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SINGLE RESOLUTION BOARD

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Dominique Laboureix is Chair and Mark Pozlep is Financial Stability Expert of the Single Resolution Board (SRB). The authors are grateful to an anonymous referee. Contact form for comments.

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Abstract

Banking crises are a feature of the modern financial system. However, their impact and probability can be mitigated by building trust in the banking sector. This is primarily achieved by banks themselves. However, with vigilant ex-ante monitoring and swift and decisive action when a banking crisis emerges, regulators can shore up trust in the banking sector. The Single Resolution Board, as the banking union's central resolution authority, is a key element of the post-global financial crisis regulatory framework and has been promoting trust in the banking sector by making banks more resolvable.

Keywords: banking crisis, resolution, Single Resolution Board, banking union.

1 Introduction

The US bank failures and UBS's acquisition of Credit Suisse in March 2023 have once again demonstrated the importance of trust for banking system stability. Credit Suisse's situation was not prompted by a breach of supervisory requirements but by a loss of confidence. It followed a string of misconduct complaints, the announcement of the refusal of one of the bank's largest investors to provide additional support and the belated publication of its annual report.

The European banking union was established in the wake of the global financial crisis. In the last few years, banking union banks have been exposed to a number of external shocks such as the COVID-19 pandemic, the Russian invasion of Ukraine and, most recently, a significant increase in inflation affecting borrowers' ability to repay their loans. These events have thoroughly tested the European regulatory framework and, so far, banking union banks have proven to be resilient. Clearly, the banking union has contributed to building trust in the region's banks.

Banks themselves are ultimately responsible for building trust by pursuing sustainable business strategies and implementing good governance mechanisms and risk management processes to ensure they are resilient to unexpected shocks. Regulators support and monitor these efforts in several ways. One of them is to set a strong and resilient supervisory framework to ensure banks could withstand a crisis. Another way is to ensure that beyond the supervisory requirements, the resolution framework could handle a bank failure, minimising its impact on financial stability and the real economy, and restore confidence post-resolution. In both cases, confidence in the system requires transparency and predictability so stakeholders are aware of the measures that could be taken by authorities in the event of turmoil.

2 Banking crises and evolving risks

In most cases bank failures are originally caused by a deterioration in a bank's assets, which may also result in liquidity problems. During periods of high economic growth or loose monetary policy, credit standards may be relaxed, which can produce asset bubbles. When they burst, credit risk materialises, assets are repriced and banks suffer losses. For instance, in the global financial crisis, problems arose when US subprime mortgages started to suffer from defaults. As a result, securities (such as mortgage-backed securities) and derivatives (such as collateralised debt obligations, linked to US subprime borrowers) were downgraded from investment grade to junk. These assets became illiquid and difficult to value. Liquidity problems quickly surfaced as institutions which were perceived to have high exposures to problematic assets saw their access to wholesale markets severely limited. In 2008, several large US financial institutions such as Bear Stearns, Washington Mutual, AIG and Lehman Brothers either failed or had to be rescued. The resulting loss of confidence and the general economic slowdown further fuelled the contagion.

The crisis quickly spread to Europe, where some banks were heavily exposed to US subprime loans. In June 2008, the Dexia Group had to be bailed out by the French, Belgian and Luxembourgish Governments. In September 2008, it became a full-blown crisis when, in the wake of the failure of Lehman Brothers, a large UK bank (Northern Rock) further destabilised EU banking systems, forcing governments to step in. Following the acute stage of the US subprime mortgage crisis, the European debt crisis emerged, peaking between 2010 and 2012. While the crisis had multiple causes, high deficits linked to the cost of bank bailouts were an important contributing factor. Hence, after the crisis one of the key objectives of the regulatory reforms was to protect taxpayer funds by preventing bank bailouts.

The failures of US banks that occurred in spring 2023 followed the outlined banking crisis pattern, although the asset deterioration was driven by interest rate risk, rather than credit risk. The situation at Silicon Valley Bank (SVB) is the most illustrative, although several other banks, including Signature Bank and First Republic Bank, failed. In 2019, unlike in the EU, US authorities introduced lighter prudential regulations for smaller and medium-sized banks, including exempting them from some liquidity requirements, e.g. the liquidity coverage ratio.[1] This allowed banks like SVB to invest heavily in long-term Treasury bonds while its liabilities were essentially made up of short-term deposits. Long-term bonds plummeted in price following the materialisation of interest rate risk, which created large unrealised losses on SVB's balance sheet. As depositors started withdrawing their money, SVB was forced to raise liquidity by selling their Treasury holdings on the secondary market. It announced a capital increase to offset the resulting losses, but then failed to raise the funds. This resulted in a complete loss of confidence and a run on SVB and other banks with a similar business model. The speed at which the SVB crisis unfolded and initially spread to other US medium-sized banks prompted the US authorities to step in by securing all the failing banks' deposits, including non-covered ones, to restore confidence in the US banking sector.

1 Board of Governors of the Federal Reserve System (2019).

In recent years, climate, cyber, operational and reputational risks have increased in importance and may weaken the level of trust in banks. In particular, climate and cyber risks have taken centre stage. They are different from the traditional banking risks because they can materialise on a different time scale. Credit risk typically materialises over the short to medium term. In contrast, climate risk has a medium-to-long-term horizon, while cyber risk can materialise immediately. The materialisation of physical and transition climate risks may lead to banks' assets becoming impaired and lower recovery rates in liquidation. This could increase the costs for national deposit guarantee schemes (DGSs) and affect the resolution strategies for banks.[2] The immediacy of cyber risk (for instance, a ransomware attack) could cause even a bank with high capital and liquidity buffers to fail overnight, and requires a high degree of crisis readiness. It is therefore important for regulators to adopt a proactive stance to deal with these emerging risks.

The timeline for the materialisation of existing risks has also shortened. In particular, the SVB case shows that deposits are less sticky than before due to digital innovation, the role of social media and other factors. At the end of 2022, SVB held around USD 170 billion of customer deposits, of which over 90% were not covered by a DGS.[3] Then on 8 March 2023, SVB sold off a large part of its Treasury portfolio to raise liquidity and announced a recapitalisation, which failed. The following day about USD 40 billion of deposits were withdrawn. More than USD 100 billion of withdrawals were expected the day after, which prompted the Federal Deposit and Insurance Corporation (FDIC) to resolve the bank. SVB had a very particular business model. It focused on venture capital (VC) funded technology companies in California, which held large uninsured cash balances at the bank.[4] This made the bank more vulnerable to a deposit run. There is some evidence that social media amplified the run,[5] with prominent VC investors suggesting to companies they invested in to withdraw funds from SVB to avoid suffering losses in the event the bank failed.[6]

While the ubiquitous presence of social media and increased digitalisation, e.g. the rise of online banking and instant payments, were expected to speed up bank runs, how much they would do so was not anticipated. SVB was on track to lose all of its deposits in less than a week. In 2008 the fastest bank run, suffered by National City, led the bank to lose about 13% of its deposits over the same period (see Table 1). For comparison, Washington Mutual, which suffered the largest run (in absolute terms) at that time, saw roughly a three times slower rate of deposit outflows than National City.[7]

Regulatory actions were also exceptionally fast. For example, UBS's acquisition of Credit Suisse occurred over the span of a few days. Credit Suisse weathered the global financial crisis relatively unscathed, but had more recently been hit by a string of scandals. In 2021, the

2 Calice and Palermo (2021).
3 SVB Financial Group (2023).
4 Board of Governors of the Federal Reserve System (2023a).
5 Cookson, Fox, Gil-Bazo, Imbet and Schiller (2023).
6 Griffith and Copeland (2023).
7 Rose (2015).

Table 1
Deposit outflows for selected US banking institutions during the global financial crisis (2008) compared to SVB (2023) (a)

Share of deposits (%)	Wachovia (15 September 2008)	Washington Mutual (8 September 2008)	National City (15 March 2008)	SVB (9 March 2023)
Daily rate (hypothetical)	0.50	0.80	2.50	23.10
Weekly rate (b) (hypothetical)	2.70	4.20	12.60	100.00

SOURCES: Board of Governors of the Federal Reserve System (2023a) and Rose (2015).

a The daily and weekly rates were recalculated based on the data in the sources by assuming that a month has 20 working days.
b The rate is capped at 100%.

bank suffered a USD 5.5 billion loss related to its prime brokerage relationship with the hedge fund Archegos Capital. This came only shortly after the bank closed four funds with around USD 10 billion of assets linked to Greensill Capital (a now defunct supply chain financing company). Over 2021 and 2022 the bank was also found guilty of money laundering for a Bulgarian drug ring and of a bribery scandal in Mozambique. When on 8 March 2023 the bank delayed the release of its annual report, confidence in the bank was already severely dented.

The publication of Credit Suisse's annual report, which disclosed that the bank's financial controls contained "material weaknesses", and the subsequent announcement of the refusal of Saudi National Bank, one of its largest shareholders, to provide further capital support appear to have been the final straw. A negative market response was imminent, forcing the Swiss authorities to swiftly publish a statement affirming that Credit Suisse satisfied capital and liquidity requirements.[8] The bank also obtained a CHF 50 billion collateralised liquidity lifeline from the Swiss National Bank (SNB).[9] However, with investor confidence in the bank gone, the run on the bank quickly escalated and by Sunday 19 March, UBS's acquisition of Credit Suisse was agreed.[10] The authorities supported the acquisition with CHF 200 billion of liquidity assistance. Half was guaranteed by the government,[11] while the remaining CHF 100 billion was backed by the privileged creditor status of the central bank in bankruptcy. The Swiss government also used taxpayer funds to provide a CHF 9 billion guarantee to UBS to backstop the potential losses on the sale of some non-core Credit Suisse assets,[12] while the regulators wrote down about CHF 15 billion of Credit Suisse's Additional Tier 1 (AT1) bonds (and preserved a portion of the equity stock, see below).

The US authorities also responded swiftly. In the case of the crisis of the US banks the systemic risk exception was invoked, which allowed the FDIC to guarantee all the deposits at

8 FINMA and SNB (2023).
9 Credit Suisse (2023).
10 Englundh (2023).
11 SNB (2023).
12 UBS (2023).

the failing institutions even if that meant higher costs of resolution, i.e. deviating from the least cost test.[13] This decision left the FDIC exposed to losses estimated at over USD 20 billion,[14] which will be recouped by a special levy imposed on other US banks.[15] The systemic risk exception exists to provide the FDIC additional flexibility to deviate from the framework in cases where adherence to the least cost test could have a negative impact on financial stability. In conjunction with the activation of the systemic risk exception, a bridge bank was set up before SVB's assets were ultimately sold to a private sector buyer. Hence both in the United States and in Switzerland the authorities were able to use the high degree of flexibility afforded to them under the regulatory framework to quickly and effectively resolve the crises.

3 What can be done to build confidence in such an evolving context?

As demonstrated by the recent examples, decisive regulatory action is often necessary in a crisis to restore confidence to financial markets. To make this possible, the market has to believe that the foundations of the financial system are sound. Between 2008 and 2013 European governments spent about 3.5% of GDP (average) to recapitalise their banking systems.[16] As a result, the sovereign deficits and debt levels increased. For instance, the euro area gross debt-to-GDP ratio rose from around 69% in 2008 to 93% by 2013.[17] Moreover, debt sustainability concerns ignited the European sovereign debt crisis. Following the global financial crisis, a global agreement was reached that future bank bailouts should be avoided if possible. Every bank should have a resolution plan which would specify, among other things, how to resolve the bank if it failed and would try to ensure that banks build up sufficient loss absorbing capacity.

If a bank is resolved, its creditors and owners are subject to burden-sharing and have to bear the losses and contribute to the recapitalisation of the institution. In this process, their losses should not be higher than if the bank had been liquidated (no creditor worse off principle). The strengthening of the resolution framework was just one part of the regulatory reforms undertaken in the EU. Indeed, in parallel, the international banking authorities decided to reinforce the prudential framework, focusing on quality and amount of capital, liquidity and the specific treatment of macroprudential risks. Moreover, following the global financial crisis and the European sovereign debt crisis, the banking union was established to avoid the bank-sovereign nexus and to protect financial stability in the participating countries (see Box 1).

In recent years, the process to secure the confidence in the financial system has continued as legislators and regulators have increasingly focused their attention on emerging risks such as

13 Labonte (2023).
14 Gruenberg (2023).
15 FDIC (2023).
16 Eurostat (2022).
17 International Monetary Fund (2023).

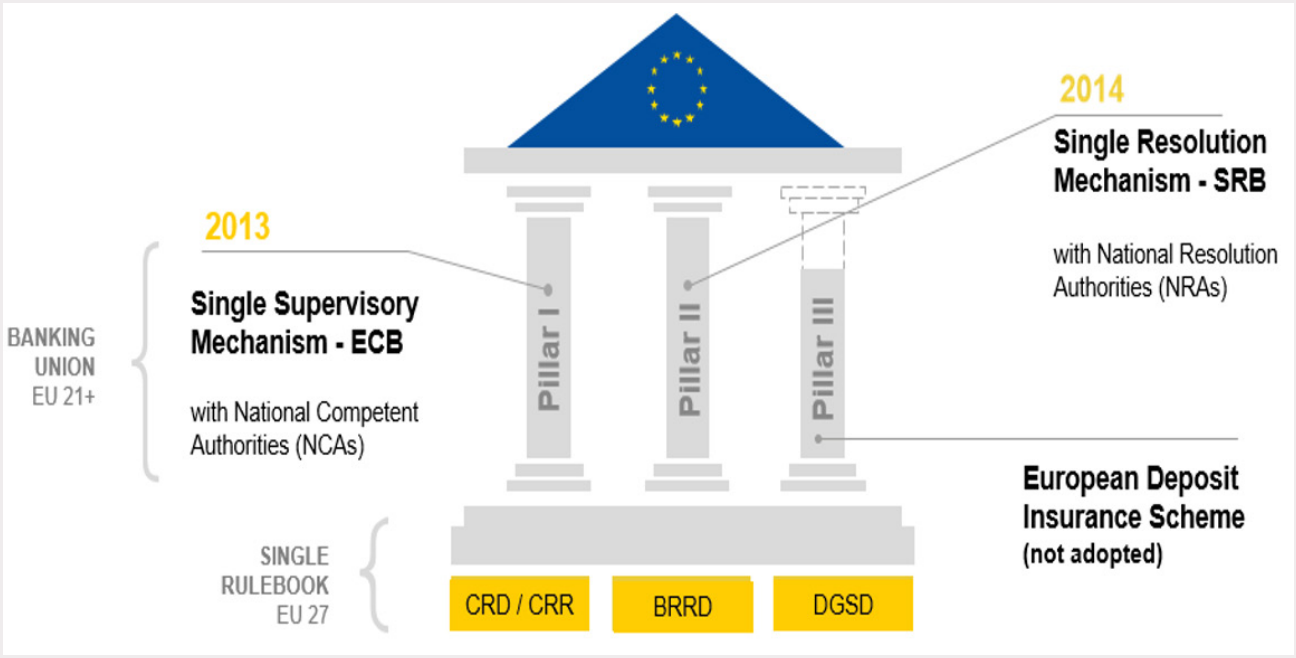
Box 1

THE EUROPEAN BANKING UNION

After a political agreement on the topic was reached in 2012, the European banking union was gradually established. It entails a partial transfer of supervisory powers from national to European level. The ultimate objective is to create a banking union that rests on three pillars (see Figure 1).

The first pillar of the banking union is the Single Supervisory Mechanism (SSM), which became operational in November 2014. It is comprised of the national competent authorities (NCAs) of the euro area member states and other participating European member states and European Central Bank (ECB) Banking Supervision. It is tasked with the supervision of all banks, the largest banks being directly supervised by the ECB. The second pillar of the banking union is the Single Resolution Mechanism (SRM), which became fully operational in 2015. It is composed of the Single Resolution Board (SRB) and the national resolution authorities (NRAs) and is tasked with the resolution of banks. The European Deposit Insurance Scheme (EDIS) is envisaged as the banking union's third pillar, but discussions regarding its implementation are pending. Nevertheless, the two existing pillars of the banking union have established a level playing field for the supervision and resolution of euro area banks and have been an important step forward in ensuring Europe has a strong and resilient banking system. The progress related to development of the banking union was also recognised by the Basel Committee on Banking Supervision in its review of the assessment methodology for global systemically important banks, which allowed a more favourable treatment of intra-banking union exposures.[1]

Figure 1
THE THREE PILLARS OF THE EUROPEAN BANKING UNION

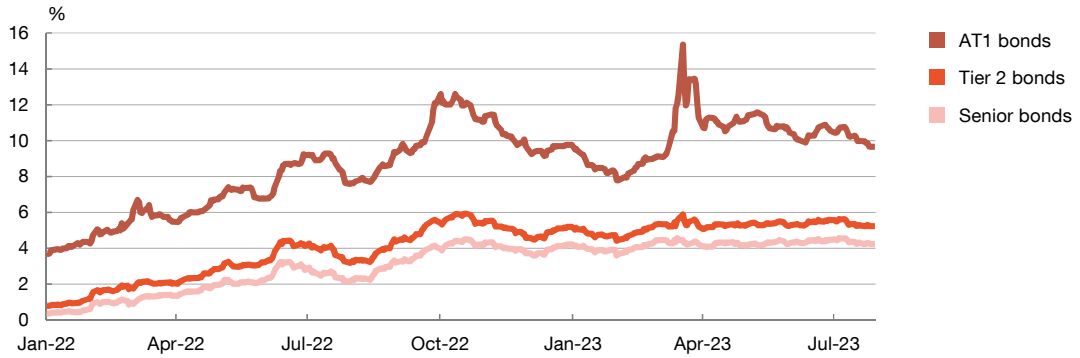


SOURCE: SRB.

1 Bank for International Settlements (2022) and ECB. (2022).

cyber and climate risk. On both fronts, significant work has already been done. For example, in November 2022, the EU passed the Digital Operational Resilience Act, which will strengthen the cyber resilience of the financial infrastructure.

Chart 1
AT1 bond yields for European banks before and after UBS's acquisition of Credit Suisse compared with Tier 2 and senior bond yields



SOURCE: Bloomberg.
Note: The chart shows the yields to worst call for various instrument types. The spike in AT1 yields corresponds to UBS's acquisition of Credit Suisse.

While a robust regulatory framework is important, institutions themselves play a pivotal role in building trust in the banking system, supplemented by a culture of intensive supervision by the competent authorities. Through benchmarking and oversight of their financial situation, their risk profiles, the progress made on different fronts, including resolvability, the prudential and resolution authorities are not only ensuring a more level playing field, but are also helping the banks to revisit their business models, risk tolerance, risk management and crisis readiness. All in all, banks are and will remain ultimately responsible for the management of their risks. The prudential and resolution frameworks reinforce the necessity to constantly adopt and improve banking management, hence also providing confidence in banks' resilience.

4 Lessons learned by the Single Resolution Board from recent banking crises

The recent crises have highlighted a number of lessons, which include three of particular importance for the Single Resolution Board (SRB): the significance of the ex-ante transparency of the resolution regime; the importance of crisis readiness; and the vital role of liquidity in resolution.

Regarding the first lesson, the resolution framework having clear ex-ante rules is key. In the Credit Suisse case, some AT1 investors were bailed in before common equity holders. This created temporary stress in the AT1 markets (see Chart 1). In response the SRB, the European Central Bank (ECB) and the European Banking Authority (EBA) issued a joint statement clarifying that under the EU resolution framework common equity holders would be the first to bear losses and only afterwards would AT1 instruments be bailed in.[18] This helped to calm the financial market and reaffirmed the key role of AT1 instruments in bank funding in the EU. In the banking

18 SRB, EBA and ECB Banking Supervision (2023).

union the systemic risk exception does not exist and an international debate is taking place about the necessity to introduce it. From a solvency perspective, this does not seem necessary in the EU as the rules for absorbing losses are well established. Even non-covered deposits, subject to different safeguards, could be expected to contribute towards funding a potential bank resolution. Hence, with strong enforcement of clear rules, there should be no need to introduce a systemic risk exception to safeguard all deposits as the US authorities did. The SRB considers that the current level of depositor protection strikes a good compromise, and helps maintain financial stability by taking into account all other elements. Nevertheless, the SRB supports the European Commission's proposal to reform the Crisis Management and Deposit Insurance framework. This proposal would, among other things, increase the usability of the DGS in resolution, which would help to increase bank resolvability.

The second lesson the latest crises have highlighted is the importance of crisis readiness. With the increased prominence of emerging risks and, particularly, with the unstable macroeconomic and geopolitical environment, the potential speed of bank failures has increased. This was demonstrated already last year by the Sberbank Europe resolution,[19] where the bank failed suddenly just three days after the Russian invasion of Ukraine. Since its establishment eight years ago, the SRB has focused on developing bank resolution plans and bank resolvability. The banks under the SRB's remit are progressing towards their resolvability and by the end of 2023 the SRB's Single Resolution Fund (SRF) will have reached its steady state with assets of around EUR 78 billion. Going forward, the focus will be testing the operationalisation and the capacity of the banks to implement existing resolution plans. This will be done through dry runs, deep dives and on-site visits to banks' premises to ensure that banks are resolvable and progressing adequately on developing their crisis readiness. Moreover, the recent crises have once again highlighted the importance of being able to face unexpected circumstances. As an example, bail-in is the preferred resolution strategy for a large number of SRB banks; however, it may not be the best tool if the bank is failing due to a liquidity crisis. Bail-in can effectively help to recapitalise the bank, but it cannot generate additional liquidity. In this vein the SRB considers it important to develop credible alternative resolution strategies, including the combination of different resolution tools, that can be successfully applied depending on the circumstances.

Finally, the recent crises have also changed our understanding regarding the liquidity needs in resolution. The Swiss and US authorities have leveraged the ability of their fiscal and monetary arms to work hand in hand. In the United States, the Federal Reserve System (Fed) introduced a Bank Term Funding Program to support the going concern liquidity needs of the banking system. The facility provided banks with a source of funding in exchange for high quality collateral, which would be valued at par. To avoid potential losses to the Fed, the US Treasury agreed to backstop the program with USD 25 billion.[20] In Switzerland, the SNB and the Swiss Government acted jointly to ensure sufficient funding. In the banking union, the lack of a centralised fiscal body limits the scope of similar actions.

19 SRB (2023).

20 Board of Governors of the Federal Reserve System (2023b).

Sufficient liquidity back-up is an important factor for the credibility of the resolution regime. The SRB has sufficient resources to cover banks' liquidity needs in a number of cases thanks to the SRF. Furthermore, when the amendment to the Treaty establishing the European Stability Mechanism (ESM) is ratified, the SRB will also have access to the ESM backstop of up to EUR 68 billion. However, in a tail risk event the current arrangements could prove insufficient. For a large bank, such as a global systemically important bank, or if several crises involving liquidity needs coincide, a larger amount of money will be necessary to restore market confidence.

This is why the SRB has been actively working on liquidity in resolution. Our key assumptions are:

1 Liquidity is provided temporarily. In the Credit Suisse case, UBS mentioned that the liquidity support was phased out in June 2023.

2 The amount of the liquidity support can be much higher than the amount of liquidity drawn, hence reducing the risks actually taken by lenders.

3 The risk to this liquidity support is directly connected to the success of the resolution action.

If the resolution action is credible and properly implemented, it will succeed and the liquidity support will be reimbursed. Lenders can trust the EU resolution framework and the SRB to implement successful resolution schemes, as demonstrated twice already, in 2017 and again in 2022.

5 Conclusion

Trust in the banking system is crucial for preserving financial stability. While banks themselves are ultimately responsible for building and maintaining trust, a strong regulatory framework and a proactive regulatory stance can support this aim. Since the establishment of the banking union, banks have demonstrated strong resilience to unexpected shocks. This has undoubtedly increased trust in banks. The SRB, as the banking union's central resolution authority, has also been taking steps to improve the resolvability of banks and to promote trust in the sector. One of the key activities in this regard is to ensure the ex-ante transparency of the resolution rules. This is heavily dependent on good communication. Second, the SRB will be placing greater importance on emerging risks and on testing resolution strategies. Finally, the SRB has been working on the topic of liquidity in resolution to ensure that there is sufficient capacity in place to support the liquidity needs of banks in a tail risk event. It is our belief that all these measures will provide additional confidence to safeguard financial stability and to protect European taxpayers.

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THE 2023 BANKING CRISES: THE CAUSES AND THE ROLE PLAYED BY BANK MANAGEMENT, SUPERVISORS AND REGULATORS

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THE 2023 BANKING CRISES: THE CAUSES AND THE ROLE PLAYED BY BANK MANAGEMENT, SUPERVISORS AND REGULATORS

Abstract

The events of 2023 have served as a reminder of how quickly banking crises can occur. This article analyses the roots of the problems which, ultimately, against a backdrop of uncertainty and rapid contagion effects, affected banks whose business models, governance and risk management presented significant weaknesses. The article also reviews the main implications for the banking sector and authorities worldwide. These events are a fresh reminder that the banking business must be based on business models that are sustainable over time and on appropriate risk management. In addition, the events again highlight the importance of supervisory activity having available the tools needed to guarantee an early and effective response. Lastly, although the current regulations have helped to check the systemic reach of crises, thanks to the increased resilience of the banking sector, reinforcing again the need to implement the Basel III framework, there are certain areas where analysis of the operation of the prudential regulatory framework should continue.

Keywords: banking crises, contagion, risk management, liquidity risk, prudential regulation, solvency, supervision.

1 Introduction

Between March and May 2023,[1] the US banking sector saw successive banking crises at several banks – Silicon Valley Bank (SVB), Silvergate Bank, Signature Bank and First Republic Bank – that were facing liquidity problems as a result of having lost the trust of their depositors and of the markets. Meanwhile, in Switzerland, Credit Suisse was affected by the market distrust provoked by the crises among these US banks. The outcome was that they became non-viable and either self-liquidated (Silvergate Bank) or were resolved and/or sold (SVB, Signature Bank, Credit Suisse and First Republic Bank).

These events took place in a setting in which both banking and financial markets were already highly sensitive as a result of the worsening of the macroeconomic situation owing to the war in Ukraine, the existing inflationary tensions and the subsequent interest rate hikes stemming from the necessary monetary policy tightening. In consequence, in view of the first signs of crisis at some individual banks, the markets focused on other banks that were showing signs of weakness, prompting outflows of funds and liquidity problems. The authorities made available additional liquidity lines and adopted certain other measures designed to curb the

1 On 28 July, the Federal Deposit Insurance Corporation (FDIC) announced that the Kansas Office of the State Bank Commissioner had closed Heartland Tri-State Bank of Elkhart and that all deposit accounts had been transferred to Dream First Bank, National Association of Syracuse (Kansas). This was the result of a scam and had no relation to the crises analysed here.

contagion effects. But these actions failed to halt the strong and rapid outflows of funds at the banks concerned, and ultimately the supervisory and resolution authorities had to intervene to address the problems identified at these banks and thus safeguard the stability of the financial system.

