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

Julio R. Hernáez, Alejandra Bernad, Laura Hierro and Ana M. Gómez-Bezares

BANCO DE ESPAÑA

The authors belong to the Directorate General Banking Supervision of the Banco de España. The authors are grateful to Xavier Torres for his helpful comments and suggestions. Contact form for comments.

Resumen

Importantes factores están reconfigurando el sector bancario y redefiniendo los modelos de negocio de las entidades. Las entidades han venido afrontando dificultades estructurales, como un entorno de bajos tipos de interés prolongado o el exceso de capacidad instalada. A esto se añaden otros retos más recientes, como la transformación digital, los nuevos competidores en el mercado bancario y el cambio climático. Adicionalmente, un entorno regulatorio exigente y el impacto del COVID-19 suponen una presión añadida. Como resultado, los bancos europeos no están siendo capaces de producir resultados que cubran el coste del capital, lo que hace necesario afrontar con urgencia estos retos. Para ello, existen distintas estrategias posibles, algunas de ellas complementarias, entre las que se pueden destacar: la reducción de la capacidad instalada, la consolidación bancaria, la diversificación o especialización y la explotación del valor de la banca relacional, así como el aprovechamiento de las oportunidades derivadas de la digitalización y las finanzas sostenibles. El supervisor deberá estar al nivel de los cambios que se produzcan en el entorno bancario y seguir de cerca los procesos de adaptación. El propósito de este artículo es servir de base para el debate, dada la controversia existente y la incertidumbre que rodea a algunas de estas cuestiones en un entorno como el actual, que cambia con rapidez.

Palabras clave: modelos de negocio bancario, rentabilidad, sostenibilidad, desafíos, enfoque supervisor.

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)].

---

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:

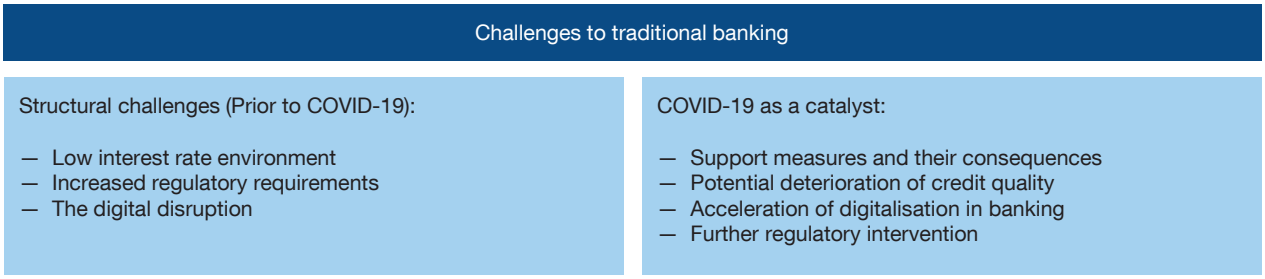
2.1.1 Low interest rate environment (LIRE)

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]

---

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).

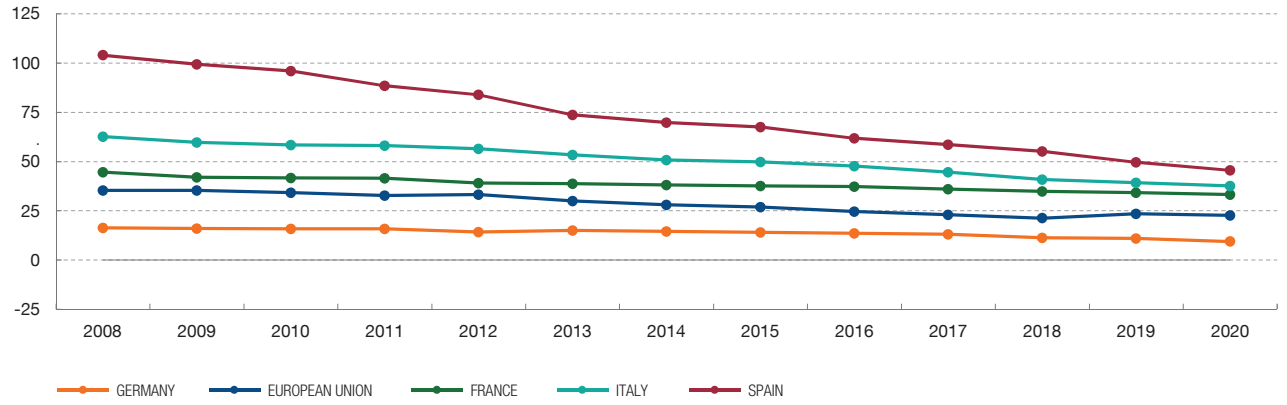
Smaller banks could be more interested in consolidation to allow for greater IT investments and cost reductions, while larger banks would primarily benefit from revenue diversification (new business opportunities) and more competitive funding costs.

