.[23] The question of voluntary reciprocity receives special attention in the *Review of Macroprudential Policy in the EU* which the ESRB has published regularly since 2015 and in which, more generally, it reviews the actions taken by the national authorities, drawing on information it compiles in its role as a hub for macroprudential measures in Europe.

The ESRB has issued recommendations on various matters identified as relevant to facilitate the role of macroprudential policy. In 2019 it supported the introduction of a framework to strengthen the mechanisms for exchange between authorities of information for macroprudential purposes on branches of credit institutions having their head office in another Member State or in a third country (ESRB/2019/18). And a year later it recommended the adoption and use of the legal entity identifier (LEI) for supervision and disclosure of information on financial institutions (ESRB/2020/12).

Most of the ESRB's recommendations are generally addressed to the relevant authorities of all the Member States. The recommendations usually deal with matters of importance for the EU as a whole. However, how they are implemented differs considerably across Member States, depending on: i) whether the addressee authority decides to comply with the recommendation; ii) the materiality of the matter in question, given the characteristics of the Member State's financial system; and iii) whether measures need to be adopted in addition to any already adopted by the addressee authority with the same aim as that pursued by the ESRB recommendation. Table 1 sets out the ESRB recommendations addressed to all Member States, indicating the Spanish authorities concerned. The predominance of the banking sector in the EU financial system explains why the bulk of the recommendations affect the (competent and designated) banking authorities, followed by the national macroprudential authorities (in Spain, the Banco de España and AMCESFI, respectively).

The ESRB has devoted an important part of its efforts to developing macroprudential instruments for non-bank financial sectors. In its advisory role to the European Commission, the ESRB has continuously defended the need to develop macroprudential policy beyond banking, in order to have available the

23 See "Reciprocity for macroprudential measures in the EU" on the Banco de España's website.

Table 1

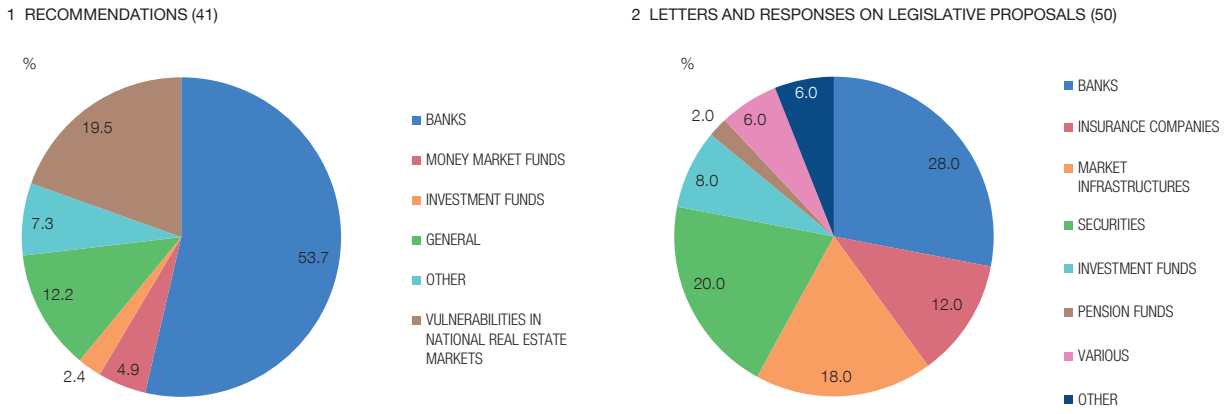
ESRB RECOMMENDATIONS AND ADDRESSEE AUTHORITIES IN SPAIN

ESRB Recommendation	Addressee authorities in Spain					
	AMCESFI	Banco de España	CNMV	DGSFP	FROB	Government
Recommendation ESRB/2021/17 of 2 December 2021 on a pan-European systemic cyber incident coordination framework for relevant authorities						■
Recommendation ESRB/2020/12 of 24 September 2020 on identifying legal entities	■	■	■	■	■	■
Recommendation ESRB/2020/8 of 27 May 2020 on monitoring the financial stability implications of debt moratoria, and public guarantee schemes and other measures of a fiscal nature taken to protect the real economy in response to the COVID-19 pandemic	■					
Recommendation ESRB/2020/7 of 27 May 2020 on restriction of distributions during the COVID-19 pandemic	■	■	■	■		
Recommendation ESRB/2020/6 of 25 May 2020 on liquidity risks arising from margin calls		■	■	■		
Recommendation ESRB/2019/18 of 26 September 2019 on exchange and collection of information for macroprudential purposes on branches of credit institutions having their head office in another Member State or in a third country	■	■				
Recommendation ESRB/2016/14 of 31 October 2016 on closing real estate data gaps	■					
Recommendation ESRB/2015/2 of 15 December 2015 on the assessment of cross-border effects of and voluntary reciprocity for macroprudential policy measures	■	■				
Recommendation ESRB/2015/1 of 11 December 2015 on recognising and setting countercyclical buffer rates for exposures to third countries		■				
Recommendation ESRB/2014/1 of 18 June 2014 on guidance for setting countercyclical buffer rates		■				
Recommendation ESRB/2013/1 of 4 April 2013 on intermediate objectives and instruments of macro-prudential policy	■					■
Recommendation ESRB/2012/2 of 20 December 2012 on funding of credit institutions		■				
Recommendation ESRB/2011/3 of 22 December 2011 on the macro-prudential mandate of national authorities						■
Recommendation ESRB/2011/2 of 22 December 2011 on US dollar denominated funding of credit institutions		■				
Recommendation ESRB/2011/1 of 21 September 2011 on lending in foreign currencies		■				