The triggers of the loss of confidence and liquidity problems at the banks affected by the crisis included the tightening of monetary conditions and the worsening of the economic and financial conditions of a significant proportion of some of these banks' customers. These factors led to funds being withdrawn at a whirlwind pace and had a serious impact on the liquidity of the banks concerned, which in order to maintain their liquidity levels then had to resort to markets that were already highly sensitive, which prompted even more doubts about their position. They also brought to light serious shortcomings in their interest rate risk and liquidity risk management, which far from being the result of a temporary situation had been developing over time and became fully visible as interest rates rose.

Although the above-mentioned banks have certain different characteristics, to a greater or lesser extent they also share the underlying causes of the crises that affected them:

— A lack of sustainability in their business models and of a comprehensive business view. In most cases, they had recorded swift and significant growth in assets over a short period, linked to businesses in rapid expansion, and had high customer concentration in certain sectors (technology (SVB), digitalisation (Silvergate Bank), crypto-assets (Signature Bank), private banking and high net worth (Credit Suisse), and banking services to wealthy customers (First Republic)). Several of these banks had a high concentration of liabilities in large deposits that were not covered by deposit guarantee schemes and were potentially subject to high turnover.

— Weak liquidity management. Insufficient asset diversification; inadequate or no contingency plans relating to alternative liquidity lines for crisis situations, with inappropriate management of the collateral available.

— Weak interest rate risk management. Inappropriate management of the duration gap between assets and liabilities. Most of the banks affected had large held-to-maturity portfolios recorded at amortised cost, whose market price fell when the monetary policy stance shifted. This resulted in losses when, faced by liquidity stress, the banks tried to liquidate these assets.

— Inappropriate governance. A lack of monitoring and control by management bodies of the risks and problems or shortcomings (findings) identified by the supervisory authorities.

Compared with the great financial crisis of 2008-2012, the crises observed in 2023 are different, as they affected only a small number of banks and occurred in a very different regulatory and supervisory environment. In the recent cases, the financial authorities swiftly took control of

the situation, so that the contagion effects were limited and repercussions on global financial stability were avoided. The financial authorities also noted the importance of ensuring that supervisory activity had available the tools needed to guarantee an early and effective response. Moreover, these crises provided an opportunity for analysis as to whether the current regulatory framework needs further improvement.

The article first describes the events observed and their causes (Section 2). It then analyses the role of supervision (Section 3) and the applicable regulatory framework (Section 4), reflecting on how they worked.

2 Recent banking crises: general description, common causes and differences

The banking crises involving four US banks (SVB, Silvergate Bank, Signature Bank and First Republic Bank) and one Swiss bank (Credit Suisse) all originated, albeit with a different relative importance in each case, from weaknesses in their business models, poor governance and inadequate risk management. The crises in the United States were triggered by the change in the monetary policy stance, which led to interest rate hikes, revealing shortcomings in interest rate and liquidity risk management, and by the distrust and the extraordinarily fast contagion effects, in a setting of uncertainty and market sensitivity when the first problems began to emerge (Gruenberg, 2023a, 2023b).

These events evidence the importance of distrust and contagion effects in the unfolding of crises, especially in today's world where information is communicated and disseminated faster than ever. Also, as usual in all crises, the banks that show the most weaknesses and shortcomings in internal control and risk management are the most vulnerable to these contagion effects and to the consequent withdrawal of funds. They are more prone to suffering self-propelling liquidity tensions that may ultimately render the institution non-viable (Enria, 2023; Federal Reserve Board (FRB), 2023a; Federal Deposit Insurance Corporation (FDIC), 2023).

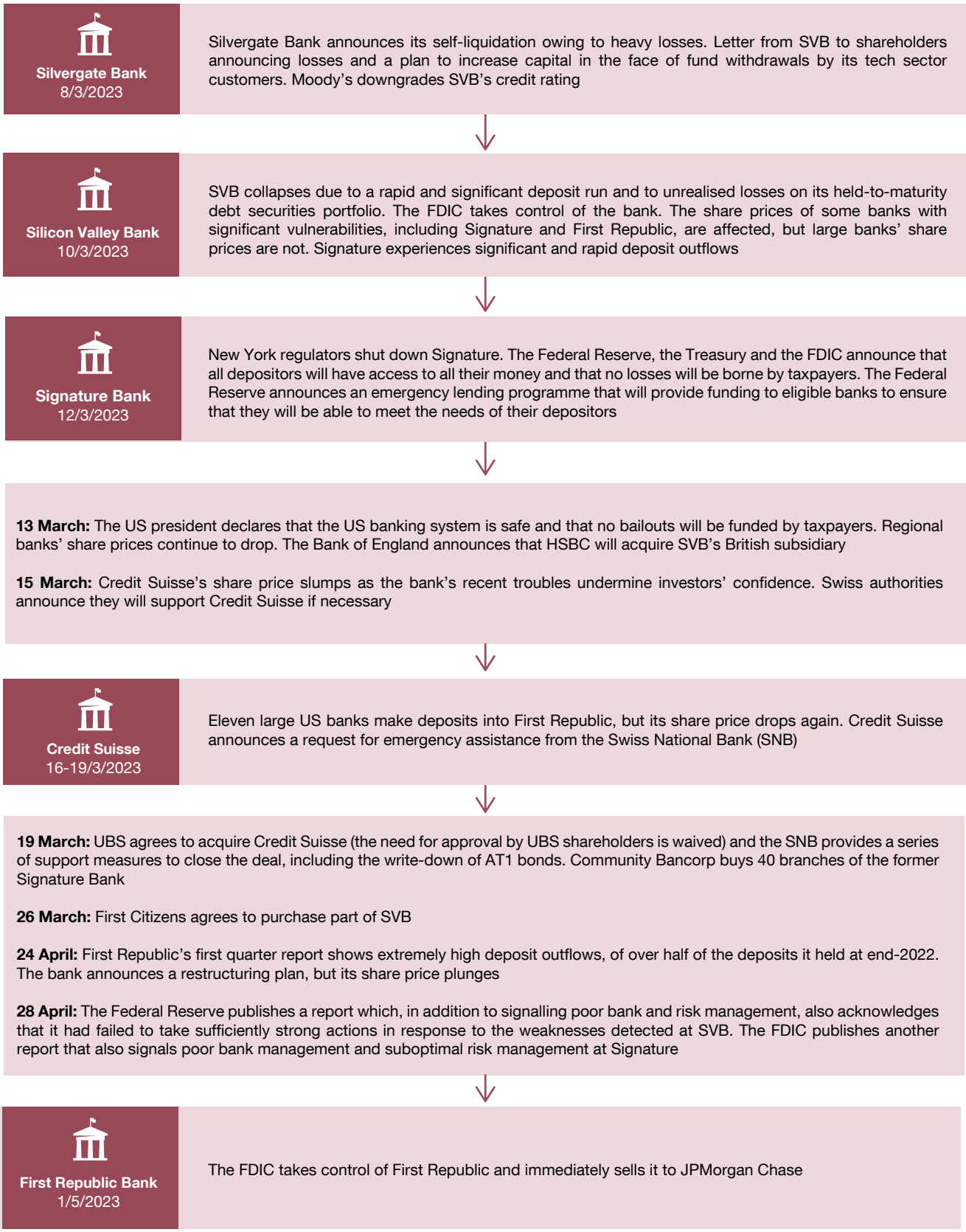
Figure 1 shows a summarised timeline of the events that took place and Figure 2 presents some of the main characteristics of the banks affected by the crisis, their business models, their main problems and the crisis exit strategies implemented by the supervisory or resolution authorities.

Some of the main events affecting the banks are described below:

— The California-based Silvergate Bank was the first to be affected by the successive crises that started in March 2023. Its business was concentrated on providing services to digital sector firms (Gruenberg, 2023a), and it had been recording extraordinarily strong growth since 2019. The collapse of the FTX crypto-currency exchange platform in November 2022 affected around 10% of its deposits. Subsequently, in 2022 Q4 it experienced a significant outflow of deposits from digital sector customers and this, combined with the impact of the FTX case, resulted in a large-scale deposit flight (Silvergate Bank, 2023). This caused the bank to sell

Figure 1

A timeline of how the banking crises unfolded between March and May 2023



SOURCE: Devised by authors.

Figure 2

Main characteristics of the banks affected by the March to May 2023 crises

	Silvergate Bank	Silicon Valley Bank (SVB)	Signature Bank (SBNY)	Credit Suisse	First Republic Bank
Date of "non-viability"	8/3/2023	10/3/2023	12/3/2023	16-19/3/2023	1/5/2023
Event	Self-liquidation	FDIC resolution Bridge bank Acquisition by First Citizens Bank & Trust Company	FDIC resolution Bridge bank Flagstar Bank (a New York Community Bancorp subsidiary) assumes substantially all deposits and certain loan portfolios	16-19/3/2023 SNB and FINMA agree on sale to UBS	FDIC resolution JP Morgan Chase Bank assumes all deposits and substantially all assets
Business model in recent years	Focused on providing services to the digital assets sector	Focused on customers in the technology and venture capital sectors	Focused on deposits from the crypto-asset sector	Focused on high net worth clients and private banking	Focused on business with high net worth clients and private banking
Assets (*) ($bn) 2019 2022	 2.1 11.3	 69.9 209.0	 50.6 110.4	 827.9 574.6	 116.3 212.6
Deposits not covered by deposit insurance funds (% of total). Average values 2022/2023 Q1 (**)	≈ 60	> 80	> 80	n. d.	> 50
Supervisor (***)	Federal Reserve - San Francisco Federal Reserve Bank and California Department of Financial Protection and Innovation	Federal Reserve - San Francisco Federal Reserve Bank	New York State Department of Financial Services (NYSDFS) and FDIC - New York Regional Office	FINMA	FDIC and California Department of Financial Protection and Innovation

(*) SNL (S&P Global). (**) BCBS (2023), Gruenberg (2023) and Standard and Poor's (2023). (***) The supervisory system in the United States is complex as there are state and federal charters and federal banks may choose to be supervised by a state or federal supervisor (see Section 3).

SOURCE: Devised by authors.

portfolio debt securities, resulting in a $1 billion loss. The bank's deteriorating situation led to the announcement on 1 March 2023 of a delay in the publication of its 2022 profit and loss account. The reaction was a sudden, steep drop in Silvergate Bank's share price. Finally, on 8 March, it announced that it would self-liquidate.

— SVB was a California-based bank whose business model focused on private banking customers linked to the technology and venture capital sectors. Its assets had grown rapidly, tripling between 2019 and 2021, linked to the growth of the sectors from which it drew most of its customers. The bank's assets were concentrated in medium and long-term US Treasury and other agency securities. It also engaged in cross-border activity with a subsidiary in the United Kingdom and branches in Germany, Canada and the Cayman Islands. SVB had been experiencing deposit outflows from the technology sector since 2022. On the same day that Silvergate announced its decision to self-liquidate, SVB announced a plan to restructure its balance sheet and sold off a substantial part of its held-to-maturity portfolio (recorded at amortised cost until then) at a significant loss. It also announced that it intended to issue capital and increase its medium-term indebtedness. A very swift deposit run-off ensued. According to some estimates, in two days SVB lost around 80% of its deposits (Basel Committee on Banking Supervision (BCBS), 2023c). SVB had a high percentage of deposits that were not covered by the deposit insurance fund. In an attempt to curb the contagion effects in the system and mitigate the loss of trust in banking markets, the FDIC granted all deposits access to the insurance fund, a measure that was also adopted in the case of Signature Bank (see Box 1). As SVB did not have adequate plans to deal with significant liquidity tensions, it was unable to make greater use of the existing liquidity facilities.

  The US Federal Reserve System, SVB's federal regulator, informed the FDIC – which engaged with the local regulatory authority, the California Department of Financial Protection and Innovation (CADFPI), i.e. the chartering authority – that it was unlikely that the bank would be able to continue to face the liquidity outflows. On 10 March 2023 SVB was closed by the CADFPI and the FDIC was appointed as receiver. This also entailed the resolution of its UK subsidiary (SVB UK), whose business model was similar to that of its parent. The FDIC initiated a process to search for a purchaser for the bank. Once the systemic risk determination was made, the FDIC created a bridge bank, which continued SVB's operations while it attempted to find an acquirer. Finally, on 26 March, the FDIC entered into an agreement with First Citizens Bank & Trust Company, Raleigh (North Carolina), whereby this institution would acquire all of SVB's deposits and loans. For its part, the Bank of England, as resolution authority, sold SVB UK's business to HSBC (Bank of England, 2023). SVB and First Republic Bank are the two largest US bank failures since the 2008 global financial crisis.

— Signature Bank, which was also affected by the March events, was originally focused on the commercial real estate sector and on financing for the industrial and wholesale and retail trade sectors. In 2018 it expanded its business model towards the private equity and digitalisation segments. Between 2019 and 2020 its assets grew by 64%.

Box 1

LIQUIDITY DURING THE RECENT BANKING CRISES AND SUPPORT PROVIDED BY THE AUTHORITIES

As explained in the main text, the crises observed materialised and were triggered by liquidity tensions. Agents' lack of confidence, resulting in very rapid deposit outflows, the difficulties the banks concerned encountered in securing market funding and the absence of appropriate contingency plans (in some cases they lacked collateral or the appropriate documentation to efficiently access the liquidity support available) triggered a sequence of bank failures. This contagion effect led to untenable situations with the mechanisms in place under the ordinary framework and ultimately the authorities had to step in with the following types of public support.[1]

United States

In addition to the ordinary liquidity lines, such as the Federal Reserve System's discount window and, as they were regional banks, the liquidity lines available through the Federal Home Loan Banks (FHLBs), the Federal Reserve launched its Bank Term Funding Program (BTFP) (Ostrander, 2023). In addition, on 12 March the Treasury, the FDIC and the Federal Reserve announced a systemic risk exception whereby the FDIC would guarantee all uninsured deposits in excess of $250,000 at SVB and Signature Bank to avoid further deposit runs at the banks concerned and adverse effects on financial stability (Congressional Research Service, 2023).

The liquidity provided by the Federal Reserve to depository institutions through the discount window[2] increased very significantly in March 2023 and the following months, and has since stabilised at significantly higher levels than in previous periods. According to the weekly data published by the Federal Reserve,[3] in the week of 29 December 2020 it granted loans amounting to $16.1 billion. After the SVB intervention, this amount soared to $295.3 billion in the week of 29 March 2023 and to $211.9 billion in the week of 24 May 2023. Since then, lending has remained at high levels with respect to previous periods ($141.1 billion in the week of 6 September 2023),[4] and all this without including the liquidity provided by the BTFP.

The BTFP was designed by the Federal Reserve over the weekend of 11-12 March 2023 to provide banks with a source of funding and to help protect the financial system's stability. The programme aimed to avoid sales of assets in some banks' held-to-maturity portfolios and it was therefore considered effective to avoid further contagion effects (Ostrander, 2023). It allowed the banks to use the holdings of securities issued by the Treasury and other US agencies held in their portfolios as of 12 March as collateral to obtain financing up to the par value, rather than market value, of such securities, with a one-year term and the possibility of early repayment without penalty. This programme was deemed appropriate, given that the Federal Reserve's discount window facility only provides loans with a haircut applied to the collateral's market value and with a maximum maturity of four months. In exchange, in the event of default, the loans granted under the BTFP would have other assets of the borrower as security, not only the collateral, as is the case with the discount window. Also, in the event of default and a lack of other guarantees, the Treasury granted a guarantee to the Federal Reserve of up to $25 billion. The outstanding amount of the loans granted under this programme stood at $62.6 billion in the week of 29 March and at $88.7 billion in the week of 24 May (the average balance of loans under the BTFP stood at $107.7 billion in the week of 6 September).[5]

The FHLBs also provided liquidity to banks. The FHLBs are regional government sponsored enterprises (GSEs) that are privately and independently capitalised. They are, therefore, not centrally managed and their securities are not backed by any state agency. In March 2023, FHLB members' demand for advances accelerated, partly in response to the situation created by the banks under stress.[6] The outstanding balance of these advances at December 2021 for the ten largest counterparties was $93.3 billion. This amount rose to $219.8 billion at

1 In addition to the support measures described in this box, the central banks of Canada, the United States, Japan, the United Kingdom and Switzerland and the European Central Bank took coordinated action to provide US dollar liquidity (the frequency of swap line operations used to provide dollar funding was increased from weekly to daily).

2 The Federal Reserve's discount window includes several types of credit (primary, secondary, seasonal and emergency credit).

3 The figures are averages for the weeks ending on the dates indicated.

4 Figures taken from the Federal Reserve's weekly H.4.1 release.

5 H.4.1 release.

6 The FHLBs provide funding to their members mainly through secured loans known as advances that are collateralised by mortgage loans or other types of eligible collateral held by the borrower banks.

Box 1
LIQUIDITY DURING THE RECENT BANKING CRISES AND SUPPORT PROVIDED BY THE AUTHORITIES (cont'd)

December 2022 (of which $14 billion related to SVB and $15 billion to First Republic),[7] and to $326 billion at March 2023 (FHLBs, 2023). Silvergate Bank, SVB and First Republic were members of FHLB San Francisco and Signature Bank was a member of FHLB New York.

In addition, as an ad hoc support measure, on 16 March a consortium of 11 large US banks deposited $30 billion in uninsured deposits into First Republic to stop the contagion effects. The measure only had a temporary effect on the withdrawal of deposits from the bank.

The contingency plans of the US banks affected by these recent crises were inadequate in a setting of rapid liquidity outflows and acute liquidity strains. In general, small and midsize banks were excessively reliant on a single liquidity source. For instance, Signature Bank concentrated its access to liquidity on the Federal Home Loan Bank of New York and lacked preparation for using the Federal Reserve's liquidity channels. A similar lack of preparation and procedures was observed at SVB. In 2022 it had not analysed its capacity to access the discount window and showed operational shortcomings (lack of appropriate collateral and agile procedures to obtain liquidity).

Switzerland

As a result of the developments at Credit Suisse, and the announcement of the bank's point of non-viability and its sale to UBS, the Swiss authorities offered various types of public assistance to facilitate the bank's sale and its access to liquidity facilities.

On 15 March, prior to the bank's demise, the Swiss monetary authority – the Swiss National Bank (SNB) – announced that it was prepared to grant emergency liquidity assistance (ELA) if necessary. Subsequently, the Swiss authorities[8] adopted certain emergency measures, which included:

— The introduction of an additional liquidity facility (ELA+) of up to CHF 100 billion, securing a hierarchy of privilege for this assistance in the event of insolvency.

— A public liquidity backstop was also activated that enabled the SNB to grant additional liquidity of up to CHF 100 billion to Credit Suisse with a state guarantee from the Swiss Confederation.

— A federal guarantee of CHF 9 billion was established to cover possible losses deriving from Credit Suisse's balance sheet during the takeover by UBS (provided such losses exceeded CHF 5 billion) (FINMA, 2023a).

On 11 August 2023 the authorities terminated the federal guarantees. No losses arose from these guarantees before they were terminated. The Swiss Confederation earned receipts of CHF 200 million as a result of the support measures launched.[9] The Swiss Federal Council has announced that it intends to submit a legislative proposal to Parliament to introduce a public liquidity backstop in Swiss law. In addition, work will continue on the revision of the regulatory and supervisory framework for banks deemed too big to fail.

7 Figures drawn from Federal Home Loan Banks (2022).
8 FINMA (2023a), the Swiss Federal Department of Finance (FDF) (2023b) and the SNB (2023c).
9 Swiss Federal Council (2023).

Like SVB, around 90% of Signature Bank's deposits were not insured by the FDIC. 20% of its deposits were from digital sector firms, although it did not grant loans to this sector. In the second half of 2022, the digital asset market shocks arising from the collapse of some important crypto-asset firms, such as FTX and Alameda Trading, and Signature Bank's announcement of a delay in publishing its financial statements, prompted rising concerns about its liquidity position, which led to significant deposit outflows. The situation became more critical with SVB's failure on 10 March. Signature Bank did not have adequate contingency plans to address the liquidity tensions (see Box 1); this prevented it from using the liquidity support

available and raised questions about its viability. Ultimately, on 12 March, the New York State Department of Financial Services (NYSDFS) closed the bank. Within 48 hours of SVB's failure, the FDIC took charge of the resolution of Signature Bank and a bridge bank was created. On 20 March Flagstar (a subsidiary of New York Community Bancorp) entered into an agreement with the FDIC to acquire most of the deposits and part of the loans of the failed Signature Bank (FDIC, 2023).

— In this setting, the uncertainties and problems Credit Suisse was already experiencing as a result of several scandals involving its managers and operations worsened in March. Over the course of 2021 and 2022 Credit Suisse incurred losses owing to its role in the Archegos and Greensill cases which triggered mistrust in the bank (Alonso Olmedo, Anguren Martín, Gamoneda Roca and Pérez Rodríguez, 2023; FINMA, 2023b). The actions taken by the Swiss Financial Market Supervisory Authority (FINMA) revealed weaknesses in the governance and risk management and control areas, although the capital and liquidity ratios remained sound, in part thanks to the issuance of mandatory convertible notes following the losses incurred due to its operations with Archegos. Since the shocks that affected the markets as a result of the emergence of COVID-19 in March 2020, FINMA had been requiring Credit Suisse to expand its liquidity buffers. After incurring net losses in three consecutive quarters, the bank issued a profit warning after 2022 Q2 which triggered a credit rating downgrade by rating agencies. This, together with a worsening of the macro-financial setting, led Credit Suisse to announce a revision of its strategy, which included a capital increase; however, this did not stop the significant liquidity outflows, amid intense rumours about its soundness. The bank's credit rating, credit default swaps (CDSs) and market capitalisation moved significantly apart from the average levels of its peer group of global systemically important banks (G-SIBs). Credit Suisse also delayed the publication of its annual report, which was scheduled for 9 March 2023, owing to last-minute technical comments by the United States Securities and Exchange Commission.

  All the above, together with a public communication from one of the bank's major shareholders stating that it did not intend to participate in the capital increase announced, raised more uncertainties about Credit Suisse's situation, despite the Swiss authorities having announced that they would support the bank's liquidity (see Box 1). Accordingly, between 16 and 17 March, the Swiss authorities, led by the Swiss Federal Council (SFC), adopted emergency measures to safeguard Credit Suisse's viability and support its takeover by the Swiss bank UBS, with the aim of protecting financial stability and the Swiss economy. In addition to adopting emergency liquidity measures (see Box 1), the Swiss Confederation granted UBS a public guarantee for any losses that could materialise. Also, FINMA informed Credit Suisse that its additional Tier 1 (AT1) capital (contingent convertible bonds or CoCos) would be written down, meaning that bondholders would bear losses before shareholders (FINMA, 2023a). This sparked adverse reactions on the AT1 markets, with European supervisors issuing statements on the legal certainty of the use and write-down of AT1 instruments (see Box 3).

— First Republic Bank (First Republic), a California bank that mainly provided private banking and brokerage services, was the next and last case of this series. At end-2022 68% of the bank's deposits were not covered by the deposit insurance fund. Although it benefited initially from some of SVB's deposit outflows, it soon began to see fund withdrawals owing to contagion effects at regional banks with high percentages of uninsured deposits. The deposit runs intensified following the SVB crisis of 10 March. Despite the liquidity support provided by the Federal Reserve, the Federal Home Loan Banks (FHLBs) and a consortium of 11 major US banks (see Box 1), and the bank's plans to increase capital and restructure its business model, strong deposit outflows continued. Finally, on 1 May, the CADFPI closed First Republic and appointed the FDIC as receiver. The FDIC resolved that JPMorgan Chase Bank would acquire all of First Republic's deposits and substantially all of its assets. An agreement was entered into between the FDIC and the acquiring institution to share any potential losses arising in the loan portfolio.

Therefore, before the liquidity stress and the crises emerged, the banks concerned already had significant shortcomings and risk management and governance problems. In general, their business lacked diversification and was concentrated in certain sectors that had expanded rapidly in recent years (Enria, 2023).

The change in the US and European monetary policy stance was the catalyst that revealed the underlying problems in SVB's balance sheet and its business model and the trigger for contagion to other banks. This led to markets attaching particular importance to unrealised losses in their portfolios, even though they were ultimately not to materialise.

Although, as explained in Box 1, the crisis-stricken banks received significant liquidity support from the authorities, in the end, the authorities were unable to halt the spread of mistrust and contagion effects at the banks affected by management shortcomings.

3 The role of supervision

The events observed were the first major test for the global banking system since the great financial crisis of 2008. Accordingly, not only is it important to consider the events from the standpoint of individual banks' own management, but analysis is also required of the activity of supervisors and the joint functioning of regulatory reforms that were adopted in the wake of that crisis. In consequence, international bodies and regional and national authorities have embarked on analyses of the events that occurred and of their possible regulatory and supervisory implications.[2]

2 This article does not address the resolution perspective, which has been considered at the global level by the Financial Stability Board (FSB). To date it has found no operational weaknesses, but rather challenges for the implementation of the international resolution framework (FSB, 2023b).

Table 1
US supervisory structure

Charter type	Chartering authority		Deposit insurance
	Federal supervisor	State supervisor	
State	Federal Reserve Bank (e.g. FRB San Francisco) or the FDIC	State (e.g. California Department of Financial Protection and Innovation)	FDIC
Federal	OCC	—	FDIC

SOURCE: Banco de España.

When reviewing these cases, it is appropriate to analyse whether the supervisory and regulatory framework in place was appropriate to deal with these problems, and also the broad lessons learnt from the supervisory and regulatory standpoint (BCBS, 2023a and 2023b).

The supervisors of the banks concerned had already detected weaknesses. However, as is explicitly recognised in the reports of those supervisory authorities (FRB, 2023; FDIC, 2023), they failed to act sufficiently rapidly owing to the sluggishness, and in some cases the inefficiency, of the internal supervisory escalation processes, and also to the absence of sufficiently effective enforcement measures.

In the case of the US banks, the supervisory authorities have pointed out that, in some cases, they lacked sufficient human resources to carry out these tasks (FDIC, 2023). Also noteworthy is that the organisation and structure of supervision in the United States is somewhat complex and encompasses various state and federal supervisory authorities (for a summary of the US supervisory structure, see González Mota and Marqués Sevillano (2010) and Baker McKenzie (2023)). In some cases, this may have slowed the decision-making process, although this is not explicitly signalled in the reports of the US supervisory authorities. In the United States, banks may opt to obtain either a state or a federal charter, without this limiting their scope of activity. Under this system, in which the type of charter extended does not limit the geographical reach, banks with a federal charter will be supervised by the Office of the Comptroller of the Currency (OCC), the federal chartering authority, and those with a state charter by the state chartering authority and a federal supervisor, which may be a regional federal reserve bank (FRB) or the FDIC (see Table 1).

Also, in the United States, the intensity and application of supervision is based on size (see Box 2), which meant that supervision of the banks affected by the crisis was less stringent. As a result, overall supervisory vision was lacking and the supervised banks' business models and risk management were subject to a more forward-looking approach.

In any event, the supervisors had, to some extent, already detected the vulnerabilities of these banks that subsequently rendered them sensitive to the crisis of trust and to contagion.

Nevertheless, the events that unfolded and the speed of contagion and of the market reaction brought to light certain areas for improvement in the supervisory structure and the supervisory approach as regards a global overview of banks' risks and business models, and in the speed with which decisions were made and measures adopted to address the problems identified. These areas for improvement are not equally applicable to all supervisors, as there are important differences between the United States and the European Union (see Enria (2023) and Box 2).