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.

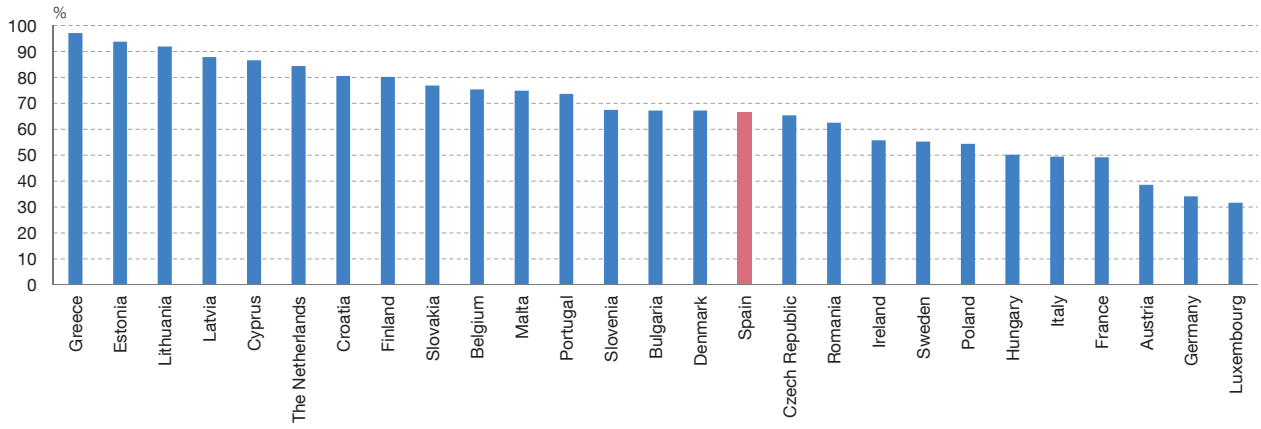
In terms of overcapacity, the Spanish banking system presented a higher number of commercial branches per capita (45.5 branches per 100,000 adults)[27] than the other three main EU markets (Germany, France and Italy) in 2020, despite a much larger reduction experienced in the last decade. The number 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.

REFERENCES

Altavilla, C., P. Bochmann, J. De Ryck, A. Dumitru, M. Grodzicki, H. Kick, C. Melo Fernandes, J. Mosthaf, C. O'Donnell and S. Palligkinis (2021). *Measuring the cost of equity of euro area banks,* ECB Occasional Paper Series, No. 254, January, pp. 27 and 37.

Alvarez and Marsal (2021). *El Pulso de la banca, Q1, 2021: Industry benchmark and top performers,* April.

Banco de España (2022). *Supervisory Statistics, Q1 2021,* January.

Board of Governors of the Federal Reserve System (2021). *Supervision and Regulation Report,* November.

Bogdanova, B., I. Fender and E. Takáts (2018). "The ABCs of bank PBRs: What drives bank price-to-book ratios?", *BIS Quarterly Review,* March.

Brei, M., C. Borio and L. Gambacorta (2019). *Bank intermediation activity in a low interest rate environment,* BIS Working Papers, No. 807, August.

Bubeck, J., A. Maddaloni and J. L. Peydró (2020). *Negative monetary policy rates and systemic banks' risk-taking: Evidence from the euro area securities register,* ECB Working Paper Series, No. 2398, April.

Calomiris, C. W., and D. Nissim (2014). "Crisis-related shifts in the market valuation of banking activities", *Journal of Financial Intermediation,* No. 23, pp. 400-435.

Cambridge Centre for Alternative Finance (2021). *The 2nd Global Alternative Finance Benchmarking,* June.

Campa, J. M. (2021). "Banking adjustment is set to continue, COVID has just speeded it up", José Manuel Campa's interview with *La Razón,* 21 July, EBA.

Cardillo, S., R. Gallo and F. Guarino (2021). *Main challenges and prospects for the European banking sector: a critical review of the ongoing debate,* Banca d' Italia Ocassional Papers, No. 634, July.

Carletti, E., S. Claessens, A. Fatás and X. Vives (2020). *The Bank Business Model in the Post-Covid-19 World,* Centre for Economic Policy Research and IESE Business School.