SOURCES: ESRB and devised by author.
NOTE: The shaded colour denotes the Spanish authorities to which each recommendation is addressed. Those ESRB recommendations that are not addressed to national authorities and those that only affect authorities from specific Member States are excluded from the table. Nor does it include Recommendations amending prior Recommendations.

appropriate instruments to prevent or mitigate potential systemic crises in those sectors. The ESRB's contribution in this field has been mainly through reports (*Macroprudential policy beyond banking: an ESRB strategy paper*), recommendations and responses to public consultations and reports. Specifically, the ESRB has

Chart 1
TOPICS OF ESRB RECOMMENDATIONS AND OTHER PUBLIC DOCUMENTS (2011-2021)



SOURCES: ESRB and devised by author.
NOTE: In Chart 1.1, "General" refers to recommendations affecting the financial system as a whole. In Chart 1.2, "Various" refers to letters and responses on more than one financial system sector.

issued several recommendations on investment funds (ESRB/2017/6) and money market funds (ESRB/2012/1 and ESRB/2021/9). It has also published a considerable number of responses and letters to consultations by the European Commission, ESMA and EIOPA on the review of the regulatory frameworks of the insurance sector (Solvency II Directive), investment vehicles, alternative investment funds and market infrastructures (EMIR), among other matters (see Chart 1).

4 ESRB risk analysis, communication and research

One of the ESRB's main tasks is to identify EU financial system stability risks and vulnerabilities. Discussion of risks is a central element of the work and deliberations of the ESRB's main bodies. Determining the principal risks and vulnerabilities helps guide and prioritise the macroprudential policy issues to be discussed and ultimately addressed, where appropriate, through warnings and recommendations. Moreover, risk analysis is an integral part of the ESRB's communication policy. Through various publications and initiatives, the ESRB addresses different groups in society, with the aim of raising awareness on the urgency – or at least the advisability – of increasing the financial system's and authorities' level of readiness to tackle major emerging challenges. In particular, the ESRB issues brief notes on the potential risks to the EU financial system in its quarterly press releases in which it sets out the matters discussed at its regular General Board meetings.

The ESRB's annual reports include a brief analysis of the main EU financial system risks and vulnerabilities. In line with the practice of other authorities in

Table 2

MAIN EU FINANCIAL SYSTEM RISKS AND VULNERABILITIES DETAILED IN THE ESRB'S ANNUAL REPORTS

2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Description
1										Risk of contagion from those Member States subject to an EU/IMF programme
2								3	5	Sovereign financing risk and doubts over debt sustainability
3	1	3	2					2	2	Weakening macroeconomic conditions
	2	1	4	2	2	2	2			Weaknesses in financial institutions' balance sheets
	3									Squeeze on financial institutions' profitability due to the low interest rate environment
		2	1	1	1	1	1			Repricing of risk premia on global financial markets
		4	3							Worsening of the sovereign debt crisis
		5	5							Vulnerabilities of insurance companies to a sharp drop in asset prices combined with low risk free interest rates for a prolonged period
		6	6							Financial market structure
				3	3	3	3			Debt sustainability problems in the sovereign, corporate and household sectors
				4	4	4	4			Vulnerabilities of the shadow banking system and spillover to the financial system as a whole
								1	1	Widespread private sector defaults due to a deep global recession
								4	3	Instability in risk assessment and pockets of illiquidity in financial markets
								5		Systemic cyber incidents
								6		Finance-driven disruptions in critical financial infrastructures
								7		Materialisation of severe climate-related shocks
									4	Sharp corrections to prices in residential and commercial real estate markets

SOURCES: ESRB and devised by author.
NOTE: Yellow, orange and red denote low, medium and high risks, respectively. For other years (white), the ESRB does not grade the risks using the aforementioned scale.

their financial stability reports, the ESRB disseminates its systemic risk assessment by publishing in its annual reports qualitative scores of the main risk categories, in order of importance and indicating the risk intensity. How the risk assessment is presented has varied over the years (see Table 2), as the ESRB has gained more experience. To complement this analysis, the ESRB also publishes, in particular, the *Risk Dashboard* and the annual *EU Non-bank Financial Intermediation Risk Monitor (NBFI Monitor)*. In normal circumstances, the ESRB's risk diagnoses are relatively steady from one year to the next, but significant changes emerge over a multi-year horizon. Thus, the risk assessment has changed considerably between the ESRB's first years of activity, marked by the euro area sovereign debt crisis, and the last two years, under the effects of the COVID-19 pandemic. The unprecedented situation created by the economic and social impact of COVID-19 throughout the EU mobilised the ESRB (and other European and global bodies)[24] to agree on an ambitious package of measures, described in Box 2.

24 See Anguren et al. (2020) for a summary of the international response to the pandemic in the regulatory and macroprudential arena.

Box 2

THE ESRB RESPONSE TO THE COVID-19 PANDEMIC[1]

Against the backdrop of the swift and broad institutional response at the global, EU and national level prompted by the urgent need to mitigate the economic and financial impact of the COVID-19 pandemic from March 2020, the ESRB adjusted[2] its annual work programme to prioritise five areas for action and coordination:

(i) implications for the financial system of public guarantee schemes and other fiscal measures to protect the real economy;

(ii) market illiquidity and implications for asset managers and insurers;

(iii) impact of procyclical downgrades of bonds on markets and entities across the financial system;

(iv) system-wide restraints on dividend payments, share buybacks and other pay-outs;

(v) liquidity risks arising from margin calls.