The main areas for supervisory improvement highlighted by the recent crises refer to aspects included in the Basel Core Principles for Effective Supervision (BCBS, 2012) and signalled by the International Monetary Fund (IMF) in its lessons learnt for supervision, drawn essentially from its Financial Sector Assessment Programs (IMF, 2023). The main areas for improvement include the following:

— Supervisory structure and resources. Supervision must be uniform, regardless of balance sheet size, although it must be adapted to each bank's business type, taking into account proportionality criteria and consistency criteria between banks. Benchmarking analysis assists in this respect. Supervision must also have sufficient supervisory resources, adapted to the complexities of the current framework in which new assets and businesses have emerged (for instance, fintech, crypto-assets and relations with non-bank financial intermediaries). Moreover, the resources available must allow in-depth analysis of specific risks (deep dives) and an appropriate balance between on-site and off-site supervision, given that supervision requires on-site verification of data management systems, procedures and infrastructure and banks' corporate culture.

— Supervision of business models. Focus must be placed on the degree of concentration of activities and operations in certain sectors and businesses, especially in areas of recent and rapid expansion. Forward-looking analysis of the sustainability of business models is required, along with the identification of outliers.

— The supervisory approach. Supervision must be based on risk assessment. This must take into account an overall view of banks, and must also consider and assess their governance and the planning of their capital and liquidity needs. Capital and liquidity requirements must be based more on a holistic view of banks.

— Supervision of liquidity management. There must be greater supervision of the liquidity lines available to banks in liquidity stress situations, including assessment of how banks use the guarantees and collateral available to them and the potential degree of rotation of their liabilities.

— Supervision of interest rate risk. More focus must be placed on interest rate risk, as a consequence of the significant duration gaps between assets and liabilities at banks.

Box 2

DIFFERENCES BETWEEN THE REGULATORY AND SUPERVISORY FRAMEWORKS IN THE UNITED STATES AND THE EUROPEAN UNION AND THEIR ROLE IN THE CRISIS

One of the key factors in the failure of the US banks was that they were not subject to the global standards set by the Basel Committee (BCBS) because they were not internationally active. In 2019, the deregulation introduced under the Trump presidency – the tailoring rule (FRB, 2019) – resulted in an approach whereby only the largest banks (with assets of $700 billion or more) or banks with significant cross-jurisdictional activity ($75 billion or more) were subject to all the requirements established in the Basel framework (for example, liquidity standards or stress test). This meant that of the thousands of banks operating in the United States, approximately only ten (including the eight global systemically important banks (G-SIBs) with a US parent) were required to meet all those standards. Moreover, only around 20 more banks (those with total assets of $100 billion or more) were required to comply with standards that are similar (albeit less stringent in several aspects) to those set by the BCBS. All other banks, including those affected by the crisis described here, operated under a less stringent regulatory and supervisory framework.

These criteria were based on the lower systemicity of these other banks and on the endeavour to simplify the requirements for smaller banks. However, as the Federal Reserve admitted in its review of the events (FRB, 2023a), the reduction in standards and the growing complexity of this approach impeded their effective supervision.[1] The framework applicable and the corresponding easing of supervision prevented a correct assessment of the magnitude of the vulnerabilities identified and the adoption of measures to address them. In addition, the events described cast doubt over the consideration of these banks as non-systemically important, as although they were not among the largest banks, they were larger than most banks in other jurisdictions and they had the capacity to trigger national and cross-border contagion. This was patent in the proposal to implement the final Basel III agreement, in which the scope of the Basel III standards is widened, published for consultation by the Federal Reserve (FRB, 2023b).

The US approach is contrary to that followed in the euro area, where the regulations apply to all banks irrespective of size. This means that smaller banks are also subject to all global requirements, including capital and liquidity standards. This homogeneity in the standards required means that small banks in the euro area are better prepared for possible periods of stress than small banks in the United States.

1 This prompted the Federal Reserve, in its proposal to implement the Basel framework, to review the tailoring rule, to make more banks subject to the requirements agreed worldwide.

— A flexible range of supervisory measures tailored to the severity of each case (enforcement) must be available, together with a precise and clear definition of the escalation processes in place, to enable faster and more flexible supervision and make available sufficient and appropriate supervisory measures to supplement the minimum regulatory standards, according to the severity or duration of the events of non-compliance or the severity of the deviations from supervisory expectations.

— The need to combine good and sound evidence with rapid supervisory action as soon as vulnerabilities appear and are detected, even if this entails a certain level of legal risk being assumed by the supervisor. Legal risk should be assessed considering not only the supervisor's risk tolerance framework, but also the severity of the supervisory findings and the possible repercussions of failure to take early action.

— Coordination between the different supervisory bodies must be improved.

Credit Suisse, owing to its size and complexity, was classified as a G-SIB and, as such, entailed greater supervisory complexity than medium-sized banks such as the US ones that were affected by the crisis. The very nature and complexity of the business of a G-SIB means that the supervisory challenges are greater. In consequence, an in-depth global analysis of their supervisory needs and of the supervisory resources and tools available may therefore be appropriate. In this respect, in March 2023 the SFC announced the launch of an overall review of the too-big-to-fail framework, together with the creation of an independent expert group to analyse this issue (Expert Group on Banking Stability, 2023). The group presented as a recommendation the need to provide FINMA with the necessary tools to ensure correct liquidity management (ensuring that sufficient collateral is deposited with the SNB to guarantee access to liquidity) and the capacity to intervene on a preventive basis before a bank reaches the point of non-viability.

4 The role of regulation

From a regulatory standpoint, the work of the BCBS is key. In March 2023 it announced its intention to take stock and share information on these banking crises so as to learn the necessary lessons (BCBS, 2023a). This resulted in the publication of a report on the conclusions drawn, and in continued analysis of how certain areas of the Basel framework (such as those addressing liquidity and interest rate risks) functioned during these episodes (BCBS, 2023b). The Basel Committee highlighted that the implementation of the globally agreed framework had protected the banking system from a more severe crisis. This is consistent with the design of the regulations, which aim to reduce the likelihood and consequences of such crises rather than to prevent bank failures. The BCBS has also emphasised the importance of continuing to prioritise the coherent, complete and swift implementation of the Basel III standards to safeguard global financial stability (Hernández de Cos, 2023).

Despite this generally positive assessment, reflections on certain global prudential standards may be appropriate. As per the prudential authorities, including those involved in these events (FRB, 2023a; FDIC, 2021; Swiss Federal Department of Finance, 2023), the following areas deserve greater global analysis:

— The scope of the regulatory framework and the application of proportionality. The US banks involved in the episodes described were not subject to some of the internationally agreed requirements (see Box 2). In consequence, the events observed could respond more to how the global prudential standards were implemented than to how they have worked.[3]

3 In the case of SVB, for example, the capital framework applicable allowed a prudential filter to be applied to losses on portfolios of assets held at fair value (thus avoiding the impact of unrealised losses on prudential capital). Such prudential filters were eliminated from the Basel framework following the 2008 financial crisis. The US authorities are considering eliminating them from their prudential framework.

The debate stems from the fact that the Basel framework applies to internationally active banks, but this concept is not defined, which means that national authorities have discretion when it comes to establishing the scope of application of the standards. Moreover, each jurisdiction may decide on the requirements to be set for all other banks, which in cases such as the United States are the majority (the European approach, whereby the Basel III framework applies to the entire banking sector, may also be adopted).

The events observed in the United States led to reflections on what authorities should take into account when determining the scope of application of the Basel III standards. SVB has shown that the failure of non-internationally active banks can have a systemic impact, both within their own jurisdiction and globally. Accordingly, it may be appropriate to consider assessing a bank's potential systemic impact, rather than its international activity, when deciding whether or not to apply international standards (which are designed to level the playing field and preserve global financial stability).

The Basel framework is based on the general principle that banks should be subject to supervision that matches their risk profile and systemic importance. Thus, if jurisdictions decide to create a proportional framework for non-internationally active banks, it is to reflect jurisdictions' circumstances and supervisory capacity and the nature of the banks' business models. This proportionality could result in simpler approaches, but it should not dilute the robustness of the standards. This means that any simpler proportionate approaches would be more conservative to compensate for their lower risk sensitivity (BCBS, 2022a). The banking crises of 2023 have shown that lower standards and a more complex framework (as a result of adjustments to standards and the creation of diverse requirements) can give rise to a less effective system.

— Liquidity standards. Liquidity distress episodes were present in all the cases described in Section 1. In consequence, the liquidity framework should be assessed to determine, in view of the latest events and the analytical evidence extracted, whether certain regulatory adjustments are needed. In this respect, both the design and the calibration of standards should continue to be analysed.

Considering first the design aspect, the case of Credit Suisse makes imperative a reflection on the usability of high-quality liquid assets (HQLAs). The Swiss bank used these assets, at a legal entity level, to cover its daily operational and intraday liquidity needs (which, in a crisis, were higher than estimated). This has prompted debate about whether the liquidity coverage ratio (LCR) should cover more risks, apart from the outflows in a 30-day stress scenario. Moreover, Credit Suisse's use of the liquidity buffer was also limited by the supervisory and market scrutiny over the bank, as the obligation to report any breach of liquidity requirements made it less willing to use this buffer (SNB, 2023b).

The calibration of these standards, especially the LCR, is another of the issues analysed. The speed and scale of the deposit outflows observed in these cases – facilitated, for example, by digitalisation and the rapid flow of information and contagion facilitated by internet and social media – call into question the definition of some of the parameters of the ratio. Most notably, the outflow rates defined by the LCR for assets such as deposits (especially those not covered by deposit guarantee schemes) or the period used to define the standard (30 days). Regarding these outflow rates, in view of the large-scale deposit withdrawals observed at the US banks, some analysts began to use alternative LCR calculations, applying higher outflow rates than those set for retail deposits. It should be recalled that the US banks in question were not subject to the liquidity requirements defined in the Basel framework (see Box 2).

A further issue that has been submitted to fresh debate and more in-depth analysis is the definition of HQLAs. The current prudential framework does not require that eligible assets be marked-to-market for accounting purposes in order to be classified as HQLAs. But it does require that they be measured at an amount no greater than their current market value to be eligible for inclusion as HQLAs in the liquidity ratios (meaning that changes in their market value will impact the regulatory ratio, but not the bank's financial statement). The direct effect of a change in this respect would be that unrealised losses would have a direct impact on capital. However, this would lead to greater volatility of prudential capital, which would not necessarily reflect the ultimate effect expected (to the extent that these assets will be held to maturity). Other channels could be considered, such as liquidity stress tests (and the interaction between liquidity and solvency) that could address situations in which unrealised losses become unmanageable, so as to ensure agents' confidence in banks' solvency (as in the case of SVB).

Other potential issues for analysis are: (i) the effectiveness of the net stable funding ratio (NSFR) as an indicator of banks' structural liquidity mismatch, and (ii) the possibility of developing additional Pillar 2 metrics (for example, on the capacity to meet liquidity positions in shorter time periods) and of demanding more frequent reporting to supervisors.

In any event, aside from assessing the workings of the liquidity framework in relation to recent events, it is important to bear in mind that liquidity buffers cannot prevent all liquidity runs. Lastly, a reflection may also be called for on the nature of standards such as the LCR which, as observed in the stress situations generated by the pandemic, could ultimately exacerbate downward pressures in times of turmoil when banks are endeavouring to maintain levels over 100% (BCBS, 2022b). Analyses conducted by the BCBS have shown that banks are reluctant to use the liquidity provided by these standards, which in practice means that they may function as minimum requirements rather than as liquidity buffers (BCBS, 2021).

Box 3

CREDIT SUISSE'S AT1 CONTRACTS AND THE INTERNATIONAL STANDARDS

When the Swiss authorities declared that Credit Suisse had reached the point of non-viability, all its AT1 instruments were written down in full. This was because the AT1 contractual clauses envisaged this option, should the bank reach the point of non-viability and become unable to continue to operate without public support (which it received, in effect, from the Swiss authorities) (see Box 1 for more details). The relevant clause also allowed all the AT1 instruments to be written down with no need to respect the hierarchy of claims in liquidation (i.e. without the bank's shareholders first losing all their investment). Also noteworthy is that the Swiss authorities approved an emergency ordinance authorising FINMA to instruct Credit Suisse to write down its AT1 instruments.

The contractual clauses of the AT1 instruments issued by Credit Suisse, the prudential treatment under the Basel framework and the response of some authorities are described below.

Write-down of Credit Suisse's AT1 instruments

The design of Credit Suisse's AT1 instruments provided for their full write-down or conversion with no need for higher quality capital (CET1) to be first exhausted. On account of their risk profile and large volume, the instruments issued by Credit Suisse were held by institutional investors.

The AT1 instruments concerned offered high returns (in some cases, up to 7.5% or even 9.75%). This rate of return also took into account the clauses that permitted write-down in the event of non-viability. The investors were aware of these clauses.[1]

The total write-down amounted to CHF 16 billion and entailed an increase in the same amount of the resultant bank's CET1. Credit Suisse's shareholders received one share in the new bank for every 22.48 shares held (a conversion ratio that recognised capital of just CHF 3 billion at Credit Suisse, compared with its capital of CHF 54 billion at the time of the merger, resulting in the generation of badwill amounting to CHF 51 billion for the consolidated bank). In consequence, the shareholders did not lose all their investment and received partial consideration from the write-down of the AT1 instruments.

Basel treatment

The Basel framework includes a specific criterion on the declaration of the point of non-viability, to make it possible to recognise instruments such as AT1 for the purposes of meeting minimum prudential solvency requirements. This criterion was introduced in 2011, by virtue of a resolution adopted by the Group of Central Bank Governors and Heads of Supervision, and affected both AT1 and Tier 2 instruments (although this box concentrates only on the former).

AT1 instruments issued by internationally active banks (or their subsidiaries) must envisage the possibility of write-down or conversion into CET1 in the event of non-viability. The point of non-viability is deemed to be reached if the relevant authority determines that (i) without a write-off, the bank would become non-viable, or (ii) a public sector injection of capital, or equivalent support, be granted, without which the bank would become non-viable.

In connection with the hierarchy of claims, the Basel framework establishes which instruments should be the first to assume losses. However, whether this hierarchy is prescriptive in the case of public support being received may need to be analysed. Moreover, it is important to note that the Basel framework is not prescriptive in the specific design of AT1 instruments, so their characteristics may

1 For instance, the first issue, which dates back to 2013, included the necessary references for the write-down made when the Credit Suisse Group (CSG) was acquired by UBS: "Viability Event. As used in these conditions, a "Viability Event" means that either: (A) the Regulator has notified CSG that it has determined that a write-down of the Notes, together with the conversion or write down/off of holders' claims in respect of any and all other Progressive Component Capital Instruments, Buffer Capital Instruments, Tier 1 Instruments and Tier 2 Instruments that, pursuant to their terms or by operation of law, are capable of being converted into equity or written down/off at that time is, because customary measures to improve CSG's capital adequacy are at the time inadequate or unfeasible, an essential requirement to prevent CSG from becoming insolvent, bankrupt or unable to pay a material part of its debts as they fall due, or from ceasing to carry on its business; or (B) customary measures to improve CSG's capital adequacy being at the time inadequate or unfeasible, CSG has received an irrevocable commitment of extraordinary support from the Public Sector (beyond customary transactions and arrangements in the ordinary course) that has, or imminently will have, the effect of improving CSG's capital adequacy and without which, in the determination of the Regulator, CSG would have become insolvent, bankrupt, unable to pay a material part of its debts as they fall due or unable to carry on its business".

vary across jurisdictions (even while respecting consistency with the Basel framework).

Response of authorities globally

The case of Credit Suisse drove up uncertainty on the AT1 markets. Some interpretations suggest that this increased uncertainty arose from the heterogeneity of AT1 instruments across jurisdictions and the endeavours made by investors to understand the implications of their investments. It should be noted, in this respect, that the Basel framework requires that instruments eligible as AT1 comply with market transparency rules and that their contractual clauses reflect the options available in each case.

In response to these developments, some authorities issued statements on the hierarchy of claims between AT1 and CET1 instruments. Specifically, the Bank of England, the Office of the Superintendent of Financial Institutions of Canada and the European authorities (the European Central Bank, the European Banking Authority and the Single Resolution Board) clarified that in situations similar to that of Credit Suisse, in their jurisdictions the order of priority would be that applicable in the event of insolvency.

— Treatment of interest rate risk in the banking book (IRRBB). This is one of the areas that has been subject to most analysis in the case of the US banks described above. The key question – beyond other more technical considerations – is whether the current treatment based on a Pillar 2 (supervisory) and Pillar 3 (market disclosure) approach addresses interest rate risk adequately.

  On the one hand, it can be argued that the correct implementation of the standard agreed in the wake of the global financial crisis (through Pillars 2 and 3) would be sufficient to mitigate this risk, including in the cases observed where the US banks were not subject to the full range of requirements. From this standpoint, this approach captures future impacts of interest rate developments, including risks from unrealised losses due to rate changes. In addition, the public disclosure requirements exert the necessary market discipline to ensure that banks manage their interest rate risk prudently.

  On the other hand, it can also be argued that the development of a Pillar 1 framework would ensure consistent global treatment of interest rate risk. These arguments are based on the idea that the information obtained on interest rate risk and on how banks identify, measure and back-test this risk would not be sufficient to ensure uniform global treatment or to address these risks.

— Treatment of portfolios held to maturity. As is explained in Section 2, unrealised losses resulting from interest rate hikes were determinant in the problems experienced.

  This debate was already ongoing before the crises unfolded. Given that, in times of stress, banks may need to sell such securities, if they were marked-to-market banks could be certain of having sufficient capital to absorb the associated losses. However, such a drastic measure would lead to an increase in the volatility and

procyclicality of prudential capital. In addition, the regulatory framework already has other tools (such as the liquidity and IRRBB standards and the Pillar 2 supervisory actions) to assess and address the problems associated with these unrealised losses irrespective of their accounting classification.

— The role of Additional Tier 1 (AT1) capital. The case of Credit Suisse, where AT1 instruments (contingent convertible bonds (CoCos)) were written down at a loss before CET1 instruments, triggered a debate on the hierarchy of AT1 (see Box 3). In this case, as it reached the point of non-viability, Credit Suisse continued to pay coupons and to record losses before the threshold of automatic conversion into shares was reached (7% of CET1 in Switzerland, compared with 5.125% of CET1 under the Basel framework). This has cast fresh doubts over the capacity of these instruments to absorb losses on a going concern basis. In the past, the BCBS has analysed how these instruments have functioned and has shown that investors would react negatively to the suspension of coupon payments, which they would expect only in exceptional circumstances, as it would send a message to the market on the non-viability of the issuing bank (BCBS, 2022b). Coelho, Taneja and Vrbaski (2023) argue that the case of Credit Suisse shows that transfer of value from investors in AT1 instruments to shareholders is possible, and that it is difficult for these instruments to be written down on a going concern basis, all of which poses the need to reconsider their design and improve their market transparency.

5 Conclusions

The banking crises that occurred between March and May 2023 were the sector's main test since the global financial crisis. Despite the differences of each case, a series of conclusions can be drawn for the authorities:

— Banks' risk management, their ability to develop their business model in a sustainable manner and their governance are key to prevent these types of episodes.

— The importance of supervision, to ensure that banks conduct their business in a secure manner, and of supervisors' ability to identify problematic practices and weaknesses and take and enforce prompt corrective action.

— The need to fully and consistently implement the globally agreed regulatory standards, which have manifestly already made the banking sector more resilient. In parallel, it is advisable to continue analysing the functioning of specific elements of the regulatory framework identified in these cases.

This has led international bodies such as the BCBS or the IMF to focus on the need to strengthen the effectiveness of supervision to ensure that problems of this kind can be identified and corrected on a timely basis. To this end, projects are currently under way globally

(and at a national scale, as in the United States and Switzerland). Although these cases have once again brought the regulatory framework to the fore, it will be necessary to continue analysing and assessing its functioning, on the basis of robust empirical evidence, before drawing conclusions on the need to adjust the framework.

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MACROPRUDENTIAL TOOLS FOR OPEN-ENDED INVESTMENT FUNDS

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Abstract

Over financial stability concerns, supervisors and regulators have turned their attention to non-bank financial institutions and activities because of the importance they have taken on in recent years. Discussions have started globally over whether macroprudential policy should be conducted in the investment fund sector. The most important risks that these institutions may pose to financial stability mainly arise from the liquidity mismatch between their portfolio assets and their redemption terms, or because they are highly leveraged. There are many different macroprudential tools available in this area which vary greatly across jurisdictions. Important international initiatives are currently under way, driven by the International Organization of Securities Commissions and the Financial Stability Board, aimed at promoting and standardising the available toolkit and how it is used. This article describes the existing tools in Spain, detailing their aim and possible actions by the regulator. It also compares the situation in Spain with other European jurisdictions, revealing that data and risk management tools are widely available in Spain.

Keywords: investment funds, liquidity management tools, financial stability, macroprudential policy.

1 Introduction

Macroprudential policy, which aims to preserve the stability of the financial system as a whole, was first developed for the banking sector. Recent years have seen its scope extended to include other sectors of the financial system, with attention being paid to the potential risks to financial stability from the non-banking sector. This shift was prompted by the last global financial crisis, which revealed, among other aspects, how under certain circumstances other actors and activities outside the banking sphere can cause systemic risk. In addition to the now traditional macroprudential policy dimensions, such as the size of participants or interconnections, the latest developments also consider other variables, e.g. the lack of transparency, matters related to asymmetric information and moral hazard.[1]

Globally, the non-bank financial intermediation (NBFI) sector has grown significantly in recent years, rising from €72 trillion in 2008 to €212 trillion at end-2021.[2] The NBFI sector currently accounts for approximately half the global financial system, and the banking sector for the other half. Its share of the financial system is smaller in Spain (25.4%).

1 Comisión Nacional del Mercado de Valores (CNMV, 2019).

2 According to the Financial Stability Board (FSB, 2022a), which comprises the 19 euro area countries plus a further 21 jurisdictions. NBFI is understood in its broad sense, including all financial institutions except central banks, banks and public financial institutions.

By definition, NBFI covers a wide range of market participants with very different levels of risk and regulation. It comprises spheres such as investment funds, private funding and venture capital, insurance and commodity funds, among others. Open-ended investment funds are one of the most regulated NBFI participants, insofar as they are subject to multiple rules from a standards of conduct and investor protection standpoint. The investment fund sector has boomed in recent years. Further, recent episodes, such as the high redemptions[3] on some funds at the onset of the COVID-19 crisis and the United Kingdom's liability-driven investment crisis in December 2022, have exposed investment funds' potential to transmit risks to the financial system. The main international – the Financial Stability Board (FSB) and the International Organization of Securities Commissions (IOSCO) – and European – the European Systemic Risk Board and the European Securities and Markets Authority (ESMA) – fora and committees have analysed the potential sources of risks to financial stability stemming from investment fund operations and the most appropriate tools to mitigate these risks.

The starting point for all macroprudential policy design should be the availability of adequate, high-quality data. According to FSB (2022b), which presents the Spanish system for reporting data to the regulator as an example of good practice, Spain excels on this front. The volume of data available to the CNMV has for years enabled it to perform, among other tasks, different recurring analyses of these undertakings' liquidity risk and leverage risk, which are the most concerning from a financial stability perspective. The CNMV, through its Supervision Department, closely monitors those funds that invest in less liquid assets. The CNMV also publishes an annual report on NBFI in Spain, which describes the latest trends of the institutions pursuing such activities and assesses the sector's most important risks. In the case of open-ended investment funds,[4] liquidity risk, credit risk, maturity transformation risk and leverage risk are all analysed.

The main objective of macroprudential policy in the investment fund sector is to boost the funds' resilience to episodes of stress and make them less likely to transmit risks to the rest of the financial system. Microprudential supervision focuses on solvency and the risks taken by individual institutions (investment funds and/or management companies). Meanwhile, macroprudential policy complements it and should be designed from a broad and system-wide perspective, considering the effects of the collective activity of investment funds as a whole or of certain groups of them.

Ex ante measures, aimed at mitigating vulnerabilities before a stress event emerges, are the most aligned with macroprudential policy's main objective. However, ex post interventions, geared towards limiting the severity, duration and impact of the crisis once triggered, should also be considered.

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3 See the CNMV's publication series Non-banking financial intermediation monitor for a detailed analysis of this sector's size and associated risks.

4 Except for equity funds and hedge funds, which do not fall within the FSB's definition of funds pursuing credit intermediation activities. In any event, all open-ended investment funds are subject to frequent risk analyses by the CNMV's Supervision Department. The reports containing the conclusions from these analyses are not publicly available.

The investment fund regulatory framework is designed with the main aim of protecting investors. Many of the rules in the European regulations, in addition to others specific to Spanish legislation, seek this goal. Some examples of these rules include: reporting requirements, rules on eligible assets and risk diversification, policies to manage liquidity risk and conflicts of interest, and asset custody and oversight requirements for custodians. They are largely macroprudential rules that limit the risks investment funds can take on individually. When applied across the board to the investment fund sector, they ultimately have a macroprudential impact.

Developing a sound macroprudential policy requires that a comprehensive and global view of systemic risk be incorporated into the regulatory framework. This can be achieved both by using the existing microprudential tools and measures for macroprudential purposes and by designing new ones. Further, it does not seem appropriate that their implementation should depend solely on management companies. Supervisory authorities are better placed to assess the risks of market participants' collective action and the interconnections between the different financial system institutions. Authorities therefore play a pivotal role in the implementation of macroprudential policy, both through ex ante monitoring of risks and through intervention when deemed necessary.

This article discusses, from a Spanish perspective, the potential risks that investment fund activity can transmit to the financial system and the existing tools to tackle these risks, placing particular emphasis on the availability and use of liquidity management tools. As mentioned above, these tools were in most cases established to protect investors. However, when applied to management companies and open-ended investment funds as a whole, the tools act on the potential risks that they can transmit to the overall financial system. Section 2 sets out these potential risks. Section 3 takes an in-depth look at the tools available in Spain that may be used for macroprudential purposes. To do so, we describe how they work and the risk they are intended to mitigate, distinguishing between those available to fund managers themselves and those which the CNMV can activate directly. In the investment fund sphere, more tools are available to both management companies and the CNMV than in other reference European jurisdictions. In recent years, Spanish legislation has introduced new tools the use of which has been encouraged, both at times of market turmoil and in calmer periods. Section 4 describes the most important European and international initiatives, focused mostly on liquidity management tools and the availability of tools in other European jurisdictions. Lastly, Section 5 presents the conclusions and the pending challenges.

2 Potential risks of open-ended investment fund activity

Investment funds are just a portfolio of financial/non-financial assets belonging to a group of investors. When investing in an investment fund, investors buy a unit in this portfolio that is proportional to their share of the fund's net asset value (NAV). The value of these units will be affected by fluctuations in the market price of the securities in the portfolio. Market risk is thus

absorbed by the fund and, ultimately, by its unit-holders, as the units' value fluctuates depending on the market closing prices of each asset in the portfolio. Beyond market risk, investment fund activity and its impact on the financial system are mainly subject to two types of risk: liquidity risk and leverage risk. Both can exacerbate market movements and may affect financial stability.