Carney, M. (2015). "Breaking the tragedy of the horizon – climate change and financial stability", speech by Mark Carney, Governor of the Bank of England and Chairman of the Financial Stability Board, at Lloyd's, London, 29 September.

Coelho, R., A. Monteil, V. Pozdyshev and J. P. Svoronos (2022). "Supervisory practices for assessing the sustainability of banks' business models", *FSI Insights,* No. 40, April.

Cornelli, G., J. Frost, L. Gambacorta, R. Rau, R. Wardrop and T. Ziegler (2020). *Fintech and big tech credit: a new database,* BIS Working Papers, No. 887, September.

Dor, E. (2020). *The ECB is now providing net "subsidies" to most banks,* IESEG School of Management, 20 January.

Enria, A. (2021a). "Enhanced outlook and emerging risk in the Banking Union", speech at the University of Naples, 2 July.

Enria, A. (2021b). "Our supervisory priorities for a healthier banking sector after the pandemic", blog post at the ECB's website, 7 December.

European Banking Authority (2021). *EBA Risks Dashboard, Q1 2021,* June.

European Central Bank (2021a). *Guide on the supervisory approach to consolidation in the banking sector,* January.

European Central Bank (2021b). *EU structural financial indicators for the EU Banking Sector,* Annex to the press release, May.

European Central Bank (2021c). *ECB Banking Supervision – Supervisory priorities for 2022-2024,* December.

European Central Bank (2021d). "ECB sets up climate change centre", ECB press release, 25 January.

European Central Bank (2022a). "Euro area bank lending survey", press release ECB, July.

European Central Bank (2022b). *Statistical Data Warehouse*.

Fernandez-Bollo, E. (2021). "Consolidation in the European banking sector: challenges and opportunities", speech at a lecture on Corporate Banking Law at the University of Bologna, 11 June.

Fernandez-Bollo, E., D. Andreeva, M. Grodzicki, L. Handal and R. Portier (2021). "Euro area bank profiity and consolidation", *Revista de Estabilidad Finaciera,* No. 40, Banco de España.

Fernández Lafuerza, L., and J. Mencía (2021). "Estimating the cost of equity for financial institutions", *Revista de Estabilidad Financiera,* No. 40, Banco de España.

Feyen, E., J. Frost, L. Gambacorta, H. Natarajan and M. Saal (2021). *Fintech and the digital transformation of financial services: implications for market structure and public policy,* BIS Papers, No. 117, July.

Financial Stability Board (2019). *FinTech and market structure in financial services: Market developments and potential financial stability implications,* February.

Financial Stability Board (2020). *Dashboard of main monitoring aggregates of the FSB's Global Monitoring Report on Non-Bank Financial Intermediation*.

Frost, J. (2020). *The economic forces driving fintech adoption across countries,* BIS Working Papers, No. 838, February.

Frost, J., L. Gambacorta, Y. Huang, H. S. Shin and P. Zbinden (2019). *BigTech and the changing structure of financial intermediation,* BIS Working Papers, No. 779.

Gabrieli, S., D. Marionnet and F. Sammeth (2021). "Is there a need for greater banking consolidation in France and Europe?", *Bulletin de la Banque de France,* No. 235/2, May-June.

Global Sustainable Invesment Alliance (2021). *Global Sustainable Investment Review 2020*.

Hernández de Cos, P. (2019). *Low interest rates for longer. Profitability and risk appetite in the Spanish banking sector,* speech by P. Hernández de Cos, Governor of Banco de España at the *15th Banking Industry Meeting / IESE,* 3 December.

International Monetary Fund (2021). *IMF Data - Financial Access Survey.*

OECD (2020). *Digital Disruption in Banking and its Impact on Competition.*

Oliver Wyman and Morgan Stanley (2020). *Steering Through the Next Cycle.*

Roengpitya, R., N. Tarashev, K. Tsatsaronis and A. Villegas (2017). *Bank business models: popularity and performance,* BIS Working Papers, No. 682, December.

Saravia, F., and G. Saletta (2020). *Banking in Europe: EBF Facts & Figures 2020,* European Banking Federation.

Shevlin, R. (2020). "Uber's Departure From Financial Services: A Speed Bump On The Path To Embedded Finance", August, Forbes.

Vives, X. (2019). "Digital Disruption in Banking", *Annual Review of Financial Economics 2019,* Vol. 11.

Yellen, J. (2015). "Supervision and Regulation", testimony by the Chair before the Committee on Financial Services, US House of Representatives, Washington, 4 November.