BIENNIAL REPORT ON CLIMATE CHANGE RISKS TO THE FINANCIAL SYSTEM

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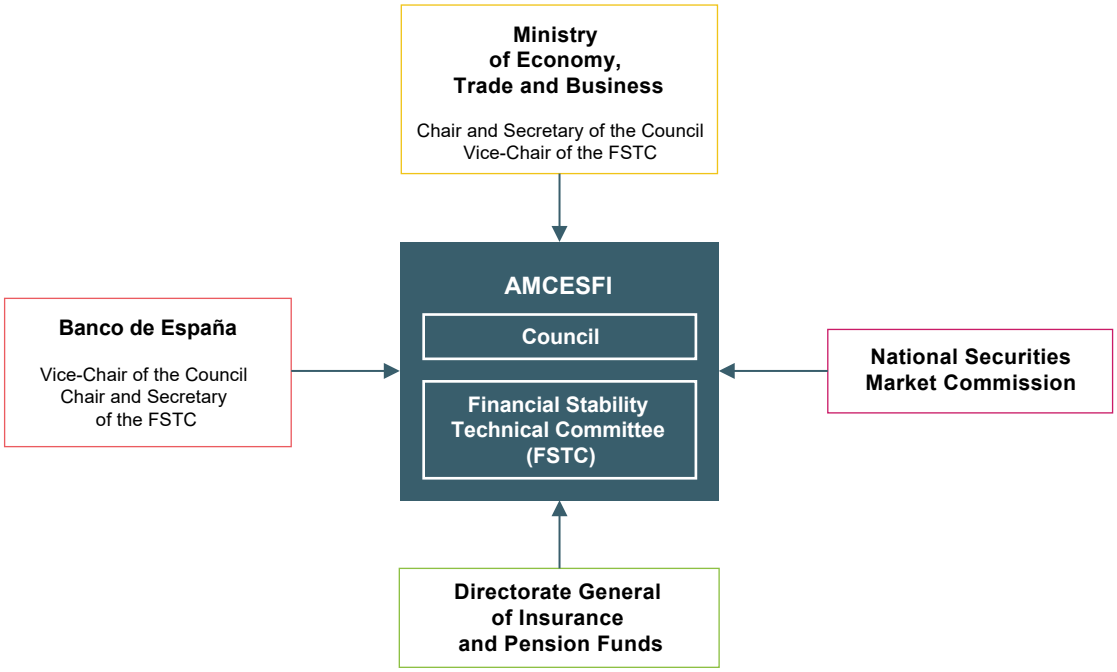
About AMCESFI and this report

AMCESFI *(Autoridad Macroprudencial Consejo de Estabilidad Financiera)* is the macroprudential authority for the Spanish financial system. Set up in 2019, its goal is to contribute to the stability of the financial system as a whole by identifying, preventing and mitigating any circumstances or actions that may give rise to systemic risk. For this purpose, AMCESFI is empowered to issue opinions, warnings and recommendations on matters that could affect financial stability.

AMCESFI is organised as an operationally independent collegiate body attached to the Ministry of Economy, Trade and Business. It also includes representatives of the three Spanish authorities with sectoral responsibilities for the regulation and prudential supervision of the Spanish financial system, namely the Banco de España, the National Securities Market Commission (CNMV) and the Directorate General of Insurance and Pension Funds (DGSFP) of the Ministry of Economy, Trade and Business.

AMCESFI comprises two permanent structures: a Council and a Financial Stability Technical Committee (FSTC). By its very nature, it has no human, material or financial resources of its own; its activity is underpinned by the support it receives from its member institutions.

Figure 1 Structure of AMCESFI



SOURCE: AMCESFI.

Spain reaffirmed its commitment to global sustainability by adopting Law 7/2021 on climate change and the energy transition. Law 7/2021 lays the foundations for greening the economy and facilitates the transition to a circular model, guaranteeing the sustainable use of resources and the adaptation to the effects of climate change.

This framework seeks to efficiently coordinate sectoral policies in pursuit of climate neutrality. The financial system holds a key position in this setting, as it is necessary to anticipate and mitigate the climate risks that may compromise its stability and sustainability.

To tackle this challenge, Law 7/2021 tasks the Banco de España, the CNMV and the DGSFP with preparing this biennial report, coordinated by AMCESFI.