2.1 Liquidity mismatch between portfolio assets and redemption frequency

Liquidity mismatch risk is defined as the difference between the time that elapses between investors requesting a redemption and receiving the payment for their units and the time that the fund manager needs to realise the investments for the orderly payment of such redemptions. This mismatch will be greater in those funds that offer their investors daily redemptions while investing a considerable portion of their portfolio in assets that take several days to be sold on the market at a price that does not deviate substantially from the price incorporated into the units' valuation.

An investment fund's asset valuation procedures are particularly important for ensuring that the price at which unit-holders buy and sell their units reliably reflects the fair value of their share of the fund's portfolio. If the valuation does not adjust appropriately to the market situation, as may be the case with less liquid assets, drops in prices may confer an advantage on redeeming unit-holders, potentially encouraging higher redemptions than would occur were the unit-holder to invest directly in the assets. In other words, in situations of falling asset prices, a poor asset valuation policy (closely linked to liquidity risk management) not only has investor protection implications, but also financial stability ones, insofar as it may encourage redemptions and exacerbate such price drops.

In market liquidity crises, exacerbated redemption dynamics may arise at funds with liquidity mismatches. Such dynamics are triggered by the first-mover advantage phenomenon, i.e. by the advantage those investors redeeming first gain by not assuming the cost associated with the illiquidity of the assets in the portfolio, as the NAV when they redeem does not include such cost. The investment fund and the remaining unit-holders will bear that cost when the assets are sold.

This risk is mitigated by levying the cost of such illiquidity on redeeming investors (see Section 3.1). Portfolio assets are typically valued at the mid-price. However, when the fund sells some assets it will get the bid price from the dealer. The bid/ask spread reflects the transaction cost and incorporates the illiquidity cost. When liquidity decreases, this spread widens. This warrants the creation of mechanisms aimed at passing on this transaction cost (i.e. the cost that the fund will have to bear when unwinding the investments required to meet the redemptions) to all redeeming investors.

First-mover advantage may also induce fund managers to meet redemption requests by selling the most liquid assets in the portfolio (rather than proportionally selling assets with

differing degrees of liquidity). This can lead to those less liquid assets ultimately accounting for a greater share of the fund's remaining portfolio and, therefore, to the investors remaining in the fund being subject to higher liquidity risk.

In both cases, if liquidity risk is not managed properly investors will have an incentive to redeem early when market liquidity is tight, which may exacerbate the liquidity problems and further heighten the risk on the market.

2.2 Leverage risk

Leverage is a strategy that enables institutions to increase their exposure above their capital. If used excessively, it can put both the over-leveraged institution itself and the rest of the system at risk. The risk of excessive leverage, which is also present in the banking sphere, has been at the root of some crisis periods in the past. In general, there are two ways to increase leverage: via debt (financial leverage) and derivatives (synthetic leverage).

Excessive use of leverage amplifies existing risks such as liquidity and market risk. Using derivatives to obtain synthetic leverage can give rise to sizeable margin requirements when asset prices fall significantly and prompt forced sales to meet those margins. The process may ultimately trigger negative price spirals and increase the losses stemming from market risk. Further, the use of derivatives increases counterparty risk and contagion risk (through interconnections with other market participants).

Leverage is regulated in the legislation on investment funds from an investor protection standpoint, insofar as it makes the investment product more complex and magnifies exposure, particularly for retail investors who may not fully understand the effects and the actual risk taken on. In any event, its financial stability implications should also be analysed in order to assess the suitability of the current tools, which are detailed in the following section.

3 Macroprudential tools for the investment fund sector in Spain

3.1 Availability in the regulations and possibility of activation

There are quite a few tools and measures for investment funds in Spain that could potentially be used for macroprudential purposes. Table 1 lists the existing measures by the risk they aim to mitigate, their intermediate objective, their possible activation by the management company or the CNMV and even whether CNMV authorisation is required to activate some of them. Most of them relate to liquidity mismatches. These tools, as we will see in the following section, are being discussed and developed at international level.

As stated above, most of these measures were adopted to protect investors, i.e. while they have macroprudential applications, they were initially conceived for microeconomic purposes.

Table 1

Tools available under Spanish legislation for collective investment undertakings

Tool	Intermediate objective	Available under Spanish legislation	CNMV authorisation required	Possibility of activation by the CNMV	Observations
Redemption fee	Liquidity mismatches and maturity	Yes	No	No	Activation entitles unit-holders to depart
Redemption gate	Liquidity mismatches and maturity	Yes	No	No	For alternative and real estate investment funds
Redemption in kind	Liquidity mismatches and maturity	Yes	Yes	No	Cannot be used under normal circumstances
Side pockets	Liquidity mismatches and maturity	Yes	Yes	No	Cannot be used under normal circumstances. Not available for real estate funds
Redemption suspension	Liquidity mismatches and maturity	Yes	Yes	Yes	Cannot be used under normal circumstances
					Real estate funds can suspend redemptions for up to two years. No limits for other funds
Valuation at bid/ask price	Liquidity mismatches and maturity	Yes (*)		No	Included in Technical Guide 1/2022
Swing pricing	Liquidity mismatches and maturity	Yes (*)	No	No	Included in Technical Guide 1/2022
Partial redemptions	Liquidity mismatches and maturity	Yes	No	No	
Asset concentration limits	Excessive concentration of risks in certain assets or sectors	Yes			Regulatory requirement
Limits on the use of derivatives	Excessive leverage	Yes			Regulatory requirement
Limits on leverage	Excessive leverage	Yes		Partial	Regulatory requirement for UCITS. The CNMV can establish specific limits for alternative funds
Liquidity ratio	Liquidity mismatches and maturity	Yes			Regulatory requirement
Liquidity management policies	Liquidity mismatches and maturity	Yes			Regulatory requirement
Strengthening of liquidity	Liquidity mismatches and maturity	Yes		Yes	On financial stability grounds, the CNMV may temporarily request an institution or set of institutions to increase its percentage of investment in highly liquid assets (this tool can be applied to open-ended and closed-ended CIUs and venture capital firms)
Notice periods	Liquidity mismatches and maturity	Yes	Yes	Yes	Possibility of establishing notice periods for redemptions not subject to the notice, minimum amount and prior amendment of the management rules requirements that are ordinarily applicable. These periods may be established by the management company or by the CNMV

SOURCE: CNMV.
(*) Not expressly envisaged in the legislation, but referred to in Technical Guide 1/2022 on the management and control of the liquidity of CISs (see the following section).

Logically, the set of tools is not static; the tools have gradually been adapted to meet the new needs identified. Specifically, in recent years two new tools that the CNMV can activate have been added: the possibility of temporarily requiring an institution or a set of institutions to meet ratios for investment in highly liquid assets;[5] and the possibility of establishing notice periods even if they are not stipulated in the fund's management rules, which was incorporated at the height of the pandemic crisis.[6]

It is important to highlight that the table includes two major groups of tools: the first is, in reality, a set of structural measures laid down in the legislation, aimed at limiting the risks that open-ended investment funds can take on;[7] the second comprises those liquidity management tools available under Spain's regulatory framework. When managing investment fund assets, management companies are required to observe all legal provisions, including those limiting risks. They are also responsible for establishing and applying an appropriate liquidity risk management policy that shall include, among others, the use of liquidity management tools. The CNMV has a dual role: it supervises management companies' compliance with the risk limits established in the legislation and correct application of the liquidity management tools; and, in the name of financial stability, in exceptional circumstances it can activate, or urge management companies to implement, some of these tools. As we will see in the following section, at a given point in time the CNMV can activate a comparatively higher number of measures than may be activated in the rest of the reference European jurisdictions.

More data on funds' activity is also available to the regulator.[8] The CNMV receives highly detailed monthly information on the funds' portfolios, their valuation, the purchases and sales during the month, the liquidity held in the depositary's account or in other highly liquid assets, in addition to operations with derivatives. With regard to funds' liabilities, the regulator receives information on the number of units subscribed and redeemed each day, unit concentration and type of investors. This information enables the CNMV to fulfil its role of supervising compliance with the limits established in the legislation, including analysing the risk taken on by each fund individually – such as liquidity risk and leverage risk – and identifying those funds taking on greater risk. Management companies' internal liquidity management procedures are monitored closely and sometimes they may be urged to adopt certain liquidity management measures and tools. These supervisory actions fall within the CNMV's investor protection mandate. However, when conducted across the board on all investment funds, they ultimately have a macroprudential impact, by preventing ex ante the build-up of risks in the sector.

5 Royal Decree-Law 22/2018 of 14 December 2018, establishing macroprudential tools.

6 See Royal Decree-Law 11/2020 of 31 March 2020, adopting urgent complementary social and economic measures to address COVID-19.

7 There is a category of hedge funds with a more flexible set of rules that is not subject to these limits. It accounts for a very negligible share of the open-ended investment fund sector in Spain (around 1%).

8 See FSB (2022b). The model for reporting data to the Spanish regulator (the CNMV) is presented as an example of good practice, as it is one of the most comprehensive of those assessed.

The tools available for funds domiciled in Spain[9] (see Table 1) are briefly described below:

1 *Anti-dilution tools.* Their aim is to pass on to redeeming investors (in some cases also to subscribing investors) the transaction and illiquidity cost that the fund will bear upon the asset sale/purchase stemming from the redemptions/subscriptions. The aim of these measures is to mitigate the risk of liquidity mismatch. Three types of tools with this purpose can currently be applied in Spain:

   — *Subscription/redemption fee.* A fee applied to the amount redeemed/subscribed by the unit-holder. It is paid into the fund's account to offset the possible transaction cost that the fund will bear on the sale (or purchase) of assets necessary to meet the redemptions (or subscriptions). This fee is a fixed percentage, capped at maximum of 5% of the redeemed amount).

   — *Swing pricing.* This refers to a process for adjusting a fund's NAV upwards (for subscriptions) and downwards (for redemptions) by applying a swing factor that reflects the effect of the transaction costs the fund will bear as a result of the asset purchases and sales stemming from these subscriptions and redemptions. This mechanism is normally activated when net subscriptions or redemptions exceed a certain threshold. Management companies shall establish in an internal procedure the criteria, swing factors and thresholds to be applied to each fund, following the recommendations in CNMV Technical Guide 1/2022 on the management and control of the liquidity of CISs.

   — *Valuation at bid or ask prices.* This consists of incorporating into the management company's internal procedures the possibility of modifying the valuation criteria, switching from using the mid-price to using the bid or ask price, depending on the direction of net fund flows (bid price in the case of net redemptions and ask price in that of net subscriptions). As with swing pricing, the mechanism can be tied to a threshold of daily net redemptions or subscriptions, taking into account the characteristics of the fund and the criteria established in CNMV Technical Guide 1/2022.

2 *Tools limiting or restricting redemption.* They seek to mitigate the risk of liquidity mismatch.

   — *Redemption gates.* These are limits on the maximum redemptions permitted on each redemption date. For example, if a gate of 5% of NAV is set, redemptions requested below that threshold are met by the fund normally. Above that threshold, orders will be met pro rata up to 5% of the NAV, and the excess shall

9 Their use is governed by Collective Investment Institutions Law 35/2003 of 4 November 2003, its implementing regulations (Royal Decree 1082/2012) and CNMV Technical Guide 1/2022 on the management and control of the liquidity of CISs. Other funds marketed, but not domiciled, in Spain may apply the tools available in the home jurisdiction.

be left pending for the following redemption date. In Spain, gates can currently be imposed on real estate funds and hedge funds.

— *In-kind redemption.* This consists of meeting the redemption requests by allocating the securities in the fund's portfolio, rather than by cash payment. The fund thus avoids having to sell the securities in the event they are illiquid.

— *Side pockets.* These are vehicles created to segregate illiquid assets from an investment fund. The unit-holders of this vehicle will be the same as the original fund, and they will be assigned units in it equivalent to their share in the original fund at the point of segregation. The purpose of this mechanism is to segregate the illiquid assets so as to realise them in the future, when market conditions permit. Meanwhile, the original fund will hold the remaining liquid assets and continue with its normal activity, accepting subscriptions and redemptions as normal.

— *Redemption suspensions.* Management companies may, in exceptional circumstances, temporarily suspend fund subscriptions and redemptions when it is impossible to determine the fair value of the units or on other force majeure grounds, and always in the unit-holders' interest.

— *Partial redemption suspensions.* This mechanism has a very similar effect to the side pockets, but it can be more nimbly implemented. It can be used when market trading is suspended for some of the portfolio assets. In these cases, units will be subscribed and redeemed in cash in proportion to the percentage of the unit price that does not correspond to the suspended securities, with the difference being made up when trading resumes, having regard to the market price of the first day it takes place.

3 *Tools providing additional temporary flexibility for meeting redemptions.* These tools also mitigate the risk of liquidity mismatch.

— *Notice periods.* Unit-holders are required to give notice of their intention to redeem a specified time in advance of the redemption date. This gives the management company more time to disinvest in an orderly manner the assets needed to cover the redemption payment. Spanish legislation envisages a general notice period of up to ten days from the redemption date for redemptions from a single unit-holder exceeding €300,000. As mentioned above, during the COVID-19 crisis the Collective Investment Institutions Law was amended to provide for a more flexible notice regime in exceptional situations, allowing the management company to set a notice period of any length for any redemption amount. It also empowers the CNMV to direct management companies to require such notice.

— *Longer settlement period for redemptions.* Redemption orders are usually settled within a maximum of three working days from the reference date. This period

may be extended to up to five days in exceptional situations. In any event, the unit redemption price to be paid to the unit-holder will be that corresponding to the redemption request date, unlike when there is a notice period, where redemptions are settled at the unit redemption price on the date on which the notice period ends.

4 *Structural measures included in the collective investment undertaking (CIU) legislation in Spain.* In terms of assets, 99% of all open-ended CIUs domiciled in Spain are harmonised (i.e. they are subject to the provisions of the Directive on undertakings for collective investments in transferable securities (UCITS))[10] or else they are "quasi-UCITS".[11] In practice this means that they must all comply[12] with the UCITS requirements in terms of liquidity, eligible assets, indebtedness and maximum synthetic leverage. These requirements limit the risk that investment funds may individually assume, helping to mitigate liquidity, leverage and contagion risks globally in the investment fund sector. The main requirements are as follows:

— *Liquidity requirements.* Financial investment funds must invest in assets admitted to trading on a regulated market or a multilateral trading facility. Investment in unlisted assets is capped at 10% of their total assets.

— *Liquidity management.* Management companies must have appropriate internal procedures in place to permanently monitor managed CIUs' level of liquidity risk. The following section describes the principles that this procedure must follow, as laid down in a recent CNMV guide (see Box 1).

— *Liquidity ratios.* Funds must at all times keep a sufficient level of highly liquid assets to meet redemption requests and other obligations, such as those arising from their derivatives activity. This ratio shall be at least 1% of the fund's net asset value. In order to protect investors or avoid systemic risk, the CNMV may also require certain management companies or investment funds to increase the liquid assets in their portfolio.

— *Risk diversification.* The UCITS Directive sets maximum investment ratios in securities issued by the same body.

— *Limits on indebtedness.* Investment funds may only resort to borrowing on a temporary basis, to meet transitory liquidity needs and for no more than 10% of their assets.

10 The UCITS legislation is a set of harmonised European rules on, inter alia, eligible assets, diversification requirements and different risk limits that CIUs authorised as UCITS must observe. These rules seek to afford a high level of protection to retail investors investing in these institutions.

11 Although this is not an official designation, this term refers to those funds which, under Article 72 of the Regulation implementing the Collective Investment Institutions Law, are afforded some additional flexibility compared with harmonised CIUs or UCITS.

12 Quasi-UCITS CIUs are exempt from a very small number of UCITS Directive requirements. However, this flexibility does not result in substantially different risks from those of harmonised CIUs.

Box 1

CNMV TECHNICAL GUIDE 1/2022 ON THE MANAGEMENT AND CONTROL OF THE LIQUIDITY OF COLLECTIVE INVESTMENT SCHEMES (CISS)

The legislation described in the previous section of the main text is complemented by the supervisory activity of the Spanish National Securities Market Commission (CNMV by its Spanish abbreviation) and the recommendations it has issued to institutions over the years. These supervisory criteria are included in Technical Guide 1/2022 on the management and control of the liquidity of collective investment schemes (CISs),[1] approved by the CNMV at end-January 2022. In addition to unifying supervisory criteria in recent years, this initiative also took into account the outcome of recent supervisory actions carried out across Europe (such as the Common Supervisory Action carried out by the European Securities and Markets Authority in 2020).

In particular, the technical guide lays down the content that CIS management companies should include to ensure that their CISs' liquidity risk is properly monitored and managed, with the aim of avoiding adverse effects on, and conflicts of interest among, investors. Specifically, the guide lists:

— The analyses to be conducted and limits to be borne in mind in the design stage for each CIS and the checks that should be performed prior to any investment.

— The recurring analyses and controls needed to ensure that the liquidity profiles of each CIS's assets and liabilities are properly aligned. The slicing approach, whereby liquid and less liquid assets are sold in the same proportion, shall be used to this end within a reasonable margin. Detailed guidelines are included on the methodologies to determine the financial instruments' liquidity ratios or levels and to estimate the time horizons for sales, the scenarios relating to redemptions and other payment obligations, and the stress tests. The final wording specifies that it shall be for the management company to define the proportion of liquid and less liquid assets in the event of redemptions in the CIS.

— The different tools that may be used for properly managing CIS liquidity. In this connection, CIS management companies should envisage in their procedures the circumstances under which the different tools set out in the legislation are applicable (notice periods, temporary borrowing, partial subscriptions and redemptions, side-pockets, etc.), ensuring that they are properly implemented. They should also envisage the use of anti-dilution mechanisms (including most notably portfolio valuation at bid/ask prices and swing pricing) to avoid conflicts of interest during particularly complex market situations between subscribing or redeeming unit-holders and those who remain. The factors that should be borne in mind when designing the anti-dilution mechanisms are also listed.

— The functions of the different areas of the management company, the involvement of the Board of Directors and additional analyses of the delegation of functions.

The proposal, published at end-November 2021, to amend the Alternative Investment Fund Managers and the Undertakings for Collective Investment in Transferable Securities Directives,[2] which for the first time incorporates at EU level elements similar to those contained in this Guide for Spain, is an example of the growing attention liquidity management is receiving in the EU.

1 Available at CNMV. Technical Guides.

2 Proposal for a Directive of the European Parliament and the Council amending Directives 2011/61/EU and 2009/65/EC as regards delegation arrangements, liquidity risk management, supervisory reporting, provision of depositary and custody services and loan origination by alternative investment funds.

— *Limits to derivatives trading.* The UCITS Directive caps the exposure relating to derivative instruments to 100% of the net value of the portfolio. Counterparty risk in over-the-counter (OTC) transactions is limited to 10% of assets. Quasi-UCITS funds may exceed the 100% exposure limit provided that the derivatives are

traded with the purpose of achieving a specific return objective guaranteed by a third party.

Non-harmonised CIUs (i.e. those not under the UCITS Directive) are subject to the EU's Alternative Investment Fund Managers Directive (AIFMD), which provides a more flexible framework in terms of the investments and maximum leverage permitted. In Spain, alternative investment funds (AIFs) include four categories of funds: quasi-UCITS (which, as mentioned, meet most of the UCITS requirements); hedge funds and CIUs investing in hedge funds;[13] real estate CIUs; and private equity funds.

Currently, alternative real estate CIUs and private equity funds in Spain are both closed-ended and do not present liquidity mismatch risks that may affect a large volume of unit-holders and generate effects in the financial system. Hedge funds are open-ended, although the applicable Spanish legislation allows them to use a wider range of tools to limit redemptions compared with UCITS, such as gates, longer notice periods, lower redemption frequencies and the establishment of lock-up periods during which no redemptions can be made.

In terms of leverage risk, Article 25 of the AIFMD requires national competent authorities to conduct quarterly analyses of alternative funds' leverage levels, in order to identify potential systemic risks arising from these transactions. ESMA must be notified of the outcome of these analyses at least annually, or more often if significant risks are identified. Likewise, the AIFMD empowers national authorities and ESMA to set leverage limits on individual funds or groups of alternative funds if it is detected that their leverage level may pose risks to the stability or integrity of the financial system.

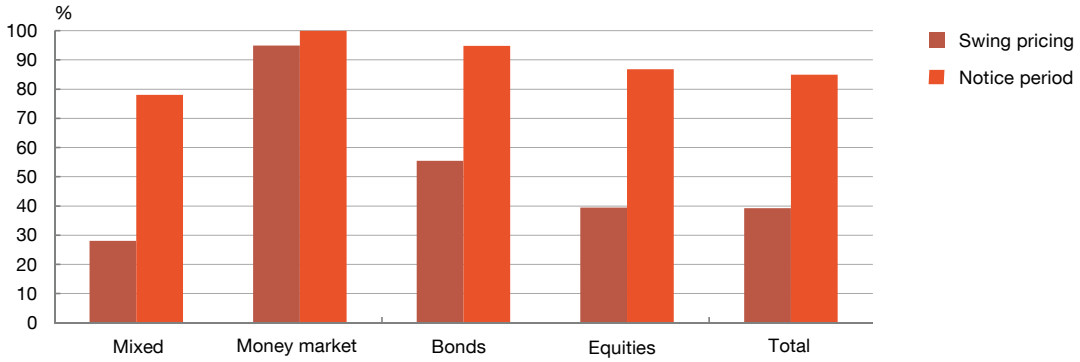
3.2 Implementation and use of tools in investment funds

On the available information, it is difficult to ascertain how much liquidity management tools are used in practice. A priori, the tools should be included in funds' prospectuses or management rules. However, management companies do not generally have to communicate when they are using a particular tool. Some tools, like valuation at bid prices or swing pricing schemes, have certain particularities. They are often activated when net redemptions exceed a certain threshold defined by the management companies. Management companies must also disclose swing pricing in their prospectuses or notify the CNMV, by means of a material event, the first time that this mechanism is set up (but not when it is effectively used).

The data suggest that the CNMV policy of promoting active use of liquidity management tools by CIUs has resulted in a significant number of investment funds (85% of the total in net asset terms) now establishing in their prospectuses the possibility of requiring advance notice of up

13 Alternative CIUs account for approximately 1% of all open-ended CIUs in Spain. The remaining 99% are UCITS and quasi-UCITS.

Chart 1
Availability of liquidity management tools for investment funds



SOURCE: CNMV.
NOTE: Percentage of NAV of each type of fund analysed.

to ten business days where redemptions exceed €300,000. Moreover, 39% of funds (in net asset terms) have established, whether in their prospectuses or by notifying a material event, the possibility of using a swing pricing mechanism. This mechanism is envisaged most often by money market and fixed-income funds. Thus, 95% of money market funds and 55% of fixed-income funds (in net asset terms) are equipped to deploy it (see Chart 1).

Information on how these tools were used in recent years has coincided with two extraordinary circumstances: the pandemic and the war between Russia and Ukraine. An analysis of this information yields the following trends:

With regard to the pandemic, significant redemptions were requested on Spanish investment funds at the onset of the pandemic, particularly the second half of March, accounting on aggregate for 2% of their assets. In subsequent months, with a somewhat irregular pattern, funds recovered part of these fund outflows, such that net aggregate redemptions between March and November were estimated at 1.7% of assets. The supervisory work conducted by the CNMV did not identify any cases where such redemptions were made with difficulties. In fact, no Spanish funds had to activate any extraordinary liquidity measures, such as suspension of redemptions or side pockets. However, five funds had to resort to partial redemptions.[14] These are similar to side pockets, but their implementation is more agile. As explained above, with this tool only part of the fund is affected by the suspension. Under Spanish legislation, management companies must activate this measure when the proportion of assets whose trading has been suspended represents more than 5% of the undertaking's portfolio, although it may also be activated below this threshold at the discretion of the management company. The largest fund affected by a partial suspension of redemptions was a fund of funds with total assets of €420 million, which had 7% of its assets invested in a Luxembourg investment fund that suspended redemptions and stopped calculating the value of its units. In this case,

14 See the 2020 NBFI monitor and the Technical Guide on the management and control of the liquidity of collective investment schemes.

any investor wishing to make a redemption from the affected fund of funds would receive a partial redemption of 93% of the price of the redeemed units. Upon termination of the suspension of the underlying fund, investors would receive the rest of the redemption, based on the fund's valuation.

This same mechanism was adopted by four other smaller funds (with combined assets of €19 million). One of them was also a fund of funds affected by redemptions being suspended at one of the underlying funds, while the rest had investments in high-yield bonds. Two of them were significantly affected by a high level of uncertainty surrounding asset valuation and by some investments becoming less liquid. In these cases, these bonds accounted for less than 6% of the fund's assets.

The CNMV significantly strengthened its coordination with management companies during the pandemic, encouraging them to use, where appropriate, the available liquidity management tools. In particular, it strongly recommended using mechanisms to prevent the increase in redemptions from negatively affecting unit-holders who remained in the fund (also known as anti-dilution mechanisms). One of the most commonly proposed mechanisms was the valuation at bid prices of assets, to ensure that the price paid to redeeming investors would be in line with the price that the fund would obtain from selling the assets. Another widely recommended mechanism was swing pricing, which also helped to pass part of the transaction costs on to redeeming investors.

In 2021, after the worst of the pandemic's impact on financial markets had passed, Spanish funds' use of liquidity management tools was much lower than in 2020. However, in 2022 the outbreak of the war in Ukraine and further episodes of market turmoil led the CNMV to step up communication with management companies once again, especially those potentially most affected by the consequences of the conflict. In 2022 Q1, with the outbreak of war and the resulting suspension of trading of assets linked to the two countries, five institutions activated their partial redemption mechanisms. The exposure of such institutions to the suspended securities ranged from 4.2% to 16.3%. Otherwise, these institutions continued to meet redemptions requests as normal.

These tools have been used during the different crisis periods with a microprudential approach, and it has not been deemed necessary to adopt or launch any tool for macroprudential reasons (i.e. because of perceived risks to the stability of the financial system).

4 European context and initiatives at the international level

4.1 Availability of tools across Europe and recent use

In describing the tools available to investment funds in Europe, a distinction should be drawn between harmonised CIUs (UCITS) and alternative funds. The use of these tools is not yet regulated at European level, although there is currently a proposal to amend the UCITS

Table 2
Tools available for funds subject to UCITS legislation

	Spain	Germany	France	Italy	Ireland	Luxembourg	Netherlands
Redemption suspension	✓	✓	✓	✓	✓	✓	✓
Gates	×	✓	✓	×	✓	✓	✓
Side pockets	✓	×	✓	×	×	✓	✓
Redemption fees	✓	✓	✓	✓	✓	✓	✓
Redemptions in kind	✓	✓	✓	×	✓	✓	✓
Swing pricing	✓	✓	✓	×	✓	✓	✓
Mandatory liquidity ratios	✓	×	×	×	✓	✓	×
Side letters	×	×	×	×	×	×	✓

SOURCES: CNMV and ESMA.