These five areas of ESRB work "in crisis mode" were mainly developed in the period April-June 2020, with the involvement of the Advisory Technical Committee and Advisory Scientific Committee. Notably, the work produced:

— A Recommendation (ESRB/2020/8)[3] addressed to all the macroprudential authorities in the EU to monitor the financial stability implications of debt moratoria and public guarantee schemes and other measures of a fiscal nature taken to protect the real economy in response to the COVID-19 pandemic. This recommendation was preceded by a letter[4] sent by the ESRB to the Economic and Financial Affairs Council (Ecofin) inviting fiscal authorities to cooperate and exchange information with their central banks and supervisory authorities. The ESRB continued its work in 2021, resulting in two monitoring reports.[5]

— A Recommendation (ESRB/2020/7) addressed to prudential authorities on restriction of dividend and other capital distributions and variable remuneration until 1 January 2021, applicable to banks, insurers, investment firms and central counterparties (CCPs). This was subsequently extended, with some technical adjustments, by another Recommendation (ESRB/2020/15)[6] until 30 September 2021 in coordination with a similar Recommendation issued by ECB Banking Supervision for credit institutions in the banking union.

— A Recommendation (ESRB/2020/6)[7] addressed to competent microprudential authorities, the European Securities and Markets Authority (ESMA) and the European Commission on liquidity risks arising from margin calls, with the aim of: i) limiting cliff effects in relation to the demand for collateral; ii) improving CCP stress scenarios; iii) limiting liquidity constraints related to margin collection; and iv) promoting international standards on mitigating procyclicality in the provision of client clearing services and in securities financing transactions.

— A Recommendation (ESRB/2020/4)[8] addressed to ESMA to coordinate with the national competent authorities to undertake a supervisory exercise with investment funds that have significant exposures to corporate debt and real estate assets, to assess their preparedness for potential future adverse shocks.

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1 This box is an updated version of Box 3.2 of the Banco de España's Autumn 2020 *Financial Stability Report.* For a more detailed summary of the ESRB's work in response to the pandemic, see Portes (2021).

2 See the ESRB's press releases: "The General Board of the ESRB held its 37th regular meeting on 2 April 2020", of 9 April 2020; "The General Board of the ESRB takes first set of actions to address the coronavirus emergency at its extraordinary meeting on 6 May 2020", of 14 May 2020; "The General Board of the ESRB takes second set of actions in response to the coronavirus emergency at its extraordinary meeting on 27 May 2020", of 8 June 2020; and "The General Board of the ESRB held its 38th regular meeting on 25 June 2020", of 2 July 2020.

3 Recommendation ESRB/2020/8 of 27 May 2020 on monitoring the financial stability implications of debt moratoria, and public guarantee schemes and other measures of a fiscal nature taken to protect the real economy in response to the COVID-19 pandemic.

4 See "ESRB letter to Governments on the financial stability impact of the national guarantee schemes and other fiscal measures", 14 May 2020.

5 "Financial stability implications of support measures to protect the real economy from the COVID-19 pandemic", of 16 February 2021, and "Note on monitoring the financial stability implications of COVID-19 support measures", of 8 September 2021.

6 Recommendation ESRB/2020/7 of 27 May 2020 on restriction of distributions during the COVID-19 pandemic. Recommendation ESRB/2020/15 of 15 December 2020 amending Recommendation ESRB/2020/7 on restriction of distributions during the COVID-19 pandemic.

7 Recommendation ESRB/2020/6 of 25 May 2020 on liquidity risks arising from margin calls.

8 Recommendation ESRB/2020/4 of 6 May 2020 on liquidity risks in investment funds.

Box 2
THE ESRB RESPONSE TO THE COVID-19 PANDEMIC (cont'd)

— A Technical Note,[9] published in July, in which the ESRB presented the findings of a top-down analysis of the impact of a mass bond downgrade scenario on the financial system.

— A letter[10] addressed to the European Insurance and Occupational Pensions Authority urging in the near term improved monitoring of liquidity risks in insurers, in order to reinforce the strength of the sector in case of a deterioration in financial conditions.

— A report on preventing and managing corporate insolvencies[11] with, inter alia, guidance to facilitate successful corporate debt restructuring for viable firms and to promote the use or introduction of efficient insolvency procedures to avoid judicial bottlenecks.

Lastly, it should be noted that, since mid-2020 the ESRB's website includes a repository of up-to-date information on the national financial policy measures[12] adopted in the Member States in response to COVID-19.

9 "A system-wide scenario analysis of large-scale corporate bond downgrades", *ESRB Technical Note,* July 2020.
10 See "ESRB letter to EIOPA on Liquidity risks in the insurance sector", 8 June 2020.
11 See "Preventing and managing a large number of corporate insolvencies", press release of 28 April 2021.
12 Accessible at this link: Policy measures in response to the COVID-19 pandemic.

The ESRB also expresses its views on the main risks and, more generally, on its working priorities through speeches. At present, the Chair of the ESRB appears regularly (generally twice a year)[25] before the European Parliament's Committee on Economic and Monetary Affairs (ECON) in a public hearing and her opening remarks are published on the ESRB website. The Chair also addresses events such as the ESRB annual conference. These speeches are an interesting gauge of the matters of most concern to the ESRB at each time. Chart 2 uses word clouds to illustrate the different concepts most frequently cited in four selected appearances: a) the first following the creation of the ESRB (2011); b) during the euro area sovereign debt crisis (2012); c) following the onset of the COVID-19 pandemic (2020); and d) at the Fifth ESRB annual conference (2021), the latest one at the time of drafting of this article. As the chart shows, in 2011 the communication focus was on institutional and organisational aspects relating to the launch of the ESRB. However, a year later, at the height of the sovereign debt crisis, the address paid most attention to the analysis of systemic risks, which had particularly adverse effects on bank funding. More recently, in 2020, the pandemic obliged the ESRB to shift the focus of its work, resulting in several recommendations (see Box 2) of which the European Parliament was informed. In her appearance before the ECON in late 2021, the Chair concentrated on the main hybrid risks that threaten the EU financial system, such as systemic cyber risk and climate change-related financial risks.