The report is submitted to the Spanish Congress of Deputies and Senate to comply with the transparency and accountability requirements.

For more information about AMCESFI, see www.amcesfi.es/wam/en/.

Contents

Introductory letter from the Minister for Economy, Trade and Business

Carlos Cuerpo, Chair of the AMCESFI Council.

Dear reader,

It is my pleasure to present the second edition of the *Biennial Report on Climate Change Risks to the Financial System,* drawn up by the Banco de España, the National Securities Market Commission and the Directorate General of Insurance and Pension Funds, and coordinated by AMCESFI, the Spanish macroprudential authority.

Geopolitical uncertainty is calling into question the international consensuses on the need to allocate resources and implement measures that curb climate change and help us adapt to its consequences. However, catastrophes such as the flash floods in the Valencia region in October 2024 lead us to reaffirm our commitment to our goals of greening and transforming our economic model, by identifying, measuring and reducing climate-related risks.

Much headway has been made in sustainable finance since the publication of the first report on climate change risks two years ago. The roll-out of the Recovery, Transformation and Resilience Plan – including a second phase of loans and non-repayable instruments – is now a reality, with instruments such as the Official Credit Institute's green financing facility *(Línea ICO Verde)*, the Regional Resilience Fund and the Social Impact Fund.

The approval and publication of the Green paper on sustainable finance in Spain laid out the roadmap for stepping up the funding that firms need to press forward towards a climate-neutral economy. The creation of the Sustainable Finance Council in February 2025, which brings together the financial sector, the corporate sector, the third sector and academia, is an effective forum for dialogue and public-private collaboration that will enable the roll-out of the actions contained in the paper and support firms (particularly small and medium-sized enterprises) in the green transition.

Within sustainable finance, the Spanish Treasury's financing activity also plays a very important role, most notably in the diversification of the eligible expenditure categories under the sovereign green bond issuance programme. In addition to continuing to fund rail transport and infrastructure, last year agroinsurance and water management items were included. Leaving public funding to one side, this diversification is also important because it puts the market spotlight on Spain's agricultural insurance and water policies, thereby broadening the environmental goals pursued via State financing activity.

We are also at a critical juncture for sustainable finance from a European policy perspective. In the context of streamlining firms' administrative hurdles, the European Commission has just published its proposals to simplify the sustainability reporting framework in order to preserve and foster European firms' competitiveness. This is a very welcome development, as it will help firms disclose their sustainability information, reducing unnecessary costs and enabling us to achieve our climate and environmental goals more efficiently, without watering them down. Far from reducing competitiveness, sustainability is a key driver of our economic growth.

Against this backdrop, we are publishing the second edition of the *Biennial Report on Climate Change Risks to the Financial System.* As we noted in the first edition, this report draws on additional data sources and uses improved methodologies. With regard to the former, of particular note is the assessment of the nature and activity of Spain's Insurance Compensation Consortium as an essential instrument for adapting to the extraordinary risks linked to climate change. In particular, a special section of this report explains and quantifies the Consortium's action in handling the claims stemming from the flash floods in the Valencia region, and notes how it has been equal to an event which wrought an extraordinary level of damage, swiftly indemnifying the insured parties. This was possible thanks to the hiring of additional loss adjusters and claims handlers, the implementation of an agreement with private insurance companies to combine forces in the adjustment and compensation of damage and, most notably, thanks to the Consortium's staff's complete dedication. Thus, at 28 February 2025, 78% of the motor vehicle claims and 72% of the multi-risk claims had been handled.

This edition of the report drills down into the conclusions of the first one: (i) the resilience of the Spanish financial sector to climate change-related risks and (ii) the need to act through greening policies and policies that help to fund our economy's climate transition to ward off the unacceptable long-term costs.

Executive summary

This year's second edition of the *Biennial Report on Climate Change Risks to the Financial System* presents a more detailed and exhaustive analysis of the physical and transition risks than 2023's first edition, by taking into account new data sources and improved methodologies. For instance, the report's assessment of the banking sector's exposures to climate-related risks uses the data published by credit institutions under the European Union's Pillar 3 framework, which did not fully enter into force until 2024. Therefore, the data could not be used in the previous edition of this report.