Table 3
Tools available for funds subject to the AIFMD (AIFs)

	Spain	Germany	France (a)	Italy (a)	Ireland	Luxembourg	Netherlands
Redemption suspension	✓	✓	✓	✓	✓	✓	✓
Gates	✓	✓	✓	✓	✓	✓	✓
Side pockets	✓	×	✓	✓	✓	✓	✓
Redemption fees	✓	✓	✓	✓	✓	✓	✓
Redemptions in kind	✓	✓	✓	×	✓	✓	✓
Swing pricing	✓	✓	✓	×	✓	✓	✓
Mandatory liquidity ratios	✓	✓	×	×	✓	×	×
Side letters	×	✓	×	×	✓	✓	✓

SOURCES: CNMV and ESMA.

a Availability of these tools depends on the type of AIF. Gates and side pockets are available for open-ended AIFs reserved for professional investors.

Directive and the AIFMD which will make it compulsory for management companies to be prepared to implement some of these tools if needed.

At present, European national authorities determine the framework for applying these tools. Tables 2 and 3 show that the availability of these tools varies considerably across seven EU Member States. Suspension of redemptions and the possibility of charging redemption fees are the only tools available in all of the countries analysed and for both types of funds. Other tools, such as swing pricing or redemptions in kind, are also widely available, although not in all countries. Finally, although the availability of a further set of tools is limited, it is greater in the case of alternative funds. This is the case of gates. Spain is one of the European countries with the highest number of available tools, alongside Ireland, the Netherlands and Luxembourg.

In addition, new tools have recently been incorporated that can be activated in crisis situations by the CNMV, making it one of the regulators with the most powers in this respect.[15]

Extraordinary events, such as the pandemic or the Russian invasion of Ukraine, have led to fund managers using these tools more often. In the case of the pandemic, fund managers in Europe used similar tools at times of heightened financial market turmoil (primarily redemption suspensions, swing pricing and gates), albeit heterogeneously across jurisdictions. In the case of UCITS, redemption suspensions mainly affected funds with significant exposures to corporate bonds, with aggregate assets of €22 billion in March 2020. This amount fell to 0.4 billion in June 2020. In the case of AIFs, the combined assets of institutions with redemption suspensions was €40 billion at end-June 2020, mainly from suspensions in real estate funds. In general, UCITS and AIF suspensions were not caused by the difficulty in meeting the increase in redemptions, but by problems in the valuation of some assets (in particular, corporate bonds, OTC derivatives and real estate market assets).

4.2 Recent initiatives of the Financial Stability Board and the International Organization of Securities Commissions

In a context where having appropriate liquidity risk management processes for investment funds was becoming increasingly important, the FSB published a set of recommendations in 2017 (FSB, 2017) aimed at mitigating possible risks to financial stability arising from four vulnerabilities in the field of investment management: liquidity mismatch in open-ended funds; leverage risk in investment funds; operational risk from the management activity, particularly during stress events; and, lastly, risks arising from fund managers' and investment funds' securities lending activity.

Most recommendations relate to the first vulnerability, i.e. they seek to mitigate liquidity mismatch risk. In this regard, it is recommended that open-ended funds' regulatory reporting and public disclosure be strengthened in order to make it easier to assess their liquidity risk. Furthermore, good liquidity management practices are promoted, both in the initial fund design phase and in the day-to-day operation of funds. These good practices include the use of liquidity management tools, in both normal and stressed market situations. Lastly, stress tests are promoted at fund and system level. In addition, and with the aim of putting some of these recommendations into practice, in 2018 the International Organisation of Securities Commissions (IOSCO) published a set of recommendations for liquidity risk management for CISs (IOSCO, 2018a). The degree of compliance with these two sets of recommendations was assessed in two exercises conducted in 2022.

The findings of the evaluation of the IOSCO recommendations,[16] which focused on assessing the extent to which they had been implemented in the regulatory frameworks of 14 participating

15 FSB (2022b) mentions Spain as one of the few jurisdictions where the authority (the CNMV) has the power to activate tools that go beyond suspending redemptions.

16 IOSCO (2022).

Table 4
Results of the jurisdictional regulatory review of IOSCO's liquidity recommendations

	Design phase					Day-to-day operation			Contingency planning	
	R.1	R.2	R.3	R.4	R.7	R.10	R.12	R.14	R.16	R.17
Australia										
Brazil										
Canada										
China										
France										
Germany										
India										
Ireland										
Japan										
Luxembourg										
Spain										
Switzerland										
United Kingdom										
United States										

SOURCE: IOSCO.
NOTE: Green: fully consistent; yellow: broadly consistent; orange: partly consistent; red: not consistent.

jurisdictions accounting for 92% of the global assets under management, were published first. Ten of IOSCO's 17 recommendations were chosen for the evaluation: five (1, 2, 3, 4 and 7) referring to the initial fund design phase; three (10, 12 and 14) to the day-to-day liquidity management; and two (16 and 17) to contingency planning and the availability of liquidity management tools. Table 4 below shows that, of the 14 participating jurisdictions, seven (including Spain) were considered fully compliant with all ten recommendations assessed, including the recommendation on the availability of tools.

In the case of the FSB, over the course of 2022 a joint task force comprising members of the FSB's Standing Committee on Supervisory and Regulatory Cooperation and IOSCO's Committee 5 on Investment Management assessed the effectiveness of the FSB's recommendations.[17] 16 jurisdictions,[18] including Spain, were evaluated. The CNMV also participated in the task force. The assessed recommendations were divided into four groups depending on their objective:

(i) those geared at reducing structural liquidity mismatch risk in open-ended CIUs;

(ii) those encouraging the use of liquidity management tools;

17 FSB (2022B).

18 Australia, Brazil, Canada, China, France, Germany, Hong Kong, India, Ireland, Italy, Japan, Luxembourg, Spain, Switzerland, United Kingdom and United States.

(iii) those intended to enhance regulatory reporting and data availability to ensure that CIUs' liquidity risk can be properly monitored; and

(iv) those aimed at extending stress testing exercises at both individual CIU and macro level, taking into account CIUs' interconnections with other financial system institutions.

The evaluation work reflected that, despite the progress made in the jurisdictions analysed since the publication of the FSB recommendations in 2017, certain vulnerabilities persisted and needed to be addressed by strengthening some of the recommendations. Spain is already largely compliant with the FSB recommendations, including the aspects with room for improvement.

The FSB's final report proposes improvements in the four areas analysed:

1 *Liquidity mismatch.* With the aim of reducing this mismatch, a bucketing approach is proposed that classifies open-ended investment funds into three buckets depending on their portfolio's liquidity profile. The redemption conditions (frequency, notice periods and long settlement periods) set for each bucket should be in line with the degree of liquidity of each bucket's assets. Thus, for funds investing mainly in liquid assets, daily redemptions are considered appropriate. In the case of funds that invest a significant percentage in illiquid assets, daily redemptions are not considered appropriate unless long notice or settlement periods are established for redemptions. Lastly, for the third bucket (funds investing mainly in less liquid assets), daily redemptions are only appropriate if anti-dilution measures are applied or if notice or settlement periods are established.

2 *Liquidity management tools.* It is recommended that supervisory authorities encourage the use of these tools in their jurisdictions, particularly those with an anti-dilution effect, which seek to pass the transaction costs of subscriptions and redemptions on to the transacting investors. Swing pricing is one of the best-known measures. It is considered appropriate for regulators to issue guidelines setting out clear criteria for the proper and consistent application of these tools.

3 *Availability of data on investment funds.* The report proposes to improve the data available on liquidity mismatch and the use of liquidity management tools, and to strengthen the information provided to investors on the effects of using these tools.

4 *Stress tests.* It is recommended that stress tests and the exchange of information between jurisdictions on their design and use be encouraged.

A new joint FSB/IOSCO task force was set up to review the FSB's recommendations in line with the improvements proposed. The review was carried out as the IOSCO guidelines on

the use of anti-dilution tools were being developed.[19] Work is also under way to identify which data should be included in supervisory reporting in order to monitor investment funds' liquidity risk.

As mentioned above, Spain is already largely compliant with the FSB Recommendations, including the aspects with room for improvement. In this regard, the CNMV has been receiving monthly data on fund portfolios for several years. This allows it to continuously monitor the liquidity risks incurred by investment funds. Moreover, as far as liquidity management policies and tools are concerned, the recently published Technical Guide 1/2022 on the management and control of the liquidity of collective investment schemes (see Box 1) specifies and further details the principles laid down in CNMV Circular 6/2009 on internal control of collective investment scheme management companies and investment companies.

Irrespective of the individual stress tests that fund managers must conduct to comply with the ESMA guidelines[20] and the above-mentioned CNMV guide on liquidity management, the CNMV carries out macro stress tests every six months. These exercises are carried out using a methodology initially devised by ESMA (the STRESI framework) (ESMA, 2019b) and later expanded by the CNMV (Ojea Ferreiro, 2020) to assess investment funds' resilience to significant theoretical increases in redemptions. This is a pre-emptive tool that helps identify ex ante funds that might show some vulnerability in the future.

5 Conclusions

Open-ended investment funds are attracting growing interest internationally from a financial stability standpoint. Until recently, national supervisors had regulated their activity to protect investors and avoid conflicts of interest, that is, from a primarily individual or microeconomic and investor protection perspective.

However, their growing importance in the financial system and the potential liquidity, leverage and contagion risks have sparked analyses, debates and policy proposals aimed at mitigating possible risks to the financial system overall, i.e. from a macroprudential perspective.

In the case of Spain, despite their development, investment funds account for a smaller share of the financial system than in the main world economies overall. The potential for Spanish investment funds to affect and destabilise the system is therefore more limited. Moreover, a high percentage of the open-ended investment funds in Spain are highly regulated, as they are subject to the UCITS Directive. This structurally limits the risk these institutions can take on.

In Spain there are already a great deal of tools to help measure, monitor and mitigate possible risks of investment funds at individual level. Taken together, these tools also contribute to

19 The two documents were subject to consultation from 5 July to 4 September 2023.

20 ESMA (2019a).

financial stability. The CNMV, as supervisor, also has tools to activate additional measures. In this regard, the international debate should be closely monitored. Although Spain is already largely aligned with the recommendations and guidelines proposed, it is committed to continuously striving to transfer to the Spanish legal framework any possible changes or improvements that are deemed necessary in the light of the final texts agreed internationally.

Lastly, in terms of the existing legal framework, it should be noted that although investment funds do not currently pose any important risk to financial stability and despite the large number of tools available to Spain, non-bank macroprudential policy is in its infancy and currently lacks an umbrella integrating all the elements that should be part of this policy. These elements include properly designing: (i) processes for assessing risk that take into account interconnections with the financial system as a whole and for evaluating the effectiveness and efficiency of the tools needed to achieve the desired objectives; and (ii) internal coordination and decision-making models, which are particularly important in times of heightened risk.

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PILLAR 3 DISCLOSURES ON ESG RISKS. FIRST DISCLOSURES OF SPANISH AND OTHER EUROPEAN BANKS

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PILLAR 3 DISCLOSURES ON ESG RISKS. FIRST DISCLOSURES OF SPANISH AND OTHER EUROPEAN BANKS

Abstract

Sustainability-related disclosures are an essential first step towards integrating environmental, social and governance (ESG) risks into the financial system and the wider business world. This article sets out the new European prudential requirements for disclosing such risks, as well as a general comparison of the initial climate-related information reported by significant institutions in the Spanish banking industry and elsewhere in Europe.

Keywords: transparency, sustainability, ESG risks, climate change, transition risk, physical risk.

1 ESG Disclosures. From the TCFD recommendations to Commission Implementing Regulation (EU) 2022/2453

Sustainability-related disclosures have gained prominence over the last few years. Investors and other market participants are demanding ever more sustainability information from companies, covering aspects such as the environment (including climate change), social and human rights and internal governance, in order to help them make better investment decisions.[1] This demand for information has extended to the banking industry too. In Europe, regulatory bodies have made significant headway in incorporating these aspects into prudential regulations, particularly in terms of transparency (Pillar 3 disclosures), which is the focus of this article.

In April 2015, G20 Finance Ministers and Central Bank Governors asked the Financial Stability Board (FSB) to consider how companies in general, and the financial sector in particular, could take account of climate change. Among other findings, the FSB concluded that the climate risk information reported to the market needed to be improved to help users in their decision-making. As a result, in December of that year the FSB set up the Task Force on Climate-related Financial Disclosures (TCFD), comprising representatives from the private sector, whose main objective is to identify climate-related disclosures that might be useful for market participants. Nearly two years later, the TCFD published its recommendations on climate-related financial disclosures.[2]

These recommendations are an important milestone. First, they have helped to foster transparency, informed decision-making and the mitigation of adverse impacts, with a view to better managing the risks. Second, they have helped companies to make progress towards

1 Lloyd (2023).

2 For more information, see Task Force on Climate-related Financial Disclosures (2017).

incorporating such aspects into their strategies and business models. However, the recommendations are voluntary rather than mandatory. As a result, in recent years some regulators and international standard-setting bodies have opted to go one step further and introduce compulsory requirements.

Three such initiatives are particularly significant: at the global level, the disclosure standards on sustainability (IFRS S1) and climate change (IFRS S2) published by the International Sustainability Standards Board (ISSB) in June 2023; in Europe, the standards issued by the European Financial Reporting Advisory Group (EFRAG), which were adopted by the European Commission in July 2023 and implement the Corporate Sustainability Reporting Directive (CSRD); and, lastly, focused on the banking sector and prudential regulation, Commission Implementing Regulation (EU) 2022/2453 of 30 November 2022 amending the implementing technical standards laid down in Implementing Regulation (EU) 2021/637 as regards the disclosure of environmental, social and governance risks (hereinafter, the Regulation).[3]

An article published in the Spring 2023 *Financial Stability Review*[4] detailed the rationale behind these proposals and what differentiates them from other international initiatives. In December 2022 the Banca d'Italia published an occasional paper (Loizzo and Schimperna, 2022) discussing the European regulatory framework and investigating the commonalities and differences between the disclosure requirements laid down in the Regulation and those envisaged in the EFRAG's European Sustainability Reporting Standards (ESRS), then in draft form.

This article focuses on the prudential transparency requirements laid down in the Regulation, assessing credit institutions' initial disclosures and delving deeper into the considerations set out in the Autumn 2023 *Financial Stability Report* (FSR).[5] Section 2 provides a description of those requirements and Section 3 analyses the climate information reported by certain Spanish credit institutions with reference date 31 December 2022. Lastly, Section 4 includes some transition risk data for a sample of European banks.

2 Commission Implementing Regulation (EU) 2022/2453. What can we expect?

The ESG disclosure requirements included in Commission Implementing Regulation (EU) 2022/2453 form part of the so-called Pillar 3 disclosures. This is one of the three pillars that make up prudential banking regulations, the others being Pillar 1 (minimum capital requirements) and Pillar 2 (supervisory review). Pillar 3 aims to promote transparency by requiring banks to provide the market with sufficient information to ensure a degree of market discipline (Vargas Bahamonde, 2001). This mitigates one of the main frictions in the banking sector (information

3 Published by the European Commission in the Official Journal of the European Union in December 2022, based on a draft prepared by the European Banking Authority (EBA).

4 For more information on the importance of climate risk transparency and the ISSB and EFRAG initiatives, see Martínez and Pérez Rodríguez (2023).

5 See Banco de España (2023).

Figure 1
Commission Implementing Regulation (EU) 2022/2453

Disclosure of ESG risks – Commission Implementing Regulation (EU) 2022/2453	
Qualitative information on ESG risks Tables 1-3	— Each table includes information on strategy, governance and management in relation to ESG risks
Quantitative information on climate risks Templates 1-10	— **Templates 1-4 on potential climate change transition risk in the banking book:** credit quality of exposures by sector, emissions, energy efficiency of the collateral, alignment metrics and exposures to top 20 carbon-intensive firms — **Template 5 on potential climate change physical risk in the banking book:** exposures sensitive to impact both from chronic and acute climate change events, broken down by sector and geographic location of the counterparty's business or of the collateral — **Templates 6-10 on taxonomy-aligned exposures, mitigating actions (GAR, BTAR) and other exposures not taxonomy-aligned**
First reference date: 31 December 2022. The following exceptions apply: — Financed GHG emissions (template 1): 30 June 2024 — Information on alignment metrics (template 3): 30 June 2024 — Information included in the GAR calculation (entered in templates 1 and 6-8): 31 December 2023 — Information included in the BTAR calculation (entered in templates 1 and 9): 31 December 2024	

SOURCE: Banco de España.

asymmetry), helping to ensure a level playing field for all market participants. Under Pillar 3, banks provide information on their risk profile, meaning it often reflects the regulatory capital requirements established in Pillar 1. However, this is not true of the ESG risk disclosure requirements laid down in the Regulation. The absence of data on those risks prompted the regulator to change strategy and set Pillar 3 requirements for ESG risks before setting the Pillar 1 requirements. Global and European regulators are still working to identify potential gaps in the Pillar 1 standards for ESG risks and to determine how they should be addressed.[6]

The main objective of the Regulation's requirements is to provide investors and other users of this information with granular and comparable data on banks' exposures subject to ESG risks and, in particular, to climate-related risks, including transition and physical risks.[7] In other words, these disclosures will help the market and supervisors to understand the extent of banks' exposures to ESG risks and how they are being managed.

The Regulation (see Figure 1 for a general overview of the Regulation) includes technical standards detailing the formats and instructions for banks' ESG risk disclosures. Given the complexity and relative novelty of this area of regulation, the EBA opted for a sequential

6 European Banking Authority (2023) and Basel Committee on Banking Supervision (2022).

7 Transition risks are risks stemming from the transition to a more sustainable economy, driven by political, technological and market changes. Physical risks result from, first, the impact of extreme weather events, such as heat waves or floods (acute events) and, second, progressive long-term shifts in weather patterns, such as changes in rainfall or rising sea levels (chronic events).

approach, thereby acknowledging the compliance effort that the new requirements would entail for banks. Thus, while the qualitative information included in the technical standards covers each of the ESG risks, the quantitative information focuses solely on climate risk, since this is the area where most international consensus and commitment has been achieved, and where, as things stand, most scientific evidence and data are available. Although the first reference date was set as 31 December 2022, the Regulation also envisages a phase-in period, as detailed below.

The qualitative information is set out in three tables,[8] in which banks are required to disclose strategy, governance and management information for each ESG risk. The quantitative information is covered in a total of ten templates:[9] i) four on transition risk, ii) one on physical risk, and iii) a further five on mitigating actions adopted by banks to manage and reduce their transition and physical risks.

Starting with transition risk, the key indicators included in the Regulation are:

— Exposures to non-financial corporations (NFCs)[10] in the banking book. These include loans, debt securities and equity instruments held in the institutions' banking book, i.e. excluding assets held in the trading book. In other words, they include exposures to NFCs in the form of loans and advances and other financial instruments, generally over a medium-to-long-term time horizon. For these exposures, banks will have to disclose, at the sectoral level, the financing extended to sectors that highly contribute to climate change, along with their exposures to counterparties excluded from the European Union (EU) Paris Agreement-aligned benchmarks. Both concepts are defined in the Commission Delegated Regulation on the minimum standards for the EU climate transition benchmarks and the EU Paris-aligned benchmarks.[11] Under the Regulation, the concept of sectors that highly contribute to climate change[12] covers a considerable number of sectors with different volumes of greenhouse gas (GHG) emissions. For its part, the concept of "excluded counterparties" refers to those companies whose activity is related with the use and distribution of fossil fuels.[13] This information is complemented by two other very important metrics: financed GHG emissions (emissions by banks' counterparties) and the so-called

8 The table format is typically used for Pillar 3 qualitative disclosures, giving institutions flexibility in how they present the information.

9 The template format is typically used for Pillar 3 quantitative disclosures, meaning institutions are required to report the information following the format of each template.

10 The concept of non-financial corporation is envisaged in the supervisory reporting framework known as FINREP.

11 Commission Delegated Regulation (EU) 2020/1818 of 17 July 2020.

12 According to paragraph 6 of Commission Delegated Regulation (EU) 2020/1818, these are the sectors listed in Sections A to H and Section L of Annex I to Regulation (EC) 1893/2006 of the European Parliament and of the Council.

13 Article 12 of Commission Delegated Regulation (EU) 2020/1818. Those counterparties whose activity depends largely on the extraction and distribution of fossil fuels (oil, gas and coal). Specifically, those counterparties that derive: i) at least 1% of their revenues from exploration, mining, extraction, distribution or refining of hard coal and lignite; ii) at least 10% of their revenues from the exploration, extraction, distribution or refining of oil fuels; iii) at least 50% of their revenues from the exploration, extraction, manufacturing or distribution of gaseous fuels; and iv) at least 50% of their revenues from electricity generation with a GHG intensity of more than 100 g CO_2 e/kWh.

alignment metrics. The volume of financed GHG emissions will have to be provided at sectoral level and will include the Scope 3 emissions[14] of the bank's counterparties, despite the complexity inherent in their calculation. The alignment metrics are forward-looking metrics that institutions use to set, for the most relevant sectors, their Paris-aligned decarbonisation targets, based on the scenarios prepared by the International Energy Agency.

— Loans collateralised by immovable property (commercial and residential) and repossessed immovable property collaterals. For these exposures, banks shall disclose the energy efficiency of the collaterals, measured as their energy consumption. The data are presented in two ways: through the energy performance certificate (EPC) and in terms of energy consumption in kWh/m^2. The EPC is an official certificate that since the transposition of Directive 2010/31/EU has been compulsory for property construction, sale or rental, with some exceptions such as garages, storerooms, plots and warehouses not used as office space.[15] This certificate rates a building in terms of its annual consumption of energy from non-renewable sources in kWh/m^2 and its CO_2 emissions. The rating scale comprises seven bands ranging from A (most efficient) to G (least efficient). The rating assigned to each band varies across the EU countries and can even vary across different climate zones within the same country. Given these variations, and for greater comparability, the information is also provided by consumption intervals in terms of kWh/m^2. Although the EPC-based energy efficiency measurement only includes data for those immovable property collaterals that have an EPC label, the consumption measured in kWh/m^2 includes both real data and banks' estimates for exposures that lack an EPC.

As for physical risk, institutions shall disclose their exposures (broken down by sector) to NFCs in the banking book, along with loans collateralised by immovable property and repossessed immovable property collaterals subject to acute or chronic physical risks, or both. This information shall be disclosed for the key geographical areas (determined by the credit institutions themselves), using the external data sources[16] deemed most appropriate and providing the relevant clarifications.

The Regulation calls for information on potential mitigating measures, or, put more simply, on sustainability indicators that provide insight into how the institutions are incorporating environmentally sustainable assets into their strategies and business models. These notably include the green asset ratio (GAR). This ratio provides information on the alignment of a credit

14 Scope 1 emissions are a company's direct emissions, Scope 2 emissions are its indirect emissions associated with the purchase or use of electricity and Scope 3 emissions are all other indirect emissions, essentially those from the company's value chain. The latter emissions are beyond the company's control and the information needed to calculate them is not always available.

15 Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018, and its transposition to Spanish law, Royal Decree 390/2021 of 1 June 2021.

16 To this effect, the Regulation cites some example data sources, including GFDRR - ThinkHazard! and PREP - PREPdata.

institution's balance sheet with the Taxonomy Regulation,[17] providing the market with comparable information on the percentage of assets that an institution has invested in sustainable activities. When interpreting the GAR, which is defined in a Commission Delegated Regulation,[18] certain particularities regarding its calculation should be borne in mind.

First, not all economic activities are covered by the taxonomy, i.e. not all economic activities are taxonomy-eligible. Second, for the time being at least, the European Commission does not allow exposures to counterparties that are not obliged to disclose sustainability information under the CSRD (essentially small and medium-sized enterprises (SMEs) and non-EU companies) to be included in the numerator. Therefore, by definition the GAR will never encompass 100% of a bank's assets and those banks that do more business with SMEs or outside of the EU (such as Spanish banks), may a priori have a lower ratio. To overcome what might be viewed as a limitation of the GAR, the EBA designed another ratio known as the banking book taxonomy alignment ratio (BTAR). This ratio allows institutions to include in the numerator exposures to counterparties not subject to the CSRD. The BTAR was included in the Regulation as a voluntary disclosure for institutions.

Lastly, these new requirements only apply to large credit institutions that have issued securities that are admitted to trading on a regulated market of any EU Member State.[19] However, and on the understanding that climate risk factors affect all institutions regardless of size, the so-called "banking package" (CRD VI and CRR III)[20] extends the requirements to all institutions including smaller ones, albeit taking into account the principle of proportionality.

Like all Pillar 3 disclosures, the information must be provided at the prudential consolidated group level. As noted above, the first disclosure reference date was 31 December 2022, although the following phase-in schedule is envisaged:

— The reference date for the GAR disclosure is 31 December 2023.

— Financed GHG emissions and alignment metrics shall be disclosed on a voluntary basis until 30 June 2024.

— The BTAR shall be disclosed voluntarily, with the first reference date being 31 December 2024.

17 Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020. This regulation is essentially a common EU-level classification system for economic activities that can be considered environmentally sustainable. Romo González (2021).

18 Commission Delegated Regulation (EU) 2021/2178 of 6 July 2021.

19 See Article 449bis of Regulation (EU) 575/2013 of the European Parliament and of the Council of 26 June 2013.

20 In October 2021, the European Commission launched new proposals to change banking regulations (Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, and Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms) to finalise the implementation of Basel III, incorporate ESG risks and improve the banking supervision mechanisms. At the time of writing this article, the proposals were in the final negotiation stages, with the parties having reached a political agreement over their substance.

3 Spanish credit institutions. Exposures subject to climate-related risks

During 2023 H1, European banks subject to the Regulation disclosed, for the first time, sustainability information with the required granularity. For Spanish banks, this disclosure was included in the Pillar 3 report.

This section discusses the quantitative information on climate change reported by all of the Spanish significant institutions:[21] Banco Santander, BBVA, CaixaBank, Banco Sabadell, Bankinter, Unicaja, Abanca, Kutxabank, Cajamar and Ibercaja. Annex 1 includes links to these banks' websites where the information analysed can be found. The total assets of these ten banks represent approximately 90% of the Spanish banking system's assets.

The reference date for the assessment is 31 December 2022. Given the complexity of the information disclosed, and the fact that the banks were disclosing it for the first time in the granularity and format established in the Regulation, the descriptive analysis here (which is based on that information) should be treated with due caution.

Transition risk: exposures to NFCs in the banking book

Chart 1.a analyses, bank by bank, the exposures to NFCs held in the banking book. These exposures are grouped into sectors that highly contribute to climate change and other sectors. The chart also shows the percentage of exposure to excluded counterparties. This information is complemented by Chart 1.b, which depicts the weight of sectors linked to the extraction and distribution of fossil fuels and electricity. The data are compared with those of an average bank, calculated as the average of the analysed banks' exposures weighted by the total assets of each individual bank.