25 The Regulation establishing the ESRB envisages that these appearances be made at least once a year. The first and second Vice-Chairs also appear occasionally before the ECON.

Chart 2

WORD CLOUDS FROM PUBLIC ADDRESSES GIVEN BY CHAIRS OF THE ESRB

1 JEAN-CLAUDE TRICHET'S APPEARANCE AT THE ECON IN FEBRUARY 2011 (FIRST APPEARANCE AFTER THE ESTABLISHMENT OF THE ESRB)

2 MARIO DRAGHI'S APPEARANCE AT THE ECON IN MAY 2012 (DURING THE EURO AREA SOVEREIGN DEBT CRISIS)

3 CHRISTINE LAGARDE'S APPEARANCE AT THE ECON IN JUNE 2020 (FIRST ADDRESS AFTER THE OUTBREAK OF THE COVID-19 PANDEMIC)

4 CHRISTINE LAGARDE'S DECEMBER 2021 SPEECH (ESRB ANNUAL CONFERENCE)

SOURCE: Devised by author.

The ESRB has its own website (www.esrb.europa.eu), a communication platform for dissemination of its publications and which it manages with the support of the ECB. The website contains a multitude of documentary and informational resources, created since the launch of the ESRB in 2011. The ESRB also has its own Twitter channel (operational since late 2020).[26] The Banco de España actively contributes to the dissemination of content in Spanish, translating the ESRB's main press releases (on general and/or banking matters) and its annual reports.[27]

In its work on risk identification, the real estate market has been a priority area of analysis for the ESRB. The real estate sector has the potential to trigger a systemic financial crisis, since it mobilises a very significant share of total bank credit and household debt. In 2016 the ESRB issued a recommendation

26 At April 2022, the ESRB Twitter channel had 1,900 followers. To put this figure into perspective, at the same date the Banco de España had 20,600 followers and the ECB 672,500 followers.

27 Available on the Banco de España's website in the Press room. The Deutsche Bundesbank and the Banco de España are the only two national central banks that translate the ESRB Annual Report in full.

(ESRB/2016/14) on closing real estate data gaps (subsequently amended by Recommendation ESRB/2019/3) which seeks to make more statistical information available to the authorities on a range of variables for monitoring credit to the real estate sector, such as credit standards applied by banks. This information feeds into analysis for ongoing monitoring of real estate sector developments and potential early detection of imbalances that might warrant macroprudential action.

In 2016, 2019 and 2021 the ESRB carried out detailed analyses of national residential real estate markets in the EU/EEA. As a result of these exercises, it has published analytical reports[28] and issued warnings and recommendations to countries where medium-term systemic vulnerabilities were identified in their housing markets. These warnings and recommendations, addressed to the governments and relevant authorities of 18 Member States, have prompted the adoption of macroprudential policy corrective measures and of other economic policy measures, countering a possible bias towards inaction by national authorities. Specifically, in 2016 the ESRB issued a battery of warnings which, three years later, were reinforced by recommendations in the case of six countries (Belgium, Denmark, Finland, Luxembourg, the Netherlands, and Sweden). In 2021 the ESRB assessed the degree of compliance with its 2019 recommendations – considering for that purpose the steps taken by the national authorities and real estate risk developments in each country – and concluded that the level of monitoring was generally satisfactory (see Table 3). Tellingly, throughout this period Spain was not among the countries in which the ESRB identified evidence of imbalances.

One strategic area of work for the ESRB since 2014 has been the design of EU stress test scenarios. The ESRB is entrusted with the design of adverse macro-financial scenarios for the regular stress tests conducted by the three European supervisory authorities (EBA, ESMA and EIOPA). Between 2014 and 2021, the ESRB, based on its regular assessments of systemic risk in the EU, has provided scenarios for a total of 17 exercises: i) five on banks for EBA; ii) four on central counterparties and two on money market funds for ESMA; and iii) four on insurers and two on pension funds for EIOPA. The scenarios developed by the ESRB are a fundamental element of these exercises, which EBA, ESMA and EIOPA use to assess financial institutions' resilience**.**

The ESRB has made significant contributions to a wide range of issues with regulatory relevance. Notably, it has analysed issues relating to the cyclicality of the new international financial reporting standards applicable to banks (IFRS 9) and insurers (IFRS 17), the differences between the models used to estimate expected credit losses in the EU and the United States, the macroprudential implications of financial instruments in Levels 2 and 3 for accounting purposes, and the financial

28 The most recent being *"Vulnerabilities in the residential real estate sectors of the EEA countries"*, published on 11 February 2022.

Table 3

ESRB RECOMMENDATIONS AND WARNINGS ABOUT VULNERABILITIES IN MEMBER STATES' RESIDENTIAL REAL ESTATE MARKETS

		Country	2016	2019		2021
EU	AT	Austria	Warning			Recommendation
	BE	Belgium	Warning	Recommendation	LC	
	BG	Bulgaria				Warning
	CY	Cyprus				
	CZ	Czech Republic		Warning		
	DE	Germany		Warning		Recommendation
	DK	Denmark	Warning	Recommendation	FC	
	EE	Estonia				
	ES	Spain				
	FI	Finland	Warning	Recommendation	LC	
	FR	France		Warning		
	GR	Greece				
	HR	Croatia				Warning
	HU	Hungary				Warning
	IE	Ireland				
	IT	Italy				
	LT	Lithuania				
	LU	Luxembourg	Warning	Recommendation	FC	
	LV	Latvia				
	MT	Malta				
	NL	Netherlands	Warning	Recommendation	PC	
	PL	Poland				
	PT	Portugal				
	RO	Romania				
	SE	Sweden	Warning	Recommendation	FC	
	SI	Slovenia				
	SK	Slovakia				Warning
	UK	United Kingdom	Warning			
EEA	IS	Iceland		Warning		
	LI	Liechtenstein				Warning
	NO	Norway		Warning		