Turning to the capital market, more robust data are used to comply with the Climate Change and Energy Transition Law's mandate of assessing the degree of compliance with the commitments under the Paris Agreement. The improvement in data quality stems from the previous edition using data that institutions sent voluntarily, while this report analyses the data published by Spanish listed firms in their sustainability disclosures.

On the insurance front, the exercise conducted in this edition of the report showcases the effectiveness of combined agricultural insurance and Spain's Insurance Compensation Consortium (CCS) at mitigating the impact of the materialisation of climate change-related risks. The report uses combined agricultural insurance and CCS data to track the damage caused by climate change and the number of extraordinary risk insurance policies and the sums insured.

Special mention should be made of the section on the flash floods that above all affected the Valencia region between 28 October and 4 November 2024. In addition to describing the phenomenon and estimating the impact on the economy of the affected areas, it details the CCS's actions in handling claims using different indicators that help to understand the singularity of this event and the CCS's extraordinary responsiveness.

This second edition of the report is fleshed out with specific analyses of different topics, such as the characteristics of renewable energy financing, the adverse economic impact of the deterioration of vulnerable ecosystems and the impact of energy efficiency on the real estate market.

Lastly, noteworthy in this edition is the section on regulatory developments following the publication of the European Commission's proposals to streamline sustainability reporting requirements.

1 Introduction. Climate change and financial stability

The financial sector supervisory authorities play an essential role in the fight against climate change by ensuring an adequate assessment of both individual and systemic climate risks. Climate change generates adverse economic and financial consequences that vary in severity depending on the sector, geographical location and type of financial intermediary. These consequences can reach a systemic dimension, affecting financial stability and economic growth.

Climate change impacts the financial system directly and indirectly through physical risks, such as extreme weather events or natural disasters, and transition risks, relating to the cost of the policies and transformations needed to mitigate its effects. Properly evaluating these risks is essential for making efficient financing and investment decisions that facilitate the transition to a carbon-neutral economy.

Financial stability policies require financial institutions to consider both the risks arising from climate change and the initiatives to mitigate and prevent it in their decision-making processes. As part of their mandate to contribute to greater financial stability, the authorities that make up AMCESFI are working on a framework to identify these risks in order to detect potential threats to the financial system in advance. Stress tests and the development of climate risk indicators are central to this task. Climate risks in the financial sector mainly manifest through institutions' exposure to carbon-intensive economic activities and investments in banks, sectors and households in affected regions.

Physical risks relate to the intensification of extreme weather events such as floods, droughts, heatwaves and hurricanes. As they become more frequent and severe, they can deteriorate the credit quality of firms, households and other economic agents exposed to them or located in the affected areas. This creates an adverse impact on the solvency of financial institutions, as their counterparts may face difficulties meeting their obligations. Additionally, insurance companies face an increase in claims due to the higher incidence of extreme events, which can affect their solvency. This deterioration not only has implications for the insurers themselves but can also have indirect effects on other financial sectors.

Transition risks relate to the regulatory, technological and economic changes needed to achieve a carbon-neutral economy. These changes include reallocating resources across sectors, adopting new technologies and encouraging innovation. They can affect both carbon-intensive sectors, which face higher adaptation costs, and individual firms that fail to adapt their business models in time. The implications include a decline in asset values, increased credit risk, legal and reputational risks and potential systemic effects in the event of a disorderly or abrupt transition.

The severity of the risks to financial stability will depend on whether it is an orderly transition that allows economic agents to plan their future decisions. However, delaying decision-making may lead to abrupt adjustments in the future, with economic and financial repercussions.

The transition towards a carbon-neutral economy will require a significant mobilisation of financial resources, but this will be far less costly than inaction. Although some of this funding will come from the public sector, the private sector – particularly financial institutions – has a crucial role to play in this process. Financing must cover both low-carbon activities and those in the process of decarbonisation for which no low-emission alternatives exist.

Financial stability policies can accelerate the transition and mitigate the physical effects of global warming. Making the right decisions within the framework of the financial stability mandate – such as raising awareness of climate risks and taking measures to drive the necessary funding – will help speed up the transition and mitigate climate change, complementing other economic and environmental policies.