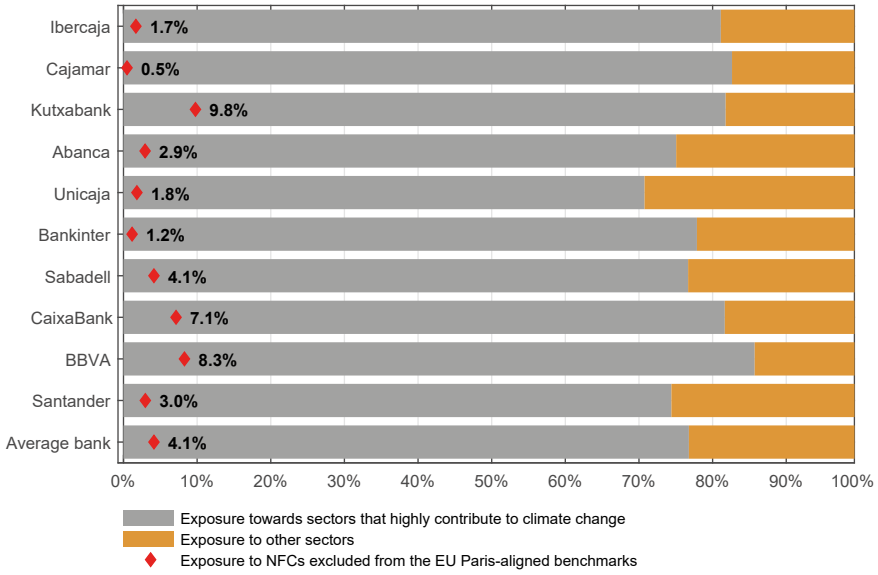
On average, close to 80% of exposures to NFCs of the banks analysed are in sectors that highly contribute to climate change, with no significant differences observed between banks (see Chart 1.a). The information presented under the concept of "sectors that highly contribute to climate change" is not very granular, since it covers a considerable number of sectors with different GHG emission levels.[22] This analysis will be more exhaustive and informative in the future, once the Regulation has been fully implemented and institutions begin to disclose their financed CO_2 emission levels in a standardised and comparable format for each sector. It will also be important to look at how these levels change over time and the percentage of

21 See Regulation (EU) 468/2014 of the European Central Bank of 16 April 2014 establishing the framework for cooperation within the Single Supervisory Mechanism, laying down the legal provisions for classifying significant supervised institutions.

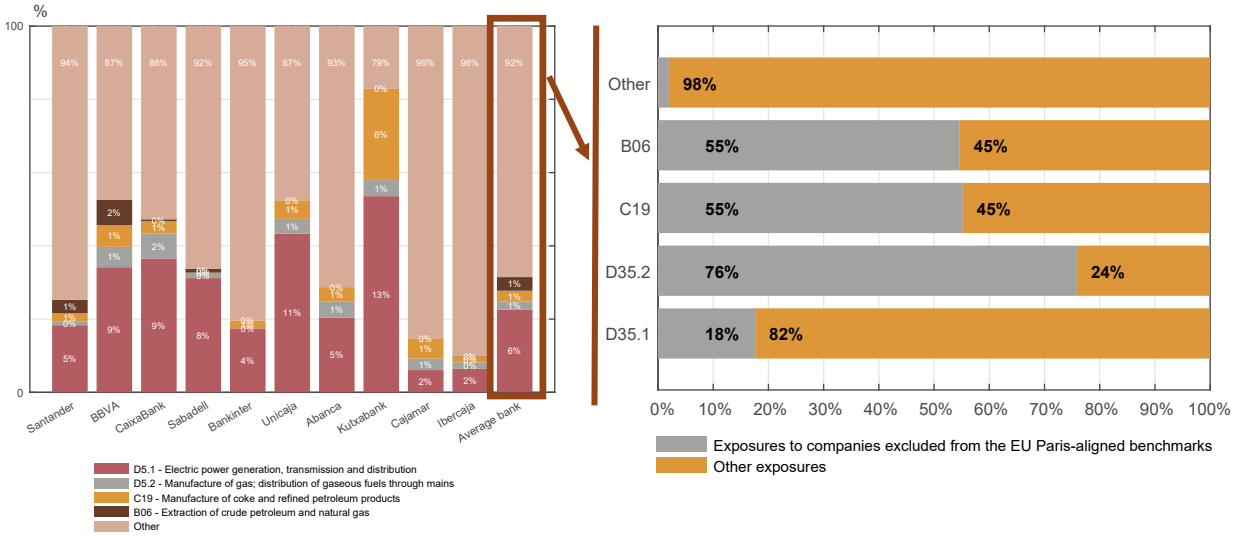
22 As already indicated in Box 3.3 of the Autumn 2023 FSR, this figure differs significantly from that mentioned in the article by Margarita Delgado (2019), since the definition of "sectors that highly contribute to climate change" according to the Commission Implementing Regulation (EU) 2022/2453 is particularly broad compared with other taxonomies, such as those used in the article mentioned here, that differentiate more clearly between polluting sectors.

Chart 1
Transition risk of Spanish significant credit institutions

1.a Exposures to NFCs



1.b Distribution by (sub)sector of exposure to NFCs



SOURCE: Banco de España calculations based on information published on the banks' websites.

investment within each sector set aside for actions that mitigate climate change or are environmentally sustainable.

Exposures to counterparties excluded from the EU Paris-aligned benchmarks are significantly smaller. For the banks analysed, such exposures represent an average of around 4.1% of exposures to NFCs (see Chart 1.a). Three banks have excluded exposures above that average: Kutxabank (9.8%), BBVA (8.3%) and CaixaBank (7.1%).

Lastly, Chart 1.b shows a breakdown by sector of the NFC portfolio, focusing on sectors linked to fossil fuel extraction and distribution (NACE[23] D35.2, C19 and B06) and electricity (NACE D35.1). The exposure of Spanish banks to the coal mining sector is negligible. The weighted average exposure of the Spanish banks analysed vis-à-vis carbon-related sectors overall (coal, oil and gas) and the electricity sector represents 9% of total NFC exposure, with the electricity sector accounting for a notable share (6%), of which 18% is to excluded counterparties (which generate energy in a carbon-intensive manner), whereas the remaining exposures are to companies that generate electricity from other sources, including renewable ones. By bank, exposure to the electricity sector is particularly significant at Kutxabank (13%), Unicaja (11%), BBVA (9%) and CaixaBank (9%).

As part of their transition risk strategies, banks have started to provide some forward-looking metrics, such as their portfolio decarbonisation targets, particularly in relation to the sectors that highly contribute to climate change. These disclosures have been promoted by an industry-led initiative known as the Net Zero Banking Alliance (NZBA), to which most of the analysed banks belong. This is the banking arm of the Glasgow Financial Alliance for Net Zero (GFANZ), founded by Mark Carney in April 2021, whose main goal is to accelerate the financial system's transition to a net-zero global economy. The disclosure of decarbonisation targets is still at a very early stage, but will be essential to enable the market and supervisors to understand the steps that banks are taking to manage the risks associated with this transition. This reporting will become more comprehensive from 30 June 2024, with the disclosure of the alignment metrics included in the Regulation.

Transition risk: energy efficiency of the immovable property portfolio

Loans collateralised by immovable property (commercial and residential) account for a very significant portion of loans to non-financial sectors in banks' balance sheets. As indicated in the Proposal for a Directive on the energy performance of buildings (recast),[24] these account for 40% of energy consumed and 36% of energy-related direct and indirect GHG emissions. The transition risk associated with these loans stems from the energy efficiency of the collateral. The Proposal for a Directive introduces new minimum energy performance standards that will require the renovation of less efficient buildings, which could affect the value of the properties held as collateral by banks.

Chart 2.a shows aggregate data on significant Spanish credit institutions relating to the energy efficiency of commercial and residential immovable property used as collateral in their loan portfolios, along with information on recovered or repossessed collateral. This information is analysed both in terms of the EPC and of energy consumption in kWh/m^2. Only loans granted within the EU have been analysed.

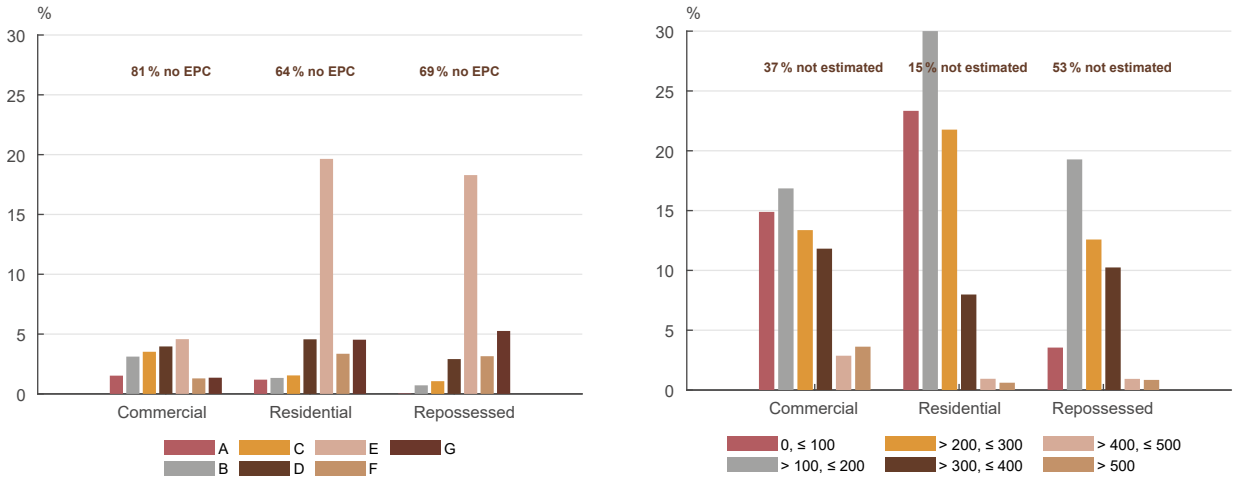
23 Statistical classification used in the EU.

24 Proposal for a Directive of the European Parliament and of the Council (2021).

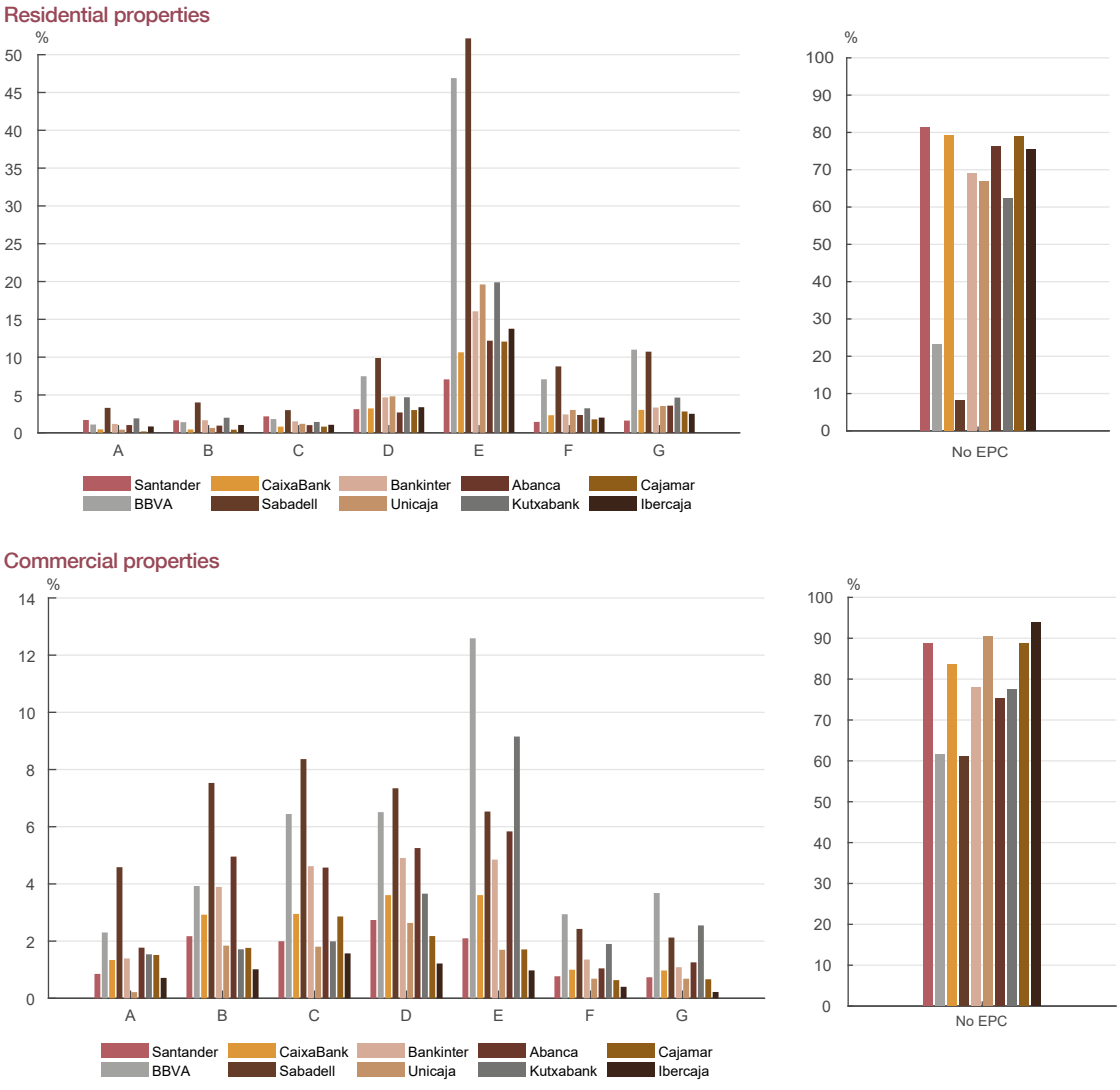
Chart 2

Energy efficiency of immovable property in the EU. Spanish significant credit institutions

2.a Energy efficiency of immovable property collaterals and of repossessed collaterals in the EU. Aggregate data of Spanish significant credit institutions



2.b Energy performance certificate of immovable property collaterals in the EU. By bank



SOURCE: Banco de España calculations based on information published on the banks' websites.

As indicated in the Autumn 2023 FSR, a high percentage of the properties in the portfolios analysed do not have an EPC. However, the information provided on consumption in kWh/m^2 shows that banks endeavoured to estimate the energy consumption of a significant portion of their properties. These endeavours are particularly evident in the residential sector, with just 15% of the properties analysed lacking information (real or estimated) on energy efficiency.

Analysis of the data provided by the EPC, considered to be more complete, shows that for loans collateralised with residential properties (84% of the total collateralised portfolio), 64% of the collateral lacks an EPC (see Chart 2.a). It also shows notable dispersion of data among banks (see Chart 2.b). According to Pillar 3 reports, at Santander 81% of the residential properties securing loans granted in the EU lack an EPC, compared with just 23% at BBVA and 8% at Sabadell. That figure stands at over 60% for all of the remaining banks. In terms of efficiency, label E is clearly the most prevalent, both at the aggregate level (almost 20% of residential properties used as collateral) and for each individual bank analysed. The most energy efficient EPC labels (A, B and C) only account for 4% of total repossessed collaterals (see Chart 2).

In the case of mortgages on commercial immovable property, which represent 14% of the total collateral, 81% of the properties have no EPC. However, although this percentage varies across banks, the dispersion is not as high as in the case of residential properties. Again, label E is the most prevalent (5% of total collateral in this portfolio), although the gap here with the other labels is not as wide, with the higher EPC labels (A, B and C) accounting for 8% of the total loans collateralised with commercial immovable property.

Physical risks: exposures to NFCs and immovable property portfolio

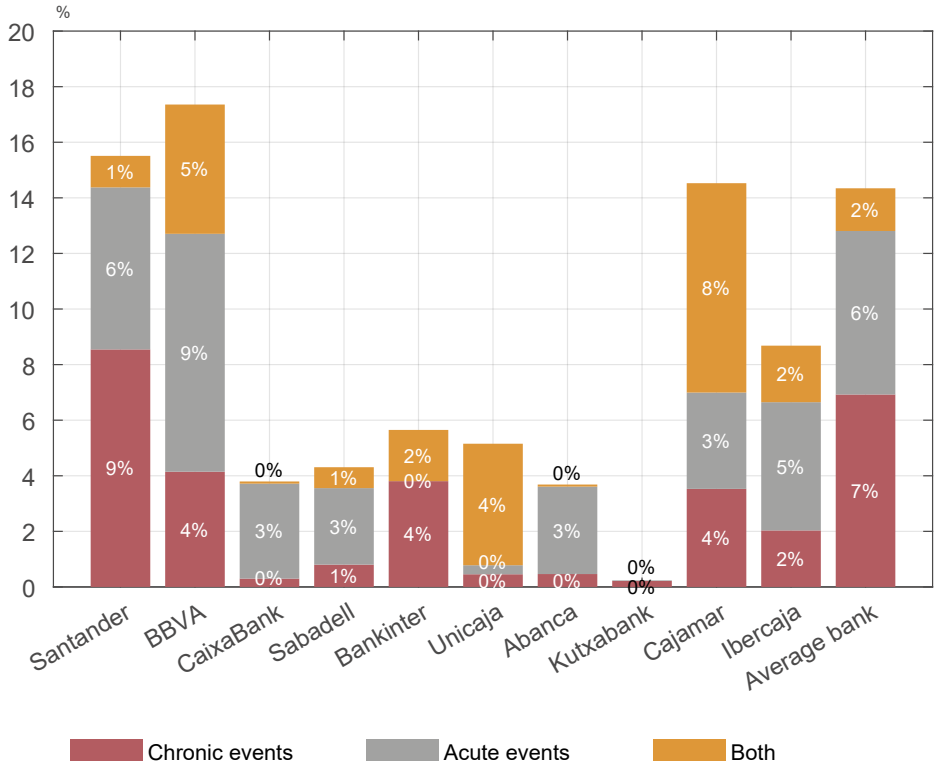
As regards information on physical risks, it is worth noting that, in line with the high degree of flexibility permitted by the Regulation, banks have used different methodologies and data sources to identify the physical risk of these exposures, which could affect the comparability of information. Moreover, it is the first time that banks have disclosed this information, opening up the possibility of interpretation errors. This information must therefore be interpreted with caution.

Chart 3.a shows, bank by bank, the physical risks (chronic and acute events) reported by banks for their exposures to NFCs in the banking book. It also includes data for an average bank, calculated as the average exposures reported by the banks analysed weighted by the total assets of each individual bank. On average, 15% of exposures to NFCs are subject to physical risks, which can be broken down into chronic events (7%), acute events (6%) or both (2%). The physical risks most commonly reported by banks are fires, rising temperatures, changing precipitation patterns and flooding (the latter resulting both from severe precipitation and coastal flooding caused by rising sea levels).

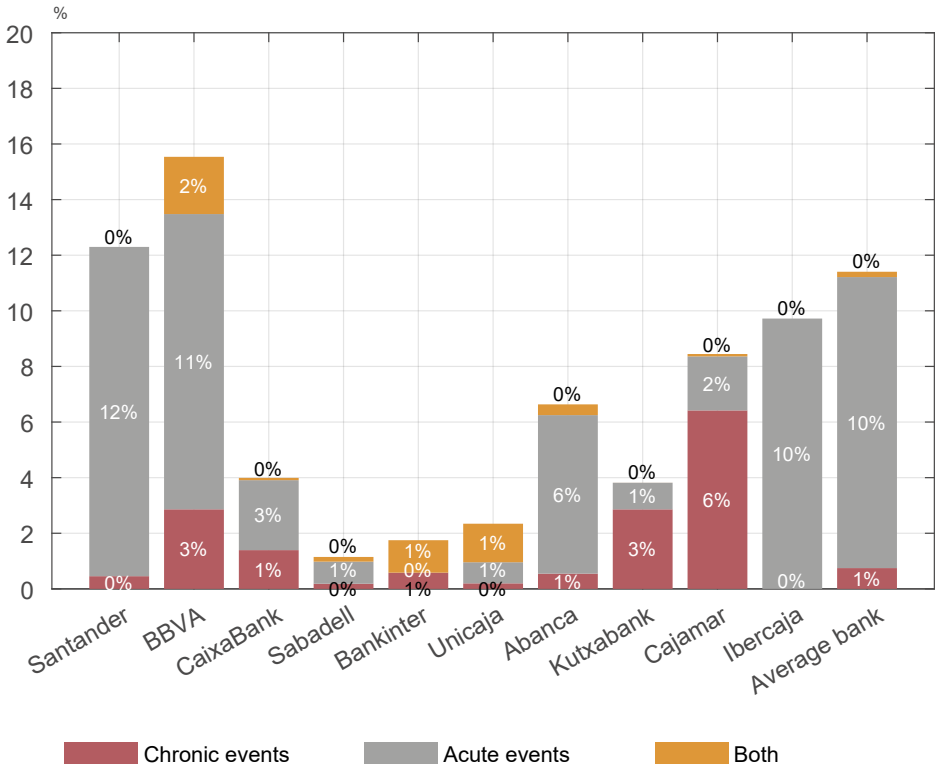
Chart 3

Physical risk of Spanish significant credit institutions

3.a Exposures to NFCs subject to physical risk



3.b Loans collateralised by immovable property collaterals and repossessed collaterals subject to physical risk



SOURCE: Banco de España calculations based on information published on the banks' websites.

The two banks that have reported the highest level of physical risk in relative terms are BBVA (17.4%) and Santander (15.5%), which could be explained by the weight of their international business in more vulnerable geographical areas. Cajamar and Ibercaja have reported exposure to physical risks (14.5% and 8.7%, respectively) that is higher, in relative terms, than that of other banks of a similar size.

Chart 3.b shows data on loans collateralised with immovable property (residential and commercial) and repossessed immovable property collaterals that are subject to physical risk in relation to the total collateralised loans. On average, 11.4% of the properties of the banks analysed are exposed to physical risks, most of which (10%) are acute events. As in Chart 3.a, Santander (12.3%) and BBVA (15.5%) are above average, and Cajamar and Ibercaja have again reported percentages that are higher than those of other banks of a similar size.

4 Observations on a sample of European banks

This section includes some preliminary data of interest (focusing on transition risk) for a sample of European credit institutions. The sample comprises all of the European global systemically important institutions (G-SIIs)[25] and a selection of other systemically important institutions (O-SIIs)[26] from Germany, Spain, France, Italy, the Netherlands and Portugal. The selected O-SIIs are those that, at the highest consolidation level within the EU, scored higher than 500 basis points in the 2022 O-SII identification process, according to the information published by the EBA.[27] Annex 2 provides a list of the selected institutions and links to the Pillar 3 disclosure information published on their respective websites.

The reference date of the data analysed is 31 December 2022. Again, all of the caveats noted in the previous section regarding the information examined should be taken into account.

Chart 4.a illustrates the transition risk in each of the sample banks' exposures to NFCs, using as indicators the sectors that highly contribute to climate change and exposures towards counterparties excluded from EU Paris-aligned benchmarks.[28] The chart also includes data for an average bank, calculated as the average of the exposures of each bank analysed weighted by the total assets of each individual bank. On average, exposures to sectors that

25 Institutions with the potential (determined by national supervisors based on certain qualitative and quantitative criteria) to destabilise the global financial system and whose failure could severely impact the real economy. They are identified based on an assessment of their size, complexity, interconnectedness, substitutability and cross-jurisdictional activity, also taking into account, for instance, their trading volume and cross-border activity.

For a more general analysis of the G-SIIs' "climate action plans", the progress they are making toward achieving them and how they are including climate risk in their risk management practices, see Beltran, Bensen, Kvien, McDevitt, Sanz and Uysal (2023).

26 Banks identified as domestic systemically important institutions in the annual assessment conducted by national competent authorities, based on certain basic criteria: size, importance for the economy of the relevant Member State, complexity and the interconnectedness of the institution or group with the financial system. Typically, any institution scoring higher than 350 basis points in the assessment is automatically identified as an O-SII.

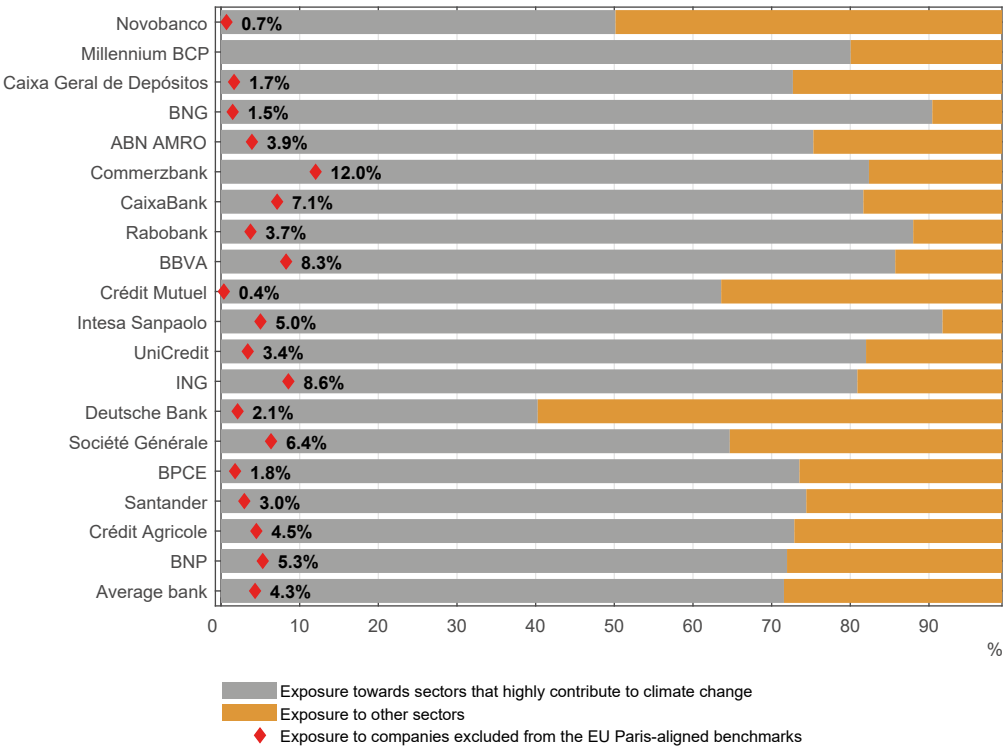
27 See the O-SII section of the EBA website.

28 With regard to Chart 4.a, it should be noted that Banco Comercial Português (Millennium BCP) did not report data on exposures to counterparties excluded from the EU Paris-aligned benchmarks.