SOURCES: ESRB and devised by author.
NOTE: FC: fully compliant; LC: largely compliant; and PC: partially compliant are the three classifications assigned ex post by the ESRB to the addressee authorities of the 2019 recommendations after assessing the measures implemented in each Member State and recent changes in real estate risks.

stability cost of misconduct risk in the banking sector. Also, at the request of the EU Council, the ESRB has examined problems associated with non-performing loans (NPLs) and possible macroprudential actions to contribute to NPL management.

The ESRB provides the research community with a platform for disseminating analytical work on financial stability issues. As part of its *Working Papers* and *Occasional Papers* series, to date it has published around 150 articles on a broad

Table 4
THE ESRB'S REGULAR PUBLICATIONS AND INITIATIVES

Regular ESRB publications
Annual Report (since 2012)
Review of Macroprudential Policy in the EU (since 2015, yearly)
EU Non-bank Financial Intermediation Risk Monitor (since 2016, yearly)
Risk Dashboard (since September 2012, quarterly)
Working Papers (ad hoc)
Occasional Papers (ad hoc)
Macroprudential Commentaries (2012-2016, ad hoc)

Advisory Scientific Committee publications
ASC Reports
ASC Insights

ESRB initiatives
Annual conference (since 2016)
Meetings with the Committee of European Auditing Oversight Bodies and with auditors of global systemically important financial institutions (banks and insurance companies) with a parent in the EU (since 2017, yearly)
RiskLab/BoF/ESRB Conference on Systemic Risk Analytics (since 2015, yearly)
Ieke van den Burg prize for young researchers (since 2015, yearly)
Alberto Giovannini Programme for Data Science (since 2019)
ESRB-ECB Macroprudential Database (MPDB)
ESRB-ECB European financial crises database

SOURCE: Devised by author.

range of issues, connected in all cases with systemic risk and macroprudential policy. These are mainly authored by economists from ESRB member institutions, but also by external academics. In addition to these publications, there are the notes and reports drafted by ASC members (*ASC Reports* and *ASC Insights*). In this area, two ESRB initiatives stand out: i) the Ieke van den Burg Prize for researchers under 35,[29] awarded by the ASC; and ii) the Alberto Giovannini Programme for Data Science[30] for the development of tools for analysis of market information on derivatives. At a different level, the ESRB is also involved in noteworthy initiatives, in conjunction with the ECB, on the European financial crises database (cataloguing and dating recession periods over the last 50 years in each EU country) and the Macroprudential Database (MPDB). Also, and similarly to other bodies, since 2016 the ESRB holds an annual conference. This event, together with other meetings and thematic seminars organised with other authorities, is an opportunity to bring

29 This award, worth €5,000, was established in memory of Ieke van den Burg, a Dutch Euro MP (1999-2009) and member of the ASC during the first three years of the ESRB, who died in 2014.

30 In memory of the Italian economist and former member of the ASC who died in 2019.

together leaders and financial system experts for panel and open session discussions on key macroprudential policy issues.

5 ESRB strategic areas of work: looking back and looking ahead

From the outset, the ESRB has taken an ambitious approach to various key issues for the future of the EU financial system. The euro area debt crisis, which reached its peak between 2011 and 2012, led the ESRB to study two issues related to the weaknesses of the "sovereign-bank nexus". First, the prudential treatment (for the purposes of banking solvency regulations) of credit institutions' exposures to Member States' government debt, which was the subject of a report published in March 2015.[31] Second, the development of a safe asset based on EU countries' sovereign bond-backed securities (SBBS). The work of the high-level task force created to analyse this issue was published in 2018.[32]

Much of the ESRB's first decade has been marked by historically and persistently low interest rates, with implications for financial stability. Over time, the idea of an increasingly structural "low-for-long" interest rate scenario was perceived with concern on account of its implications for financial stability in four main risk areas: i) low profitability for financial institutions (which may have led to excessive risk-taking on their part); ii) indebtedness and viability of borrowers; iii) systemic liquidity risk; and iv) sustainability of insurers' and pension funds' business models. Together with the ECB's Financial Stability Committee, in 2016 and 2021 the ESRB published a broad battery of work initiatives and analytical and macroprudential policy options[33] to address and mitigate the risks identified.

The United Kingdom's exit from the EU has had, and will doubtless continue to have, an impact on the ESRB's areas of work. Beyond the incalculable loss for the ESRB of the departure of two institutional members such as the Bank of England and the Financial Conduct Authority, Brexit has been a key focal point since 2016, and this will continue in the coming years. This is because the EU financial system is still extensively interconnected and exposed to the British financial system (and economy) and has variable levels of dependence on the City of London's financial services and infrastructures, in a new setting in which coordination is more difficult and more important. Thus, potential future financial crises could reveal weaknesses in the regulatory and supervisory cooperation framework between the EU and the United Kingdom. Against this backdrop, the ESRB will play an important role in

31 ESRB report on the regulatory treatment of sovereign exposures.

32 High-Level Task Force on Safe Assets. The high-level task force was chaired by Philip Lane, the then Governor of the Central Bank of Ireland.

33 See "Lower for longer – macroprudential policy issues arising from the low interest rate environment", ESRB press release, 1 June 2021.

initiatives such as that recently launched by the European Commission[34] to reduce the dependence of the EU's financial institutions on British central counterparties.