This second edition of the Biennial Report on Climate Change Risks to the Financial System differs from the first, published in 2023, in that it incorporates new data sources and work carried out by AMCESFI to advance towards a more comprehensive analysis of physical and transition risks. However, it remains a work in progress, focused on specific areas, and does not reflect the entire panorama of risks. The previous edition identified information and knowledge gaps that this report aims to address. Chapter 2 reviews various metrics for assessing exposure to climate risks, Chapter 3 summarises progress made by each bank, with specific analyses of the economic and financial effects of physical and transition risks, and Chapter 4 focuses on new regulatory and supervisory initiatives.

BOX 1.A Degree of alignment with Paris Agreement commitments

This box complies with the provisions of Article 33(1) of Law 7/2021 of 20 May 2021 on climate change and the energy transition, which stipulates that the report prepared by the supervisory authorities must include information on the degree of alignment with the climate goals of the Paris Agreement.

The Paris Agreement (2015) establishes a binding international framework to address climate change, promoting the mitigation of its effects, the adaptation to its consequences and the means necessary to implement these actions. Spain ratified this agreement in 2017. The signatory countries are committed to holding the increase in the global average temperature to below 2°C above pre-industrial levels, with additional efforts to limit the increase to 1.5°C. In addition, signatory countries must develop, communicate and maintain national emission reduction plans and adaptation measures aligned with these targets

In this context, the European Union (EU) agreed in 2020 to reduce greenhouse gas (GHG) emissions by at least 55% by 2030, compared to 1990 levels, and to set climate neutrality as a target for 2050. Since then, climate ambition has been increased at European level, reflected in the European Climate Law[1] and in the Fit for 55 and REPowerEU plans. Through the National Integrated Energy and Climate Plan (PNIEC) 2023-2030, Spain set a 32% reduction of its GHG emissions by 2030, with respect to 1990. This plan prioritises the decarbonisation of the energy sector and promotes the use of renewable sources and energy efficiency. In fact, according to PNIEC forecasts, by 2030 renewable energies will account for 48% of final energy consumption and 81% of electricity generation.

This report analyses the emissions of Spanish listed issuers. There is a broad regulatory framework governing the sustainability information that securities issuers are or will be required to disclose to the market and the supervisor (the National Securities Market Commission or CNMV). The carbon footprint data available for this report are based on Law 11/2018[2] of 28 December 2018 as regards non-financial information and diversity. In addition, Regulation (EU) 2020/85[3] of the European Parliament and of the Council ("Taxonomy Regulation"), together with its delegated regulations, established new obligations for securities issuers. As from 2023, financial and non-financial undertakings must report the proportion of eligible economic activities aligned to climate change mitigation and adaptation objectives in relation to their total turnover, capital expenditure and operating expenditure.

Both Directive (EU) 2022/2464[4] of the European Parliament and of the Council

1 Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ("European Climate Law").
2 Law 11/2018 of 28 December 2018 amending the Commercial Code, the consolidated Limited Companies Law approved by Royal Legislative Decree 1/2010 of 2 July 2010 and Audit Law 22/2015 of 20 July 2015, as regards non-financial information and diversity.
3 Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088.
4 Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 amending Regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU, as regards corporate sustainability reporting.

BOX 1.A Degree of alignment with Paris Agreement commitments (cont'd)

on Corporate Sustainability Reporting (CSRD)[5] and the information reported by issuers (based on the European Sustainability Reporting Standards or ESRS) will allow for the establishment of metrics that help to ascertain the evolution of the securities issuers' commitment to climate change.

Data on the GHG emissions of Spanish issuers were obtained from the information available at the CNMV and the Refinitiv commercial database.[6] Information on GHG emissions and other environmental, social and governance (ESG) information is provided by the non-financial reporting by the various issuers. GHG emissions are divided into three types: Scope 1 (from sources owned or controlled by the company), Scope 2 (from the generation of electricity, steam, heat and cooling purchased and consumed by the reporting company) and Scope 3 (all other indirect emissions that occur in a company's value chain).

In 2023 97 issuers were required to report information on issues related to climate change. This information is representative, as they are large undertakings: the 37 issuers for which – sometimes incomplete – data can be obtained in the four years considered for the three scopes account for 97.2% of the total income received in 2023 by the 97 issuers obliged to report information (Table 1.A.1).