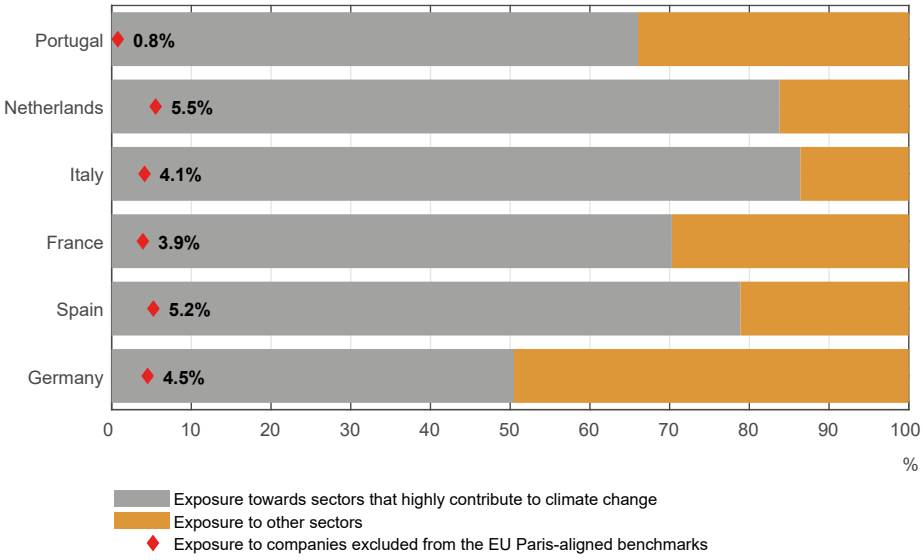
Chart 4

Transition risk of other European credit institutions

4.a Exposures to NFCs



4.b Exposures to NFCs aggregated by country of origin



SOURCE: Banco de España calculations based on information published on the banks' websites.

highly contribute to climate change account for just over 70% of all exposures towards NFCs, with clear differences between the banks. For instance, in the case of Intesa Sanpaolo this percentage stands at 92%, compared with 40% for Deutsche Bank. Looking at Spanish banks, Santander stands at the average, while both BBVA and CaixaBank are above the average. Again, in average weighted terms, the share of exposures towards counterparties excluded from EU Paris-aligned benchmarks is far lower (4.3%).

Aggregating the data by the analysed banks' country of origin (see Chart 4.b), in Germany the percentage of exposures to sectors that highly contribute to climate change is comparatively low (50%), particularly compared with the Netherlands and Italy (nearly 90%), while Portugal, France and Spain lie somewhere in between (70%-80%). These aggregate data must be treated with caution due to the small sample size and the relative weight that some banks may have in the data.

Lastly, Chart 5 sets out, at the aggregate level, the energy efficiency of the immovable property pledged as collateral in loans extended by the sample banks, grouped for these purposes by country of origin. Again, the aggregate data should be regarded with caution due to the small number of banks in the sample and the relative weight that certain banks may have in the data.

As can be seen, immovable property collaterals lacking an EPC label is a common phenomenon across all of the European banks analysed. In this sample, French banks have the highest percentage of collaterals without EPC labels (86%), while Dutch banks have the lowest percentage (59%). Among the EPC labels that have been granted, there is a notably high percentage of class E labels at Spanish banks, which highlights the need to improve the rating allocation criteria to provide as accurate a picture as possible of their energy efficiency. Again, it is worth highlighting the endeavours of the institutions analysed to estimate the energy consumption of immovable property collaterals without EPCs in the EU.

5 Concluding remarks

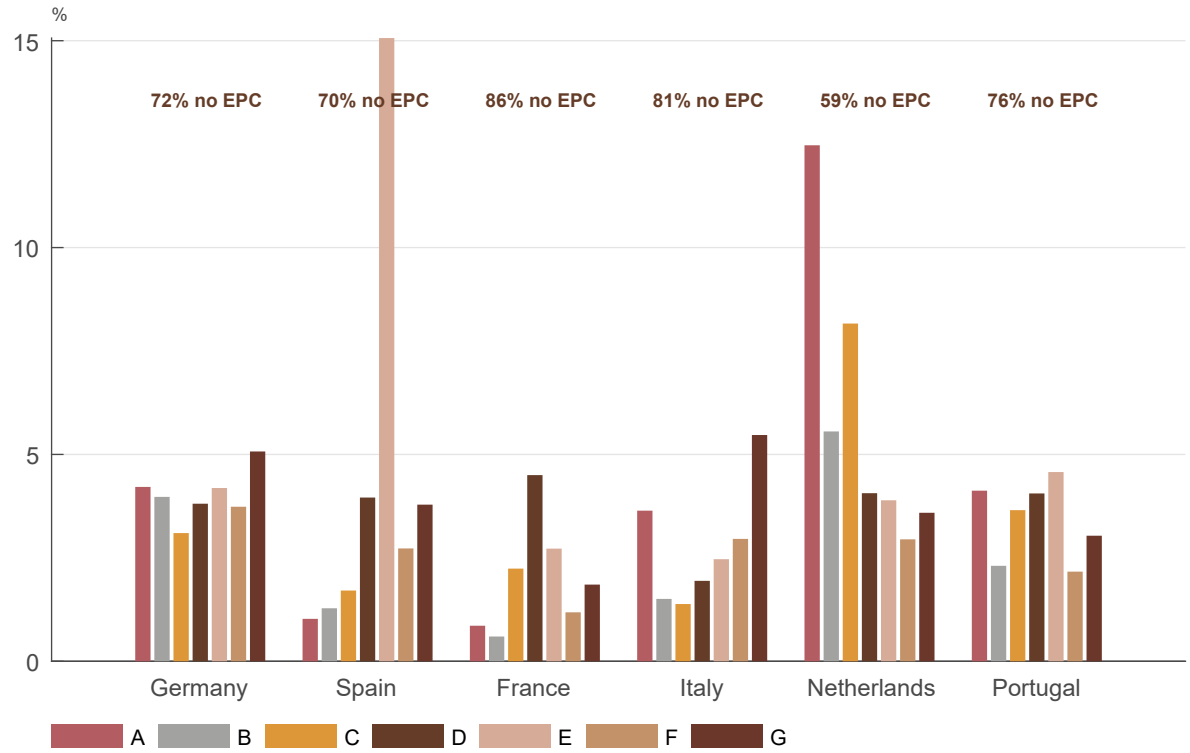
The implementation of the first requirements set out in the Regulation represents a major step forward in the disclosure of climate-related risks in the banking sector, obliging European credit institutions to publish granular and comparable climate data that were previously not available.

These disclosures have provided the basis for the analysis conducted in this article. This is a descriptive analysis that, as noted above, must be interpreted with due caution. First, because the information disclosed is complex and had not been reported in this granularity and in these formats before, meaning that errors of interpretation cannot be ruled out. Second, because some of the risk indicators (e.g. the identification of sectors that highly contribute to climate change) could be overly broad. And lastly, because the analysis is based on still incomplete information, given that a significant part of the data to be disclosed under the Regulation is subject to the phase-in periods detailed above.

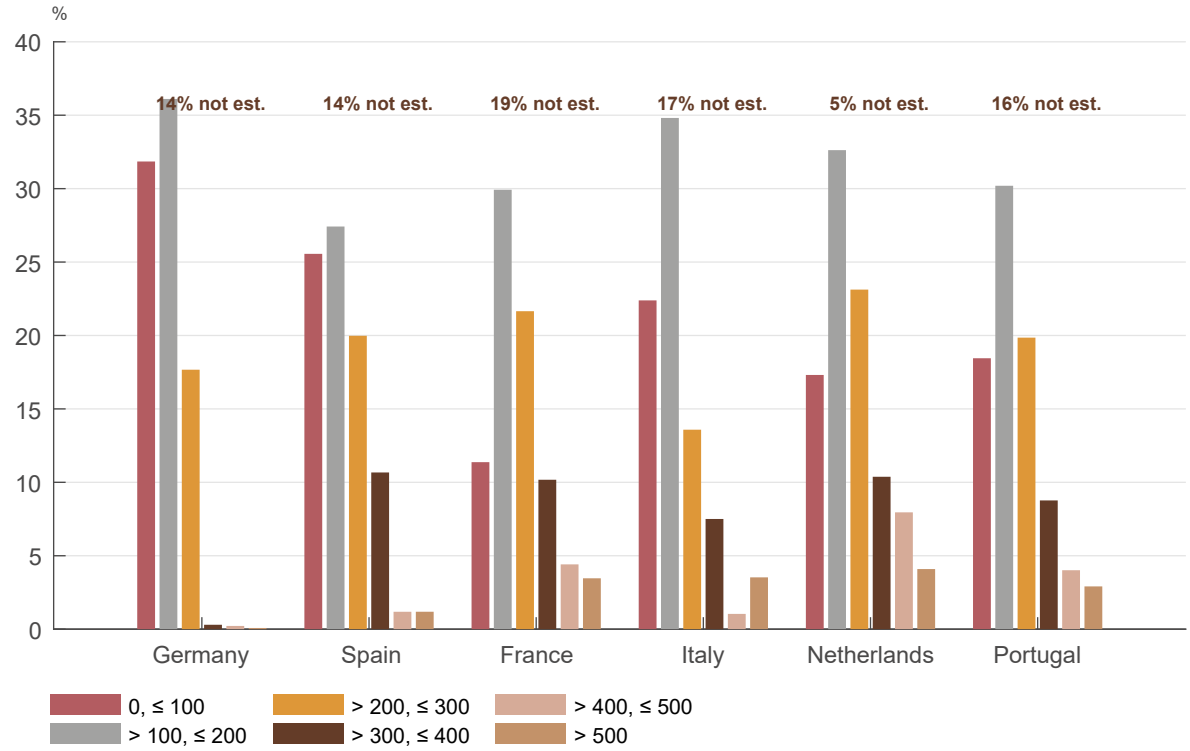
Chart 5

Energy efficiency of immovable property collaterals and of repossessed collaterals in the EU. European credit institutions analysed, aggregated by country of origin

5.a By energy performance certificate



5.b By energy efficiency level



SOURCES: Banco de España calculations based on information published on the banks' websites.

With the application of the Corporate Sustainability Reporting Directive, banks will foreseeably have higher quality data on their counterparties, thus enhancing the quality of their Pillar 3 disclosures. With time, the analysis can also be rounded out with the other aspects envisaged in the Regulation and with future developments in the indicators, thus enabling a more comprehensive and qualified assessment.

However, as pointed out in Banco de España (2023), the information disclosed highlights the significance of banks' exposures to climate risks and the need to further improve the quality and granularity of the database to ensure that these risks are managed appropriately.

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Annex 1 List of Spanish credit institutions analysed[1]

Table A1.1

Institution	Link to published corporate information
Banco de Santander, S.A.	https://www.santander.com/en/shareholders-and-investors/financial-and-economic-information/pillar-iii-disclosures-report
Banco Bilbao Vizcaya Argentaria, S.A.	https://shareholdersandinvestors.bbva.com/financials/financial-reports/#2022
CaixaBank, S.A.	https://www.caixabank.com/en/shareholders-and-investors/economicfinancial-information/informacion-con-relevancia-prudencial-pilar-3.html
Banco de Sabadell, S.A.	https://www.grupbancsabadell.com/corp/en/shareholders-and-investors/economic-and-financial-information.html
Bankinter, S.A.	https://www.bankinter.com/webcorporativa/en/shareholders-investors/financial-information/third-pillar-market-discipline
Unicaja Banco, S.A.	https://www.unicajabanco.com/en/inversores-y-accionistas/informacion-economico-financiera/informacion-con-relevancia-prudencial
ABANCA Corporación Bancaria, S.A.	https://www.abancacorporacionbancaria.com/en/investors/financial-information/#2022
Kutxabank, S.A.	https://www.kutxabank.com/cs/Satellite/kutxabank/en/investor_relations/financial_information/pillar_iii
Banco de Crédito Social Corporativo, S.A. (Cajamar)	https://www.cajamar.es/en/comun/informacion-corporativa/informacion-para-inversores/informacion-financiera/informacion-relevancia-prudencial/
Ibercaja Banco, S.A.	https://www.ibercaja.com/shareholders-and-investors/financial-information/information-of-prudential-relevance

1 This article uses the information published on the websites of the sample banks at 31 July 2023.

Annex 2 List of European credit institutions analysed[1]

Table A2.1

Institution	Type	Country	Link to published corporate information
Deutsche Bank AG	G-SII O-SII	Germany	https://investor-relations.db.com/reports-and-events/regulatory-reporting/#tab-container-1-2022-2020-2
Commerzbank AG	O-SII	Germany	https://investor-relations.commerzbank.com/disclosure-report/
Banco Santander, S.A.	G-SII O-SII	Spain	https://www.santander.com/en/shareholders-and-investors/financial-and-economic-information/pillar-iii-disclosures-report
Banco Bilbao Vizcaya Argentaria, S.A.	O-SII	Spain	https://shareholdersandinvestors.bbva.com/financials/financial-reports/#2022
CaixaBank, S.A.	O-SII	Spain	https://www.caixabank.com/en/shareholders-and-investors/economicfinancial-information/informacion-con-relevancia-prudencial-pilar-3.html
BNP Paribas S.A.	G-SII O-SII	France	https://invest.bnpparibas/en/search/reports/documents/regulated-information?s%5Bsubthemes%5D%5B%5D=4
Crédit Agricole S.A.	G-SII O-SII	France	https://www.credit-agricole.com/en/finance/financial-publications
BPCE S.A.	G-SII O-SII	France	https://groupebpce.com/en/investors/results-and-publications/pillar-iii
Société Générale S.A.	G-SII O-SII	France	https://investors.societegenerale.com/en/financial-and-non-financial-information/regulated-information-and-other-important-information
Confédération Nationale du Crédit Mutuel	O-SII	France	https://investors.bfcm.creditmutuel.fr/investor-relations/regulated-financial-information?aeed09c6_year%5Bvalue%5D=2023&aeed09c6_widget_id=aeed09c6&form_build_id=form-UasZ_E-GFQrlgzVFJylibl80UDiXLXD38gvN7c3blBl&form_id=widget_form_base
UniCredit S.p.A.	G-SII O-SII	Italy	https://www.unicreditgroup.eu/en/investors/financial-reporting.html
Intesa Sanpaolo S.p.A.	O-SII	Italy	https://group.intesasanpaolo.com/en/governance/risk-management/3rd-pillar-basel
ING Groep N.V.	G-SII O-SII	Netherlands	https://www.ing.com/Investor-relations/Financial-performance/Annual-reports.htm
Coöperatieve Rabobank U.A.	O-SII	Netherlands	https://www.rabobank.com/about-us/organization/results-and-reports/downloads
ABN AMRO Bank N.V.	O-SII	Netherlands	https://www.abnamro.com/en/investor-relations/information/all-financial-reports?selectedTabs=2022
BNG Bank N.V.	O-SII	Netherlands	https://www.bngbank.com/Financials/Annual-report-2022
Caixa Geral de Depósitos, S.A.	O-SII	Portugal	https://www.cgd.pt/english/investor-relations/financial-information/pages/pillar-3-report.aspx
Novo Banco S.A. (Novobanco)	O-SII	Portugal	https://www.novobanco.pt/english/investor-relations/financial-information0/financial-disclosures#accordion-824cc5bc4d-item-3e46c3eae0
Banco Comercial Português, S.A.	O-SII	Portugal	https://ind.millenniumbcp.pt/en/Institucional/investidores/Pages/Disciplina-de-Mercado.aspx

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INNOVATION IN RETAIL PAYMENTS AND ITS IMPACT ON CENTRAL BANKS' OVERSIGHT FUNCTION

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INNOVATION IN RETAIL PAYMENTS AND ITS IMPACT ON CENTRAL BANKS' OVERSIGHT FUNCTION

Abstract

Technological advances are having a significant impact on countless aspects of our lives and, in particular, on how we pay for the goods and services we consume. These changes in the payment value chain are affecting the oversight functions of central banks and other authorities entrusted with making certain that new risks that appear are managed appropriately, to ensure that innovation translates into secure efficiency gains. This article focuses on the impact of these innovations on central banks' functions. It first examines recent developments in payment habits in Spain as a consequence of technological innovation and other key factors such as those related to the COVID-19 pandemic. It then describes the impact of innovation on interbank payment processes. Lastly, it analyses the response of the Eurosystem – from an oversight standpoint – and of other authorities to the changes in the payment ecosystem.

Keywords: innovation, oversight, instant payments, cyber security, cyber resilience, crypto-assets.

1 Introduction

Technological advances are having a significant impact on countless aspects of our lives and, in particular, on how we pay for the goods and services we consume. These changes are occurring throughout the payment value chain (see Figure 1), extending not only to the payment instruments and services provided to final users but also to interbank clearing and settlement services. In consequence, they are affecting the oversight functions of central banks and other authorities entrusted with making certain that new risks that appear are managed appropriately, to ensure that innovation translates into secure efficiency gains.

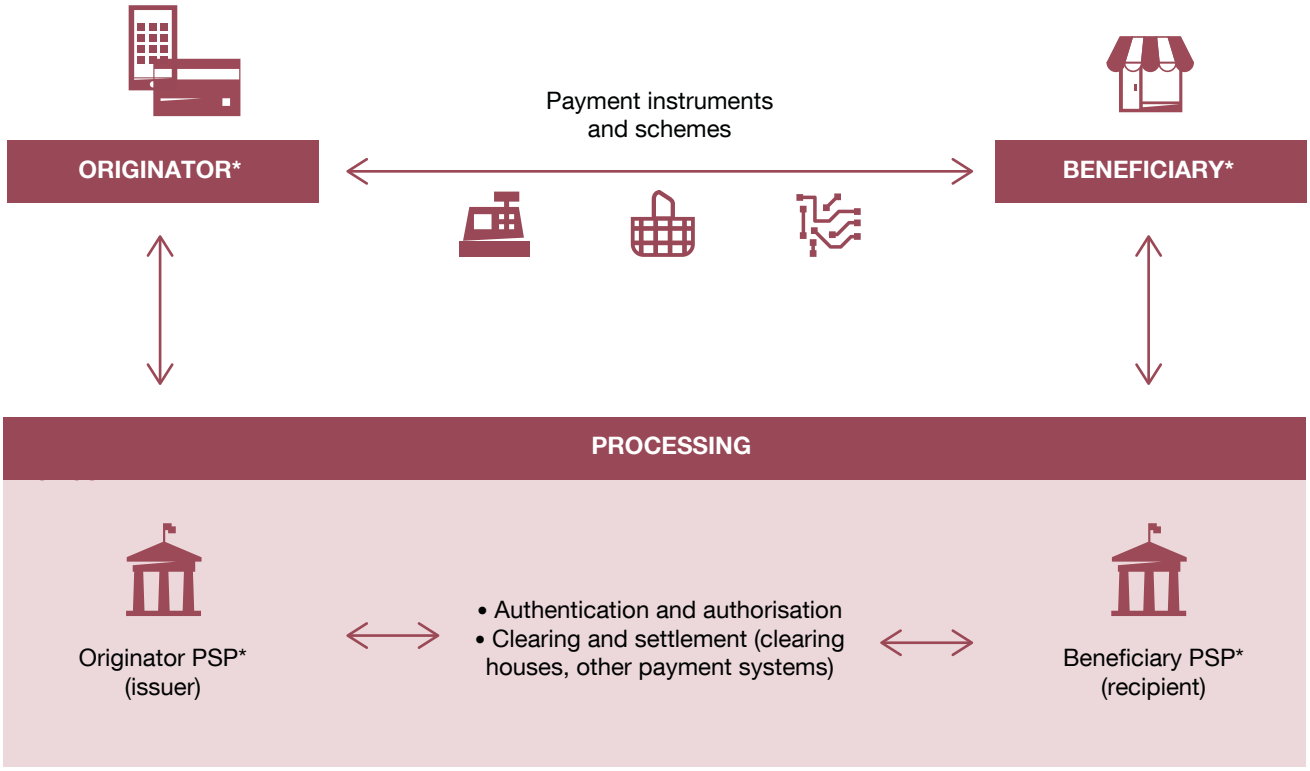
Against this backdrop, Section 2 presents an overview of recent developments in payment habits in Spain as a consequence of technological innovation and other key factors such as those related to the COVID-19 pandemic. Section 3 describes the impact of innovation on interbank payment processes, while Section 4 analyses the response of the Eurosystem – from an oversight standpoint – to the changes arising in the payment ecosystem. Lastly, Section 5 sets out the main conclusions drawn.

2 Today's retail payment ecosystem[1]

The retail payment ecosystem was severely affected by the spread of the COVID-19 pandemic, owing to the impact of the restrictions and social distancing measures on economic activity.

1 The payment ecosystem may be defined as the total set of players in the payment chain, including, among others, the participating institutions, the final service users (i.e. the payee and payer in each transaction), the clearing and settlement mechanisms and the IT service providers.

Figure 1
Typical payment value chain



* PSP: Payment Service Provider. In most payment transactions, the originator is the payer; one exception are direct debits, where the payment order is issued by the beneficiary, according to a previous direct debit mandate.

SOURCE: Banco de España.

Nevertheless, in Spain and in the rest of Europe, the financial market infrastructure and its ecosystems responded swiftly and effectively to the effects of the pandemic.

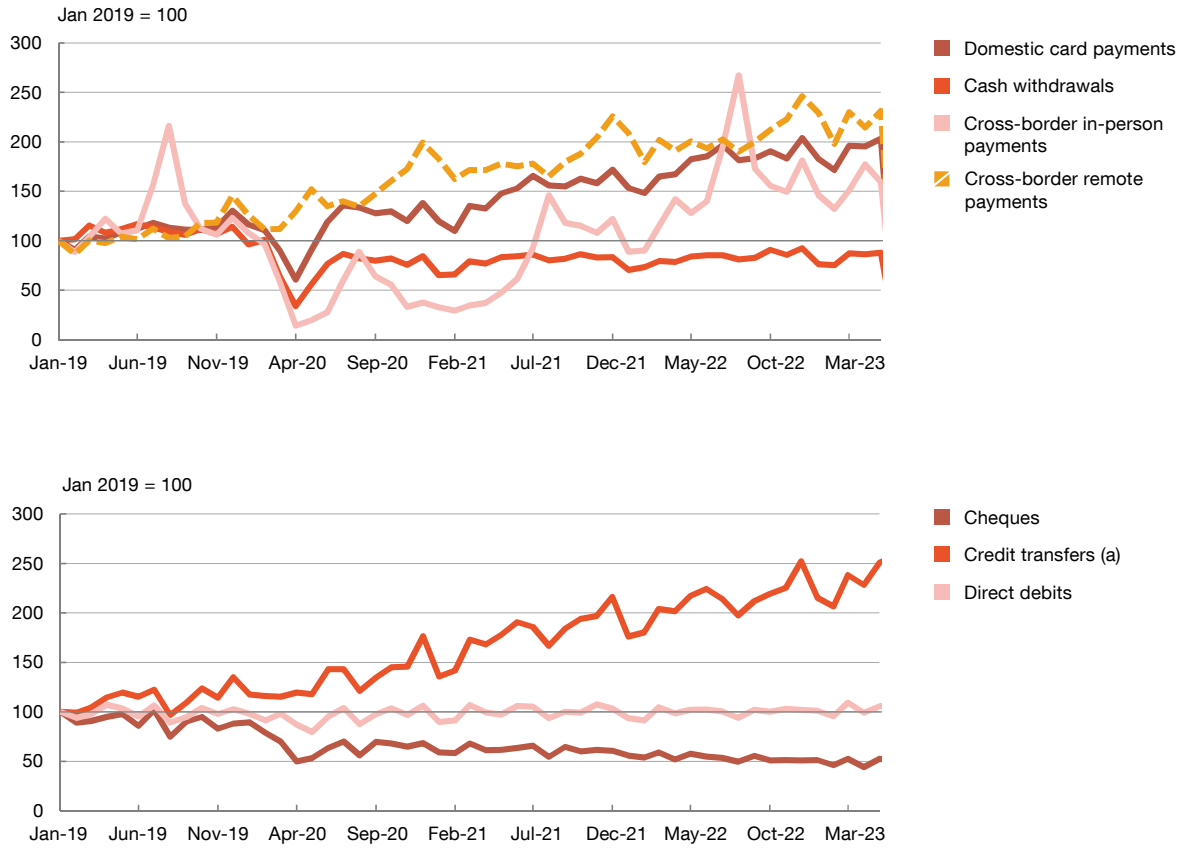
During the most acute phases of the health crisis, payment system transactions decreased significantly, in line with the sharp fall in economic activity. In 2020 Q2, for instance, card payments by residents fell by 50% year-on-year in Spain as a result of the slump in private consumption. Cross-border card payment transactions fell even more sharply, by almost 90%, owing to the collapse in travel and in the tourism industry in general. Direct debits also suffered a significant impact, decreasing by almost 20%, as did payments by cheque, which fell by 42% year-on-year during the lockdown periods in 2020.

After the crisis, activity levels recovered. Thus, compared with 2019 Q4, the last full quarter before the onset of the pandemic, in 2022[2] card transactions were 48% higher by number (34% higher by value). Credit transfers have likewise increased sharply, in this case largely

2 On card data available up to 2022 Q2.

Chart 1

Latest developments in the use of different payment instruments in Spain, by number of transactions



SOURCE: Banco de España, drawing on data provided by card networks and the SNCE.

a Includes instant credit transfers.

driven by the take-off of instant credit transfers. All other electronic payment instruments have also shown signs of recovery, albeit at a more moderate pace, while payments by cheque continue to decline.

Electronic payment instruments have gradually gained ground, to the detriment of cash as a means of payment. The strong growth in remote payments is consolidating, especially in e-commerce, at the same time as contactless payments[3] have become widely used. Thus, in 2022, remote card transactions were 45% higher than in 2019 Q4, whereas cash withdrawals from ATMs, which reflect the intensity of cash use, were 26% lower. Similarly, SPACE[4] data

3 Contactless payments are those where the payment instrument – be it a physical card or other device (such as a mobile phone, or wearables such as a smartwatch or bracelet) – does not need to enter into direct contact with the point of sale in order for a payment to be made.

4 *Study on the payment attitudes of consumers in the euro area (SPACE).*

show that cash transactions at points of sale fell by 18 percentage points (pp) between 2019 and 2022, from 84% to 66% of the total.

Even before the pandemic, contactless card and mobile payments had achieved high penetration levels in Spain. This trend accelerated in 2020 Q2, especially for low-value purchases. By late 2021, contactless payments amounted to 84% of all in-person card payments, compared with 78% before the start of the pandemic, with stores reinforcing this consumer preference by encouraging purchasers to reduce physical contact at points of sale to a minimum as part of their COVID-19 protection protocols.

Broadly speaking, most contactless payments in Europe use NFC (near-field communication) technology. This is short-range wireless technology that requires that the distance between the point of sale and the physical card or mobile device is no more than 15-20 centimetres. In early 2022, 92% of cards and 93% of points of sale in Spain were enabled for contactless NFC payments. In addition to mobile phones, a wide variety of devices are being enabled for NFC technology, including wearables such as smart watches, bracelets and rings.

Remote card purchases (payments made online, via e-mail/post or by telephone), which accounted for slightly more than 20% of all card purchases in Spain before the pandemic, grew to more than 40% of the total in April 2020, as a consequence of the lockdown measures and physical store closures that led new users in different age groups to experiment with their first remote purchases and payments. In early 2022, remote purchases continued to account for around 25% of the total value of purchases made with cards issued in Spain.

The use of digital wallets on mobile phones[5] and smart watches has also grown, via solutions owned by financial institutions and X-Pay solutions.[6] Both provide for secure digital storage of cards, for in-person use via NFC technology and e-commerce, and are a means of payment accepted in a large number of stores.