In recent years the ESRB has increasingly focused on issues related to hybrid risks, such as climate change-related and cyber risks. The ESRB and the ECB have joined forces to analyse matters such as climate risk transmission channels, quantification of financial institutions' exposure to climate-related risks, and the design of scenarios for climate-related stress tests, complementary to the work carried out in this area by other fora and committees (such as the Network for Greening the Financial System (NGFS) and the BCBS at the global level). This work has given rise to two reports (see ECB and ESRB (2020 and 2021)) and will foreseeably continue to be a priority area of analysis for the ESRB, in light of the key mandates entrusted to it by the European Commission in its Strategy for Financing the Transition to a Sustainable Economy[35] for the coming years. As regards cyber risks, the constant threat of systemic cyber incidents is a priority area for the ESRB; indeed, for this reason it maintains a joint working group with the Bank of England on this matter. In late 2021, Recommendation ESRB/2021/17 was issued to promote the establishment of a pan-European systemic cyber incident coordination framework for relevant authorities. This initiative has gained even more importance in view of the increased geopolitical tensions following the Russian invasion of Ukraine in February 2022.

Other issues that will foreseeably attract more attention from the ESRB relate to digitalisation. At the European and global level, there is a growing interest in the implications for financial stability of crypto-assets and stablecoins (see FSB (2022)), decentralised finance (DeFi)[36] and fintechs and big techs as competitors for the traditional banks (see Gorjón (2021) and Martínez Resano (2021)). The new tendencies in this area have the potential to alter, inter alia, the structure of the conventional financial system and the competition between participants. They could also generate new sources of risk to financial stability and require far-reaching changes to existing financial regulations. These reasons more than warrant the view that digitalisation will become consolidated as a key area of work for the ESRB and other prudential committees worldwide. The ESRB, through the ASC, published its first report on this topic in early 2022.[37]

Looking ahead, the ESRB will continue to work to prevent or cushion the next financial crises, and to contribute to any reviews of the macroprudential

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34 Targeted consultation on the review of the central clearing framework in the EU, European Commission (2022).

35 European Commission communication of 6 July 2021.

36 Arising from the application of blockchain protocols. For more information, see Aramonte, Huang and Schrimpf (2021).

37 *ASC Report* No. 12. "Will video kill the radio star? Digitalisation and the future of banking". In connection with this report, see "Digitalisation and banking: new risks and three scenarios for the European banking system of the future" in this issue of the *Financial Stability Review.*

frameworks in place in EU legislation. Naturally, the ESRB will have to adapt and alter the focus of its work, as it has done in the past (especially in its response to the COVID-19 pandemic), to address the specific challenges posed by future crises. The occurrence and intensity of such episodes will partly depend on the completion of the macroprudential policy regulatory framework applicable to the different sectors of the financial system and, clearly, on the use the relevant authorities make of the available instruments. In this respect, it will be key to ensure that European co-legislators take into account the proposals made by the ESRB in the ongoing legislative reviews, for example of the CRR and the CRD for the banking sector,[38] the Solvency II Directive for insurers, the Money Market Funds Regulation and the Market Infrastructure Regulation (EMIR). Also, as it acquires ever more experience in the introduction of macroprudential measures, the ESRB will be well placed to analyse the evidence available, draw conclusions on the measures' effectiveness, identify best practice and coordinate the decisions of Member States and different national authorities, to the benefit of both the EU financial system and the EU economy.

38 The ESRB's contribution to this reform was published in the *Review of the EU Macroprudential Framework for the Banking Sector. Response to the call for advice* and the *Review of the EU Macroprudential Framework for the Banking Sector. A Concept Note*, both dated March 2022.

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KEY LEGISLATION FOR THE ESRB

Regulation (EU) No 1092/2010 of the European Parliament and of the Council of 24 November 2010 on European Union macro-prudential oversight of the financial system and establishing a European Systemic Risk Board.

Regulation (EU) No 2019/2176 of the European Parliament and of the Council of 18 December 2019 amending Regulation (EU) No 1092/2010 on European Union macro-prudential oversight of the financial system and establishing a European Systemic Risk Board.

Council Regulation (EU) No 1096/2010 of 17 November 2010 conferring specific tasks upon the European Central Bank concerning the functioning of the European Systemic Risk Board.

Decision of the European Systemic Risk Board of 20 January 2011 adopting the Rules of Procedure of the European Systemic Risk Board (ESRB/2011/1).

Decision of the European Systemic Risk Board of 20 March 2020 amending Decision ESRB/2011/1 adopting the Rules of Procedure of the European Systemic Risk Board (ESRB/2020/3).

Annex

Table A.1
ESRB MEMBER INSTITUTIONS (a)

	Name of the authority
EU	*European Central Bank (ECB)*
	ECB Banking Supervision
	European Commission
	European Banking Authority (EBA)
	European Insurance and Occupational Pensions Authority (EIOPA)
	European Securities and Markets Authority (ESMA)
	Single Resolution Board (SRB)
	Economic and Financial Committee (EFC)
AT	*Oesterreichische Nationalbank*
	Österreichische Finanzmarktaufsicht (FMA)
BE	*Nationale Bank van België / Banque Nationale de Belgique*
	L'Autorité des services et marchés financiers (FSMA) / Autoriteit voor Financiële Diensten en Markten
BG	*Bulgarian National Bank*
	Financial Supervision Commission
CY	*Central Bank of Cyprus*
	Cyprus Securities and Exchange Commission
	Insurance Companies Control Services
	Supervisory Authority of Occupational Retirement Benefits Funds
CZ	*Česká národní banka*
DE	*Deutsche Bundesbank*
	Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin)
DK	*Danmarks Nationalbank*
	Finanstilsynet
EE	*Eesti Pank*
	Finantsinspektsioon
ES	*Banco de España*
	Comisión Nacional del Mercado de Valores (CNMV)
	Dirección General de Seguros y Fondos de Pensiones (DGSFP)
FI	*Suomen Pankki / Finlands Bank*
	Finanssivalvonta / Finansinspektionen
FR	*Banque de France*
	Autorité de Contrôle Prudentiel et de Résolution (ACPR)
	Autorité des marchés financiers (AMF)
GR	*Bank of Greece*
	Hellenic Capital Market Commission
HR	*Croatian National Bank*
	Croatian Financial Services Supervisory Agency
HU	*Magyar Nemzeti Bank*
IE	*Central Bank of Ireland*
	The Pensions Authority