In relation to GHG emissions produced in 2023 and with respect to Scopes 1 and 2, the energy sector is the sector that produces most emissions among the issuers identified in the previous analysis.[7] Scope 3 emissions account for close to 85% of the total reported emissions (including financed emissions from credit institutions), while Scope 1 emissions account for slightly less

Table 1.A.1 Number of securities issuers reporting GHG emissions

	Scope 1 emissions	Scope 2 emissions	Scope 3 emissions
2020	48	48	37
2021	49	49	42
2022	49	49	44
2023	49	49	44

SOURCES: CNMV and Refinitiv.

5 This directive replaces Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups, also known as NFRD.

6 The following document shows how Refinitiv reports Scopes 1, 2 and 3 for each of the companies for which it provides information: https://www.lseg.com/content/dam/data-analytics/en_us/documents/methodology/lseg-climate-data-package-ghg-emissions-methodology-process.pdf. Bloomberg also offers this type of information, although you have to be a Bloomberg client to access it. This documentation can be accessed via the following link: https://www.bloomberg.com/professional/blog/bloombergs-greenhouse-gas-emissions-estimates-model-a-summary-of-challenges-and-modeling-solutions/.

7 It is important to emphasise that there are two approaches to calculating Scope 2: a market-based approach and a location-based approach. While just over 20% provide information on their emissions using both approaches, there are institutions that report their data using the market-based method only, while others use only the location-based method. More than half do not specify which of the two calculation methods they used.

BOX 1.A Degree of alignment with Paris Agreement commitments (cont'd)

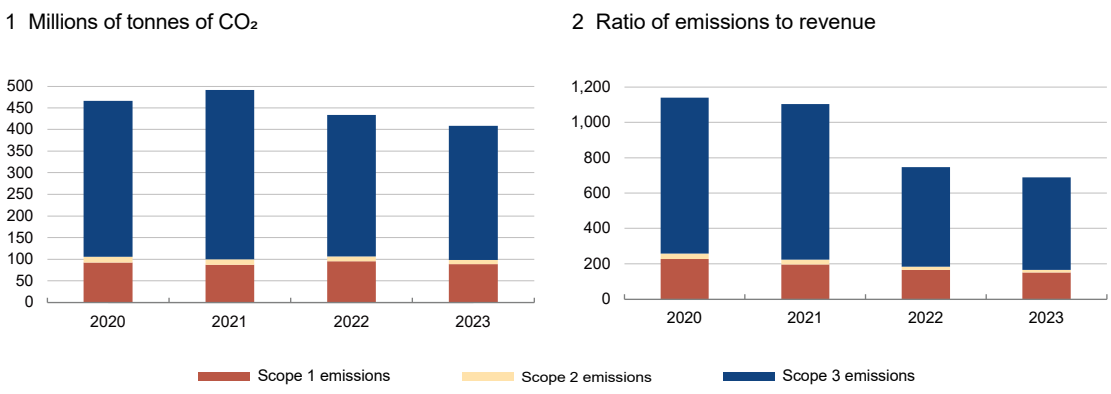
than 15% and Scope 2 emissions do not reach 1%. According to the reported data, financial institutions and energy companies stand out significantly, together accounting for more than 80% of the total of these emissions (slightly over 40% each). The industrial sector follows at a considerable distance, with a contribution of 9%.

There are still a considerable number of institutions that do not report the totality or the breakdown of Scope 3 emissions corresponding to the categories stipulated in the GHG Protocol. With regard to financed emissions (Category 15 of Scope 3 in the GHG Protocol), which are estimated to be between 400 and 700 times higher than the rest of the sector's emissions in Scopes 1, 2 and 3 combined, although there is a greater effort to provide these data, most financial institutions indicate that they are in the process of refining their measurement methods and the scope considered in order to generate more accurate and complete data. According to a European Central Bank (ECB) report published in March 2022, only 15% of euro area banks disclose Scope 3 financed emissions, even though they represent approximately 93% of their total emissions.

Spanish issuers' total CO_2 emissions between 2020 and 2023 fell significantly, by around 12.5% (Chart 1.A.1). Scope 1 emissions fell by 4.2% and Scope 2 emissions by 25.9%. The significant decrease in Scope 1 and 2 emissions may reflect undertakings' efforts to reduce emissions under their direct control, as well as emissions from activities performed by third-party companies (even more so if the decrease in activity due to the COVID-19 pandemic is taken into account).