Quick-response or QR codes[7] are an alternative technology that offers various solutions for mobile phone payments. They may be either static or dynamic and are presented by either the consumer or the store. Bizum[8] has introduced an in-person payment solution based on QR codes for use in Spain's State lottery outlets, for payments and for collection of lottery prizes via instant credit transfers. Other examples of mobile payment solutions using QR codes in the rest of Europe are MB WAY in Portugal, Bancontact in Belgium, Swish in Sweden and

5 Digital wallets are applications that store payment credentials securely, allowing users to make in-store and e-commerce payments. They can also provide other value added services, such as storing and sorting loyalty cards, identification documents, etc.

6 Mobile payment solutions provided by tech companies, such as Apple Pay, Google Pay or Samsung Pay.

7 QR codes have evolved from traditional barcodes and are a matrix of dots or pixels arranged in a two-dimensional square. They may be scanned, for instance, with a mobile phone camera, which instantly opens up the content of the matrix, enabling the exchange of information for payment.

8 Bizum is the outcome of a sector-wide initiative launched in 2016 by Spanish financial institutions to enable payments via mobile devices or telephone numbers. Among other use cases, Bizum allows individuals to make and receive payments to and from other individuals, and enables payments to and from firms and the self-employed. It is also expanding both as an e-commerce and an in-store payment solution.

iDEAL in the Netherlands. QR code-based payment solutions are also widely used in China and India. At the international level, PayPal is also expanding thanks to its own QR code-based in-person payment solution.

In consequence, mobile devices are being used more and more for making payments. In addition to providing an enhanced user experience, they incorporate security innovations, such as the use of biometrics for user authentication[9] or tokenisation[10] of payment credentials, thus limiting the risks associated with their use and, therefore, reducing fraud and enhancing consumer protection.

Another change in recent years is the rapid growth in instant payments, worldwide and especially in Spain, driven by the digitalisation of the economy and the need for immediacy. Indeed, instant payments are expected to replace other traditional payment instruments completely over the medium to long term. There are numerous use cases of instant payments, but mobile person-to-person (P2P) payments,[11] where the payment is made by the payer and received by the payee instantly, are currently the most common example. In Spain, Bizum has proved to be a successful payment solution, providing a basic service that uses the personal telephone numbers of the payer and payee rather than the IBAN of their respective payment accounts. Provided that both parties to the transaction have signed up to the service with their respective financial institutions, all that the payer needs to know to transfer funds to the payee is their personal telephone number.[12]

Although the concept of instant payments may be more or less intuitive, there is no agreed definition worldwide, but rather it varies by country or region. In Europe, the European Commission has launched a proposal for a regulation on instant credit transfers in euro, which aims to encourage the use of these transfers and will foreseeably include a definition. Meanwhile, the Euro Retail Payments Board (ERPB)[13] defines instant payments as electronic retail payments that are processed 24/7, in which the payment instruction is processed and the funds are made available to the recipient immediately, or almost immediately, providing the payer with confirmation of the transaction in a matter of seconds, irrespective of the payment instrument and interbank clearing and settlement systems used. However, the ERPB

9 Confidence in payment systems is essential for financial stability. In this respect, the European regulation (PSD2) has been revised, to strengthen security. Payment service providers (PSPs) are required to undertake strong customer authentication when customers access their payment accounts and make electronic payments. Strong or two-factor authentication requires at least two of the following: 1) something you know (a password or PIN code known only to the user); 2) something you have (a chip card or device that generates a security code held only by the user); and 3) something you are (for instance, using fingerprint or voice recognition thanks to advances in biometrics).

10 Tokenisation consists in payment instrument credentials, such as card details, being replaced by limited-use tokens. For instance, a token may be linked to a specific mobile phone, or may be used only in a specific e-commerce store, with no need for the store to access the genuine card number, thus reducing the risk of unauthorised access to data and hence the risk of fraud.

11 Other use cases of instant payments are person-to-retail (P2R) or person to e-retail (P2eR) payments.

12 When a user signs up to Bizum, their telephone number is linked to the IBAN of the payment account that will be used to send and receive payments through Bizum. From that point on the telephone number becomes a proxy for the IBAN, such that, in practice, providing one's telephone number is the same as providing one's IBAN.

13 The ERPB is tasked with enhancing euro retail payments. It is chaired by the European Central Bank (ECB) and includes representatives from both the supply and demand side of the EU payments market.

has opted for instant credit transfers, as defined by the European Payments Council (EPC), as the underlying payment instrument for instant payments.

In November 2017 the EPC approved the pan-European SEPA instant credit transfer (SCT Inst) scheme[14] to enable individuals, businesses and other economic agents in the SEPA area to make and receive instant credit transfers in euro according to the same rules, conditions and standards, irrespective of the country of origin or destination of the payment. Since the introduction of this new scheme, instant credit transfers are gradually replacing traditional credit transfers, such that by early 2023 they accounted for 13.3% of total credit transfers in the euro area. This migration has been much faster in Spain, where by the same date instant credit transfers amounted to 48.7% of the total, and is closely connected to the widespread adoption of mobile payments via Bizum, which accounts for some 90% of all instant credit transfers in Spain.[15]

One of the aims of the Euroystem's retail payments strategy is for instant credit transfers to become the "new normal" in terms of payment instruments. This entails making instant credit transfers available to all individuals and businesses across Europe, offering attractive conditions for end users, such as reliability of payments across all electronic channels and ease of use. This aim is consistent with the ERPB's work streams, which seek to promote the development of a pan-European solution for instant payments in euro, open to any PSP in the SEPA area.

Lastly, among the innovations attracting most attention in recent years is the possibility of certain crypto-assets[16] being used in the future to make payments.

However, the specific features of crypto-assets, together with their price volatility, stand in the way of their possible use as a means of payment because of the risks involved. Subsequently, variants have emerged with features that are more susceptible to such use. For example, stablecoins, whose main feature is that they are backed by another asset or pool of assets and aim to maintain a stable value relative to such asset or assets. Meanwhile, some types of centrally-issued stablecoins or payment tokens could be considered similar to e-money.

To date, the lack of a regulation governing the issue and use of stablecoins has hindered their expansion as a means of payment. In Europe, the recently approved MiCA (Markets in Crypto-Assets) Regulation aims to cover some of the activities related to these assets. So far, however, crypto-assets cannot be considered a reliable means of payment. Indeed, the European supervisory authorities of the European System of Financial Supervision (EBA, ESMA and

14 The EPC is an international non-profit association with 77 members (PSPs or associations of PSPs) which devises standards and schemes to promote the integration and development of European payments. The SCT Inst scheme, which enables instant credit transfers, is one of such schemes.

15 Source: Banco de España, drawing on data provided by Bizum and Iberpay, which manages the Spanish Electronic Clearing System (SNCE, by its Spanish acronym).

16 Crypto-assets are defined as digital representations of value or rights that can be transferred and stored electronically, using distributed ledger or similar technology, but which are not backed by any authority and for which there is no public or private body that controls the ledgers.

EIOPA[17]) have issued a warning, backed by the Banco de España, the Spanish National Securities Commission (CNMV) and the Directorate General of Insurance and Pension Funds (DGSFP), on the risks that crypto-assets pose to consumers in the European Union, making them inadvisable either as an investment or as a means of payment or exchange for most retail consumers.

In this setting, numerous central banks worldwide have launched projects to issue central bank digital currencies (CBDCs). Many of these projects are analysing how sovereign digital currencies can fit into the wholesale or retail payment sphere, considering a range of support technologies for their issue and distribution. In particular, in October 2021 the Eurosystem launched a research project for a possible digital euro,[18] which could complete the retail payment ecosystem with an easy-to-use retail CBDC. The initial investigation stage of the project lasted for two years. On 18 October 2023, the ECB Governing Council approved the second or preparation phase, which is expected to last for another two years. The successive phases of the digital euro project are conditional upon the EU approving the necessary legislative framework, and upon the ECB Governing Council making the decision to issue the digital euro. Some countries, such as China, have already launched pilot CBCD projects.

3 Innovation in interbank payment processes

Technological innovation and changes in payment habits are also affecting interbank clearing and settlement processes, which are a key component of the retail payment value chain.

The boom in instant payments seen in recent years has inevitably been accompanied by changes in the payment systems used to process them, given the specific features of this payment instrument. In particular: (i) the immediate crediting of the payee's account as soon as the payer has issued the payment instruction, with the funds being made available instantly to the payee; and (ii) the need to mitigate the interbank credit risk that may arise if the funds are credited to the payee's payment account before interbank settlement takes place (i.e. before the funds are debited to the payer's bank and credited to the payee's bank).

To enable instant payments, the Eurosystem implemented a system for real-time interbank gross settlement, where transactions are settled individually on a firm and irrevocable basis in the corresponding clearing house register, without there being any interbank credit risk as banks prefund the dedicated central bank account managed by the clearing house. TARGET Instant Payment Settlement (TIPS) is the platform operated by the Eurosystem for the real-time settlement 24/7 of such transactions in central bank money.

Other central banks have also developed their own instant payment settlement systems, such as PIX, established by Banco do Brasil for mobile phone transactions; the CoDi platform,

17 The European Banking Authority, European Securities and Markets Authority, and European Insurance and Occupational Pensions Authority, respectively.

18 See the digital euro page of the ECB's website.

implemented by Banco de México to enable credit transfers to be sent and received using QR and NFC codes, or the Transferencias 3.0 initiative (using interoperable QR codes) launched by Banco Central de Argentina.

Moreover, much of the innovation in interbank clearing and settlement processes is based on distributed ledger technology (DLT). This enables the recording of data, such as asset holdings or financial transactions, on a computer network which verifies each item and stores updates, without having to rely on a single centralised ledger system. The key feature of this technology is that it offers a single shared ledger of which there are multiple identical copies distributed among several participants and which are updated in a synchronised manner. This reduces costs, by minimising messaging and eliminating the need for reconciliation between parties, while enhancing the traceability of transactions, transparency and, in some cases, the speed of interbank processes.

In addition, DLT networks can be leveraged for the use of "smart contracts",[19] allowing the execution of payments to be automated and programmed, based on a code or IT protocol that will enable automated verification and execution of the underlying agreement, without the need for intermediaries, when predetermined conditions are met. An example of how this technology is used is the "proof of concept" (PoC) launched in September 2019 by Iberpay (which, as mentioned earlier, manages and operates the SNCE) and various major financial institutions. The PoC, known as "Smart Payments", aimed to test the execution of payments on blockchain networks linked to smart contracts, ultimately using instant credit transfers for these payments. The PoC tested the connection of blockchain networks to the SNCE (specifically, with the instant credit transfer sub-system), such that the payments initiated on a blockchain network could be processed and settled using the current payment systems. In particular, a collateral management business case was tested, that is, the entire lifecycle management of a bank guarantee in a blockchain network, and the automatic processing and settlement of the payment associated with the fees and enforcement of the guarantee.

4 Regulatory and oversight developments in response to these changes

The profound transformation of the payment ecosystem in recent years has, needless to say, led the various authorities concerned to adopt measures to avoid excessive risk-taking which could jeopardise the efficiency gains for this ecosystem, in particular, and the development in general, in economic terms, of financial and technological innovation processes.

One of the challenges the authorities face in this area stems from the cross-border nature of many of the innovative solutions that have emerged in recent years. A clear example are the initiatives launched by the big techs, which provide IT services for the payment chain or payment services of their own worldwide. This adds complexity and poses new challenges in

19 Programmable contracts that are automatically executed without the involvement of third parties and operate as IT programs, replacing printed documents containing legal language.

terms of ensuring the right balance between innovation, competition and national sovereignty. Accordingly, coordination efforts between the authorities of different countries and supranational institutions have intensified in recent years at different fora both within the Eurosystem and globally.

In short, the authorities have had to gradually adapt their regulatory, supervisory and oversight framework, to put in place the tools they need to more effectively address the challenge of boosting innovation, while ensuring that it offers security and develops in a level playing field, under the "same activity, same risks, same rules" premise, regardless of the technology used or the environment (traditional vs. new players).

Specifically, the oversight of infrastructures by a central bank, particularly of payment systems and instruments,[20] consists of various activities which include the assessment of their risk management and functioning, and their security and efficiency. Notable in this regard are the CPMI-IOSCO[21] Principles for Financial Market Infrastructures (PFMIs), which are aimed at improving the security and efficiency of these infrastructures, be they payment or securities infrastructures, and more generally, at reducing systemic risk and promoting transparency and financial stability. These principles are international in scope and provide harmonised standards for infrastructures overall. However, they are not directly applicable but must be adopted by the competent authorities in their respective jurisdictions. The Eurosystem has developed its oversight frameworks on the basis of the PFMIs, which serve as common principles applicable to all euro area payment systems, both those deemed systemic[22] and other systems, based on proportionality from a risk perspective. The Eurosystem framework is complemented by the national frameworks, which may replicate it or expand on it further.

Consequently, the framework is more prescriptive for systemically important payment systems, to which Regulation (EU) 795/2014 (the SIPS Regulation) applies, regardless of whether they are large-value or retail payment systems, or operated by private operators or central banks. However, the requirements take into account the operator's risk profile and, accordingly, the regulation establishes certain exemptions for central banks. The Eurosystem's framework for the oversight of payment systems also includes a less prescriptive one for systems that are not systemically important.[23]

Turning to the risks to which payment systems are exposed, cyber risk has featured prominently in recent years. Cyber space, digitalisation, cloud services and big data, among other developments, offer major opportunities for innovation, but they also pose new threats, such

20 The Banco de España's oversight function is described in Article 16 of Law 13/1994 of 1 June 1994 on the Autonomy of the Banco de España.

21 The Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO). See the PMFI section of the website of the Bank for International Settlements.

22 Systemically important payment systems are those that pose a greater risk on account of their size, market share, cross-border activity or provision of settlement services to other financial market infrastructures.

23 The Eurosystem classifies payment systems as follows: systemically important payment systems (SIPS), prominently important retail payment systems (PIRPS), other retail payment systems (ORPS) and non-systemically important large-value payment systems (non-SIP LVPS).

as cyber attacks. The Eurosystem's current oversight frameworks therefore include additional requirements to address cyber risk. In the latest revision of the SIPS Regulation, a series of requirements for systems operators to establish an effective cyber resilience framework, with appropriate governance measures to manage cyber risk, was included in the article on operational risk. Operators shall identify their critical operations and supporting assets, and have appropriate measures in place to detect and respond to cyber attacks, protecting these operations and enabling their recovery from such attacks. In addition, bearing in mind the importance of implementing a culture of protection in this area, operators shall ensure that there is a process of continuous learning and change to enable them to adapt their cyber resilience framework to the dynamic nature of cyber risks, in a timely manner and whenever needed.

In 2017, the ECB adopted the Eurosystem's cyber resilience strategy for the financial market infrastructures under its remit. The strategy proposes the development of a range of tools that can be used by regulators and infrastructures to enhance cyber resilience. It consists of three pillars, for each of which a range of instruments are developed with a view to ensuring not only the cyber resilience of an infrastructure at the individual level, but also that of the infrastructure network as a whole. The first pillar centres on infrastructures and seeks to enhance their cyber resilience maturity. To do this, it includes tools such as: (i) cyber resilience oversight expectations (CROE),[24] which form the basis for the Eurosystem's testing exercises for payment systems; and (ii) the TIBER[25] framework, which details how to implement penetration tests such as "red teaming" in a real-life environment mimicking the tactics, techniques and procedures used in cyber attacks. The second pillar focuses on the collective resilience of the sector, through the analysis of interdependencies, collaboration through effective information-sharing mechanisms and sector-wide business continuity exercises. Lastly, the third pillar centres on the Euro Cyber Resilience Board (ECRB), a high-level strategic forum that brings together industry stakeholders and regulators. Its objectives include raising awareness about cyber resilience and acting as a catalyst for joint initiatives to develop effective solutions for the market.

It should be noted that the smooth functioning of payment systems overall not only requires robust and resilient infrastructures, but also secure and efficient payment instruments.

Traditionally, the oversight framework for payment instruments in the Eurosystem has been based on payment schemes. For oversight purposes, a payment scheme is a set of formal, standard and common rules for the transfer of funds between end users via electronic payment instruments (e.g. credit transfers, direct debit or payment cards).

Generally, the assessments conducted confirmed that payment schemes met with oversight requirements and, where shortcomings were found, the authorities governing these schemes followed the recommendations to remedy them issued by the overseers. However, the changes

24 European Central Bank (2018c).

25 European Central Bank (2018b).

in the payment ecosystem in the past decade have made it necessary to review the oversight framework for payment instruments, as occurred with that of payment systems, to broaden its scope, in order to encompass all the new developments in payments and any that may arise in the future.

The intent to extend the scope of this new framework is evident from its new name, the Eurosystem's oversight framework for electronic payment instruments, schemes and arrangements (the PISA framework). This framework, published in 2021,[26] comprises three documents: (i) the oversight framework itself; (ii) the assessment methodology, which takes into account the specificities of each particular scheme or arrangement; and (iii) an exemption policy, which is justified by a proportionality criterion.

It should be noted that the current definition of "payment scheme" has a broader scope, replacing the traditional concept of a transfer of funds with that of a transfer of value, in order to include, where necessary, certain crypto-assets. Specifically, crypto-assets that have a payment function and a governing authority are subject to oversight. Thus, crypto-assets that are fully decentralised fall outside the scope of the PISA framework.

Moreover, the framework introduces a new concept – "payment arrangement" – which is defined as a set of operational functionalities that support the end users of multiple payment service providers in the use of electronic payment instruments. These functionalities include: (i) payment initiation and facilitation of transfers of value; and (ii) storage or registering of personal security credentials or data related to electronic payment instruments. As with payment schemes, payment arrangements must be managed by a governing authority which issues the relevant rules (or terms and conditions) for their use. Payment arrangements include firms that provide support for the use of payment cards, credit transfers, direct debits, electronic money transfers and crypto-assets, such as digital wallets.

All in all, oversight frameworks are not static, but tend to evolve over time to respond to innovation in payments. Against this backdrop, the PFMIs are regularly reviewed to verify that they remain pertinent, as shown, for example, by the publication in 2021 of an analysis of the stablecoin arrangements ecosystem, which concludes that the PFMIs can also be applied to the oversight of such infrastructures, but must take into account their specific features.[27]

The Financial Stability Board (FSB)[28] has also published high-level recommendations for the regulation, supervision and oversight of stablecoin arrangements, but applicable only to global stablecoin arrangements. By contrast, the CPMI framework has a broader scope as it also addresses local stablecoin arrangements, although, in principle, only those considered systemically important for the jurisdiction concerned.

26 European Central Bank (2021).

27 Bank for International Settlements (2021).

28 Financial Stability Board (2020).

5 Conclusion

Although the payment market has, from the start, evolved in step with technological developments, the pace of change has greatly accelerated in recent years. The rapid succession of innovations is affecting the entire payment chain, be it the interbank component or that of the products offered to end users, and it has an impact on existing payment instruments and services and also drives the emergence of new ones, such as instant credit transfers. In addition, the COVID-19 pandemic boosted the penetration of certain innovations, particularly in the area of digitalisation, as shown by the growth in contactless or instant payments.

The transformation of the sector requires constant adaptation by the players involved in the payment ecosystem, highlighting the strategic importance of both efficient payments and the smooth functioning of the payment infrastructures for the economy as a whole.

Lastly, the regulatory and supervisory authorities have kept a close eye on this transformation, engaging in intense activity to adapt their regulatory, supervisory and oversight frameworks in order to provide the appropriate tools for the new setting and make them sufficiently flexible to address the continuous changes. The sector faces a complex challenge: to optimise the benefits of innovation while at the same time ensuring a sufficient level of security and a level playing field (i.e. same risks, same rules).

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FOURTH CONFERENCE ON FINANCIAL STABILITY ORGANISED BY THE BANCO DE ESPAÑA AND CEMFI

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FOURTH CONFERENCE ON FINANCIAL STABILITY ORGANISED BY THE BANCO DE ESPAÑA AND CEMFI

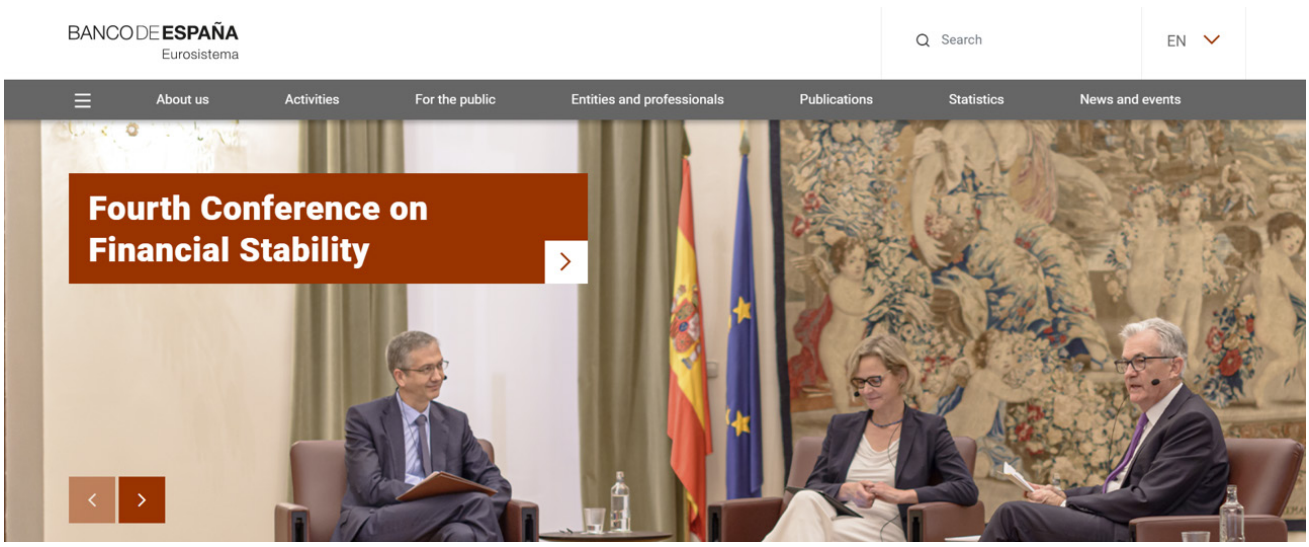
The Fourth Conference on Financial Stability, jointly organised every two years by the Banco de España and the Centro de Estudios Monetarios y Financieros (CEMFI), was held on 29 and 30 June 2023. As in previous editions, the event aimed to promote research and discussion of financial stability and macroprudential issues among central bankers, academics and practitioners.

The conference was attended by Jerome H. Powell, Chair of the Board of Governors of the Federal Reserve System, who gave an overview of the economic situation and the recent stress in the US banking sector. His remarks were followed by a dialogue with Pablo Hernández de Cos, Governor of the Banco de España, where they exchanged views on some of the main issues currently affecting global financial stability.

The programme included four research sessions in which twelve theoretical and empirical working papers were presented, selected from more than one hundred submitted in response to the *call for papers*. The topics covered included, inter alia, the effectiveness of capital requirements for banks, the impact of monetary policy on credit allocation, the relevance of environmental disclosures, contagion in banking networks, and the financial stability implications of central bank digital currencies and the so-called stablecoins.

The closing panel of the conference was devoted to crisis management and deposit insurance regulatory policy, focusing in particular on the specificities of the European Union's institutional and legal frameworks, the experience gained over the last decade and possible avenues for future reforms.

The event was held in English and in a hybrid format, with the speakers and nearly one hundred members of the audience physically present in the meeting hall of Banco de España's headquarters and the discussions streamed live on the internet.



Dialogue on 29 June 2023 in Madrid, photograph featured on www.bde.es.

Below are the links to the available conference files, including the working paper presentations, and to the video recordings uploaded to the Banco de España's YouTube channel. Speakers are indicated in italics.

29 June 2023

Opening (8:25-8:30)

Víctor Márquez, Banco de España

Keynote and dialogue (8:30-9:30)

Jerome H. Powell, Federal Reserve Board
Pablo Hernández de Cos, Banco de España

Moderator: *Cornelia Holthausen,* European Central Bank

Session 1 (10:15-12:15)

Chair: *Rafael Repullo,* CEMFI

Local lending specialization and monetary policy
Alejandro Casado, Universidad Carlos III de Madrid
David Martínez Miera, Universidad Carlos III de Madrid
Discussant: *Christian Eufinger,* IESE Business School

Useful, usable, and used? Buffer usability during the Covid-19 crisis
Aakriti Mathur, Bank of England
Matthew Naylor, Bank of England and University of Oxford
Aniruddha Rajan, Bank of England
Discussant: *Diana Bonfim,* Banco de Portugal and Católica Lisbon

Glossy green banks: The disconnect between environmental disclosures and lending activities
Mariassunta Giannetti, Stockholm School of Economics
Martina Jasova, Columbia University
Maria Loumioti, University of Texas at Dallas
Caterina Mendicino, European Central Bank
Discussant: *Eva Ortega,* Banco de España

Session 2 (13:30-15:30)

Chair: *Veronica Rappoport,* London School of Economics

The state-dependent impact of changes in bank capital requirements
Jan Hannes Lang, European Central Bank

Dominik Menno, Deutsche Bundesbank
Discussant: *Galo Nuño,* Banco de España

Sectoral credit allocation, capital requirements and financial stability
Maximiliano San Millán, CEMFI
Discussant: *Pedro Gete,* IE University

Banking dynamics, market discipline and capital regulations
Jose-Victor Rios-Rull, University of Pennsylvania
Tamon Takamura, Bank of Canada
Yaz Terajima, Bank of Canada
Discussant: *Javier Suarez,* CEMFI

Session 3 (16:00-18:00)

Chair: *Anatoli Segura,* Banca d'Italia

A structural model of interbank network formation and contagion
Patrick Coen, Toulouse School of Economics
Jamie Coen, Imperial College London and Bank of England
Discussant: *Piero Gottardi,* University of Essex

Can stablecoins be stable?
Adrien d'Avernas, Stockholm School of Economics
Vincent Maurin, Stockholm School of Economics
Quentin Vandeweyer, University of Chicago
Discussant: *Matthieu Bouvard,* Toulouse School of Economics

CBDC and financial stability
Tony Ahnert, European Central Bank
Peter Hoffmann, European Central Bank
Agnese Leonello, European Central Bank
Davide Porcellacchia, European Central Bank
Discussant: *Xavier Vives,* IESE Business School

30 June 2023

Session 4 (9:00-11:00)

Chair: *Núria Mas,* IESE Business School

Dynamic credit constraints: Theory and evidence from credit lines
Niklas Amberg, Sveriges Riksbank
Tor Jacobson, Sveriges Riksbank
Vincenzo Quadrini, University of Southern California

Anna Rogantini, Sveriges Riksbank
Discussant: *Frederic Malherbe,* University College London

A theory of eligibility
Matthias Kaldorf, Deutsche Bundesbank
Florian Wicknig, Deutsche Bundesbank
Discussant: *Victoria Vanasco,* CREI

Financing and resolving banking groups
Albert Banal-Estañol, Universitat Pompeu Fabra
Julian Kolm, Universität Wien
Gyöngyi Lóránth, Universität Wien
Discussant: *Alonso Villacorta,* UC Santa Cruz

Panel on crisis management and deposit insurance in Europe (11:30-13:00)

Chair: *Ángel Estrada,* Banco de España

Elena Carletti, Università Bocconi
Cornelia Holthausen, European Central Bank
Jesús Saurina, Single Resolution Board

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