SOURCE: ESRB.

a The authorities with voting rights on the ESRB General Board are denoted by italics. Two UK authorities (the Bank of England and the Financial Conduct Authority (FCA)) were ESRB members up to January 2020 (date of the United Kingdom's withdrawal from the EU).

Table A.1
ESRB MEMBER INSTITUTIONS (a) (cont'd)

		Name of the authority
EU	IT	*Banca d'Italia*
		Istituto per la Vigilanza sulle Assicurazioni (IVASS)
		Commissione Nazionale per le Società e la Borsa (CONSOB)
		Commissione di Vigilanza sui Fondi Pensione
	LT	*Lietuvos bankas*
	LU	*Banque centrale du Luxembourg*
		Commission de Surveillance du Secteur Financier (CSSF)
		Commissariat aux Assurances
	LV	*Latvijas Banka*
		Finanšu un kapitāla tirgus komisija (FKTK)
	MT	*Bank Ċentrali ta' Malta / Central Bank of Malta*
		Malta Financial Services Authority (MFSA)
	NL	*De Nederlandsche Bank*
		Autoriteit Financiële Markten (AFM)
	PL	*Narodowy Bank Polski*
		Komisja Nadzoru Finansowego (KNF)
	PT	*Banco de Portugal*
		Autoridade de Supervisão de Seguros e Fundos de Pensões (ASF)
		Comissão do Mercado de Valores Mobiliários (CMVM)
	RO	*Banca Națională a României*
		Romanian Financial Supervisory Authority
	SE	Sveriges Riksbank
		Finansinspektionen
	SI	*Banka Slovenije*
		Agencija za zavarovalni nadzor
		Agencija za trg vrednostnih papirjev
	SK	*Národná banka Slovenska*
EEA	IS	Seðlabanka Íslands / Central Bank of Iceland
	LI	Ministry of General Government Affairs and Finance
		Liechtenstein Financial Market Authority (FMA)
	NO	Norges Bank
		Finanstilsynet

SOURCE: ESRB.

a The authorities with voting rights on the ESRB General Board are denoted by italics. Two UK authorities (the Bank of England and the Financial Conduct Authority (FCA)) were ESRB members up to January 2020 (date of the United Kingdom's withdrawal from the EU).

Table A.2

NATIONAL INTER-AGENCY COMMITTEES THAT PERFORM MACROPRUDENTIAL AUTHORITY TASKS (RECOMMENDATION ESRB/2011/3)

		Name of the authority
EU	AT	Finanzmarktstabilitätsgremium (Financial Market Stability Board)
	DE	Ausschuss für Finanzstabilität (Financial Stability Committee)
	DK	Det Systemiske Risikoråd (Systemic Risk Council)
	ES	Autoridad Macroprudencial Consejo de Estabilidad Financiera (AMCESFI)
	FR	Haut Conseil de Stabilité Financière (HCSF)
	HR	Vijeće za financijsku stabilnost (Financial Stability Council)
	HU	Pénzügyi Stabilitási Tanács (Financial Stability Council)
	LU	Comité du risque systémique (CRS)
	NL	Financieel Stabiliteitscomité (Financial Stability Committee)
	PL	Komitet Stabilności Finansowej (Financial Stability Committee)
	RO	Comitetul Național pentru Supravegherea Macroprudențială (National Committee for Macroprudential Oversight)
	SI	Odbor za finančno stabilnost (Financial Stability Board)
EEA	LI	Ausschuss für Finanzmarktstabilität (Financial Stability Council)

SOURCE: ESRB.