Emission intensity also decreased significantly (39.6% between 2020 and 2023). This intensity, measured as the ratio of a company's GHG emissions (in kg of CO_2) to its revenue (in millions of euro),[8] applies to all issuers, regardless

Chart 1.A.1 GHG emissions of Spanish issuers



SOURCES: CNMV and Refinitiv.

8 Standard and Poor's. (2020). "Index Carbon Metrics Explained". Available at https://www.spglobal.com/spdji/en/documents/additional-material/spdji-esg-carbon-metrics.pdf.

BOX 1.A Degree of alignment with Paris Agreement commitments (cont'd)

of the sector to which they belong.[9] The decrease in intensity affected all scopes (33.9% for Scope 1; 48.9% for Scope 2; and 40.7% for Scope 3) and was due not only to the decrease in the absolute value of companies' GHG emissions, but also to the increase in their activity.[10]

The efforts that the various issuers plan to make point to a significant GHG reduction in Scope 1 and 2 emissions (Table 1.A.2). On the basis of Bloomberg data (using the methodology applied by the Science Based Targets Initiative (SBTi))[11] each company's targets are translated into contributions to global warming (in degrees Celsius above the current situation), which facilitates interpretation of the alignment of these targets with the Paris Agreement and EU targets. From the information obtained, and based on the reported emissions, it could be deduced that the issuers' targets are aligned, insofar as Scopes 1 and 2 are concerned, with the Paris Agreement and EU legislation, although as regards Scope 3 they would contribute to increasing the temperature by just under 2°C, which would exceed the EU target (+1.5°C) and would come close to the upper limit of the Paris Agreement (+2.0°C).

The above-mentioned results must be qualified. On the one hand, although a significant portion of these issuers are domiciled in the EU, some of their suppliers are outside the EU, which makes it more likely that they will have to comply with EU legislation regarding Scope 1 and 2 emissions, but not Scope 3 emissions. On the other hand, the table is based only on issuers for which information is received on their reduction strategy for future GHG emissions, so it should be considered as a first approximation of the true contributions of Spanish issuers, and only those that have set targets, to global temperature increase.

Table 1.A.2 Temperature increase based on securities issuers' projections (°C) (a)

Scopes 1 and 2			Scopes 1, 2 and 3		
Short term (b)	Medium term (c)	Long term (d)	Short term (b)	Medium term (c)	Long term (d)
0.96	0.85	1.33	1.65	1.89	1.74

SOURCES: CNMV and Bloomberg.

a The temperature increases shown are derived from the aggregation of individual data from issuers weighted by their sales.
b Short term refers to a 5-year horizon.
c Medium term refers to a horizon of between 5 and 15 years.
d Long term refers to a horizon of more than 15 years.

9 There are other measures of GHG emissions intensity, such as the calculation of the ratio of GHG emissions to a physical unit of output adapted to each economic activity (e.g. carbon dioxide equivalent emissions per kWh). While these metrics have the advantage of reflecting efficiency (i.e. emission reductions regardless of the total volume of economic activity) and they do not have revenue-related biases, they do not allow for comparisons or aggregations between companies in different sectors.
10 Their revenue growth in real terms between 2021 and 2023 was 23.1%.
11 SBTi is the result of a partnership between the Carbon Disclosure Project, the United Nations Global Compact, the World Resources Institute and the World Wide Fund for Nature.

2 Exposures to climate-related risks and the green transition

This chapter provides an overview based on the fresh information available on the financial sector's exposures to climate risks and shows, with limitations deriving from the available data, how the financial sector is contributing to the green transition.

First, the Spanish banking system's exposures to physical and transition risks are analysed and compared with those of other EU banks, using an approach based on the information disclosed by banks in their EU Pillar 3 reports.

Additional data are presented on physical risks, including the frequency and cost of extreme weather events, using CCS and DGSFP data. Not only does this analysis illustrate the financial impact of these events, it also highlights the importance of adequate management of the associated risks.

Subsequently, information is included on investment fund exposures to sectors with different levels of emissions, which provides a better understanding of how investment decisions can influence sustainability and climate risk management.

Lastly, the Green Asset Ratio (GAR) reported by the banking industry, as an initial approximation to the funding of economic activities aligned with the EU taxonomy, is shown, followed by an analysis of how the Spanish banking sector is financing investments in renewable energies to provide a measure of how financial institutions are supporting the green transition.

2.1 The banking sector. Disclosure of environmental risks under the EU Pillar 3 framework

Since 2023 European credit institutions have been disclosing to the market information on their exposures to environmental, social and governance (ESG) risks under the prudential disclosure (Pillar 3) framework. The main objective of Commission Implementing Regulation (EU) 2022/2453[1] is to provide investors and other users with granular and comparable information on banks' exposures to ESG risks and, in particular, to climate-related risks, including physical and transition risks. The Regulation specifies the uniform templates that large credit institutions whose securities are admitted to trading on EU regulated markets are required to use for

1 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.

these purposes. This information was first disclosed in 2023, with the reference date set as at December 2022, and is updated biannually since then.[2]

This section analyses data relating to exposures to physical and transition risks for a sample of European banks with reference date as at December 2023. A descriptive analysis was conducted of the exposures to physical and transition risks of a sample of European banks based on ESG information disclosed in their Pillar 3 reports. The sample comprises all of the European global systemically important institutions (G-SIIs) and a selection of other systemically important institutions (O-SIIs) from France, Germany, Italy, the Netherlands, Portugal and Spain.[3] In any event, the conclusions of this analysis, which is partial in its methodology, should be taken with caution, as this is a new framework that collects complex information subject to a high degree of interpretation, which may affect its comparability.

2.1.1 Physical risks

Here the analysis focuses on physical risk exposures to non-financial corporations (NFCs) and on the exposures of the portfolio of loans collateralised by (commercial and residential) real estate and repossessed real estate. Chart 2.1.1[4] analyses the exposures to NFCs recorded in the banking book[5] that are subject to (acute and/or chronic) physical risk reported by the sample banks compared with their total exposures in this portfolio. Chart 2.1.2 shows data on loans collateralised by (residential and commercial) real estate and repossessed real estate that are subject to physical risk compared with the total collateralised loans. In both cases, the comparison is made on a bank-by-bank basis for 2023 and 2022, also including data for an average bank, calculated as the average exposures reported by the banks analysed, weighted by the total assets of each bank.

In the NFC portfolio, the share of exposures subject to physical risk is 12%, on average, for 2023 and includes three different groups of banks. The first, comprising Crédit Agricole, ABN AMRO, ING, Deutsche Bank, Commerzbank, Rabobank and BBVA, reports exposures subject to physical risk which account for around 20% of the total. In the second group, comprising Société Générale,

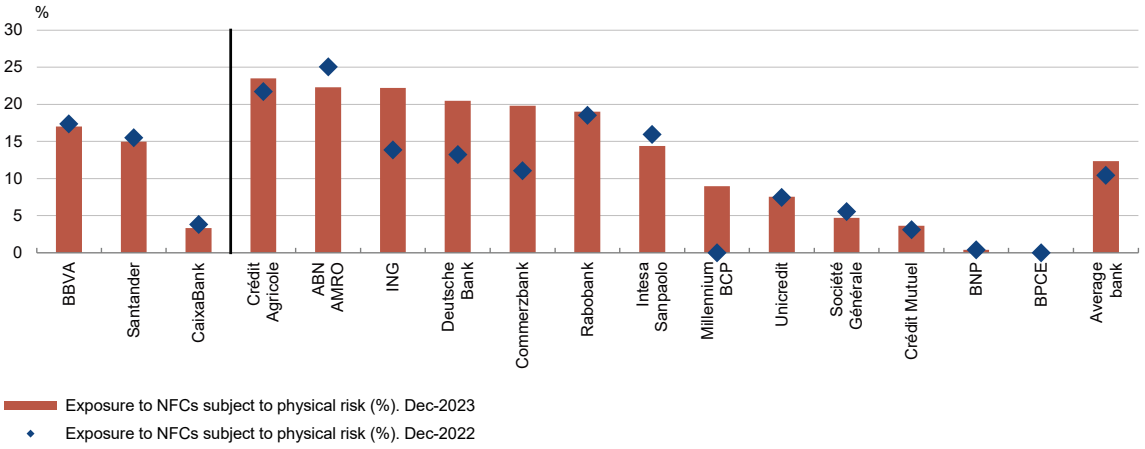
2 For further information on the contents of this Regulation, see Herminia Cuevas, Esther Palomeque and Beatriz Santa-Cruz. (2023). "Pillar 3 disclosures on ESG risks: first disclosures of Spanish and other European banks". Financial Stability Review, 45, pp. 73-94.https://doi.org/10.53479/36156