Table A.3

LEADERSHIP POSITIONS IN THE ESRB ORGANISATIONAL STRUCTURE

Term		Position
	Chairs of the General Board	
Since Nov-19	**Christine Lagarde**	President, ECB
Nov-11 to Oct-19	Mario Draghi	President, ECB
Jan-11 to Oct-11	Jean-Claude Trichet	President, ECB
	First Vice-Chairs of the General Board	
Since Feb-20	**Stefan Ingves**	Governor, Sveriges Riksbank
Jul-13 to Jan-20	Mark Carney	Governor, Bank of England
Jan-11 to Jun-13	Mervyn King	Governor, Bank of England
	Second Vice-Chairs of the ESRB	
2022	**Petra Hielkema**	Chair, EIOPA
2021 (Nov-Dec)	Verena Ross	Chair, ESMA
2021 (Apr-Oct)	Anneli Tuominen	Acting Chair, ESMA
2012, 2015, 2018, 2021 (Jan-Mar)	Steven Maijoor	Chair, ESMA
2020	José Manuel Campa	Chair, EBA
2013, 2016, 2019	Gabriel Bernardino	Chair, EIOPA
2011 (Mar-Dec), 2014, 2017	Andrea Enria	Chair, EBA
2011 (Jan-Feb)	Thomas Huertas	Acting Chair, EBA
	Chairs of the Advisory Technical Committee	
Since Jun-19	**Pablo Hernández de Cos**	Governor, Banco de España
Apr-17 to May-19	Philip Lane	Governor, Central Bank of Ireland
Jan-11 to Mar-17	Stefan Ingves	Governor, Sveriges Riksbank
	Vice-Chairs of the Advisory Technical Committee	
Since Apr-20	**Claudia Buch**	Vice-President, Deutsche Bundesbank
May-11 to May-19	Andreas Ittner	Vice-Governor, Oesterreichische Nationalbank
Term of chairmanship	**Chairs/Vice-Chairs of the Advisory Scientific Committee** (a)	Affiliation
Since Jan-22	**Loriana Pelizzon**	Leibniz Institute for Financial Research SAFE and Goethe University Frankfurt
Mar-18 to Apr-19 / Sep-20 to Dec-21	Javier Suárez	Centro de Estudios Monetarios y Financieros (CEMFI)
Jan-17 to Feb-18 / May-19 to Aug-20	Richard Portes	London Business School
May to Dec-15	Philip Lane	Trinity College Dublin
Jan-14 to Apr-15 / Jan to Dec-16	Marco Pagano	Università degli Studi di Napoli Federico II
Sep-12 to Dec-13	André Sapir	Université Libre de Bruxelles
May-11 to Aug-12	Martin Hellwig	Max Planck Institute
	ESRB Secretariat	Position
Since 2010	**Francesco Mazzaferro**	Head of Secretariat
Since 2015	**Tuomas Peltonen**	Deputy Head of Secretariat
2012-2014	Andréa Maechler	Deputy Head of Secretariat

SOURCES: ESRB and devised by author.

a The Chair and two Vice-Chairs of the Advisory Scientific Committee rotate in their positions in four-year cycles, hence the terms typically last approximately 16 months.

Table A.4

BANCO DE ESPAÑA OFFICIALS ON THE ESRB GENERAL BOARD

	With voting rights	Position
Since Jun-18	**Pablo Hernández de Cos**	Governor
Jul-12 to May-18	Luis M. Linde	Governor
Jan-11 to Jun-12	Miguel Fernández Ordóñez	Governor
	Without voting rights	**Position**
Since Mar-20	**Ángel Estrada**	Director General Financial Stability, Regulation and Resolution
Mar-17 to Feb-20	Jesús Saurina	Director General Financial Stability, Regulation and Resolution
Oct-13 to Feb-17	Julio Durán	Director General Financial Stability and Resolution
Jan-11 to Sep-13	José María Roldán	Director General Banking Regulation and Financial Stability

SOURCE: Devised by author.

Table A.5

THEMATIC ESRB REPORTS (TO FEBRUARY 2022)

	ESRB Reports
2014	*Flagship Report on Macro-prudential Policy in the Banking Sector*
	Handbook on operationalising macroprudential policy in the banking sector
2015	*Report on the regulatory treatment of sovereign exposures*
	Report on misconduct risk in the banking sector
	A review of macro-prudential policy in the EU one year after the introduction of the CRD/CRR
	Report on systemic risks in the EU insurance sector
2016	*Macroprudential policy beyond banking: an ESRB strategy paper*
	Report on residential real estate and financial stability in the EU
	Report on commercial real estate and financial stability in the EU
	Macroprudential policy beyond banking: an ESRB strategy paper
	Preliminary investigation into the potential impact of a leverage ratio requirement on market liquidity
	Market liquidity and market-making
	Vulnerabilities in the EU residential real estate sector
2017	*The macroprudential use of margins and haircuts*
	Revision of the European Market Infrastructure Regulation
	Resolving non-performing loans in Europe
	Financial stability implications of IFRS 9
	Recovery and resolution for the EU insurance sector: a macroprudential perspective
	Regulatory risk-free yield curve properties and macroprudential consequences
2018	*Report on sovereign bond-backed securities by the High-Level Task Force on Safe Assets*
	Handbook on operationalising macroprudential policy in the banking sector
	Final report on the use of structural macroprudential instruments in the EU
	Macroprudential provisions, measures and instruments for insurance
	Report on vulnerabilities in the EU commercial real estate sector
2019	*Expected credit loss approaches in Europe and the United States: differences from a financial stability perspective*
	Macroprudential approaches to non-performing loans
	CCP interoperability arrangements
	The cyclical behaviour of the ECL model in IFRS 9
	Features of a macroprudential stance: initial considerations
	Vulnerabilities in the residential real estate sectors of the EEA countries
	Methodologies for the assessment of real estate vulnerabilities and macroprudential policies: residential real estate
	Macroprudential policy implications of foreign branches relevant for financial stability
	Methodologies for the assessment of real estate vulnerabilities and macroprudential policies: commercial real estate
2020	*Mitigating the procyclicality of margins and haircuts in derivatives markets and securities financing transactions*
	Systemic cyber risk
	Macroprudential implications of financial instruments in Levels 2 and 3 for accounting purposes
	Enhancing the macroprudential dimension of Solvency II
	Issues note on liquidity in corporate bond and commercial paper markets
	System-wide restraints on dividend payments, share buybacks and other pay-outs
	Liquidity risks arising from margin calls

SOURCE: ESRB.

Table A.5
THEMATIC ESRB REPORTS (TO FEBRUARY 2022) (cont'd)

	ESRB Reports
2021	*Financial stability implications of support measures to protect the real economy from the COVID-19 pandemic*
	Prevention and management of a large number of corporate insolvencies
	Issues note on systemic vulnerabilities of and preliminary policy considerations to reform money market funds
	Note on monitoring the financial stability implications of COVID-19 support measures
	Report of the Expert Group on Macroprudential Stance – Phase II (implementation)
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