3 Specifically, the sample comprises the following banks: BNP Paribas, Crédit Agricole, Banco Santander, BPCE, Société Générale, Deutsche Bank, ING, Crédit Mutuel, Intesa Sanpaolo, Unicredit, BBVA, Rabobank, Commerzbank, CaixaBank, ABN AMRO, Bank Nederlandse Gemeenten, Caixa Geral de Depósitos, Millennium BCP and Novobanco.

4 This analysis does not include data from Bank Nederlandse Gemeenten, Caixa Geral de Depósitos or Novobanco.

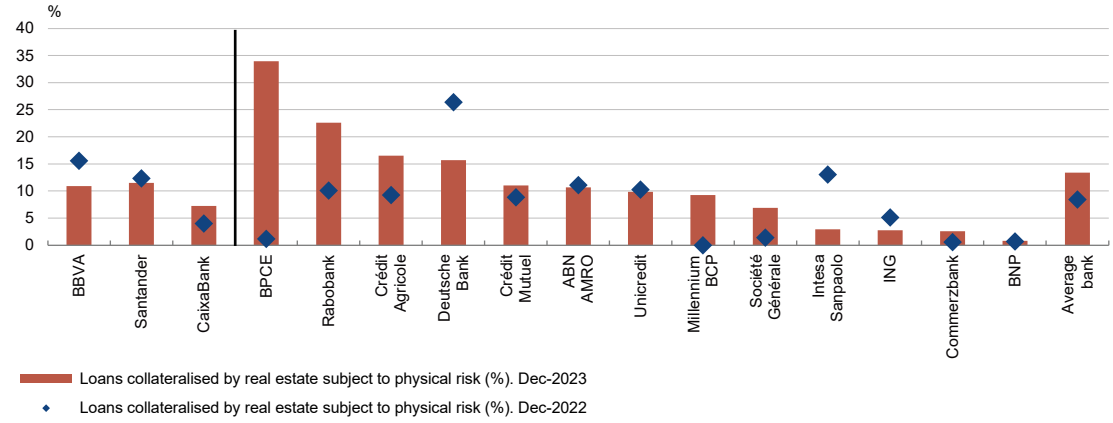
5 These include exposures to NFCs, in the form of loans and debt and equity instruments as defined in the FINREP supervisory reporting framework, that banks hold in their banking book, i.e. excluding assets held in the trading book.

Chart 2.1.1 European systemically important institutions' exposures to physical risk. Exposures to NFCs, by bank



SOURCE: Authors' calculations drawing on information published on the banks' websites.

Chart 2.1.2 European systemically important institutions' exposures to physical risk. Loans collateralised by real estate and repossessed real estate, by bank



SOURCE: Authors' calculations drawing on information published on the banks' websites.

Crédit Mutuel, BNP, BPCE and CaixaBank, these exposures do not exceed 5% of the total NFC portfolio. Lastly, the ratios at the other banks (Santander, Intesa Sanpaolo, Millennium BCP and Unicredit) are more aligned with the average.

In the portfolio of loans collateralised by real estate and repossessed real estate the share of the average bank's exposures subject to physical risks is 13% for 2023. The groups shown in Chart 2.1.2 are not as differentiated as in the NFC portfolio, but the data are highly heterogeneous. BPCE (34%) and Rabobank (23%) are the banks with the highest exposure to physical risk in this portfolio, and BNP (1%), Commerzbank (3%), Intesa Sanpaolo (3%) and ING (3%) report the lowest exposure. Spanish banks stand below the average.

Analysis of changes in the past year shows variations of more than 5 percentage points (pp) in the exposures subject to physical risk reported by many banks. These variations occur in both directions: at some banks the exposures increased by more than 5 pp, while at others they declined. In some cases, such as BPCE and Millennium BCP, the movements are highly significant. These variations may largely be due to changes or improvements in the methodologies and data sources used by the banks to identify physical risk. The Regulation allows for much flexibility in this connection and the information is difficult to obtain, as 2023 was only the second year it had to be provided.

2.1.2 Transition risks

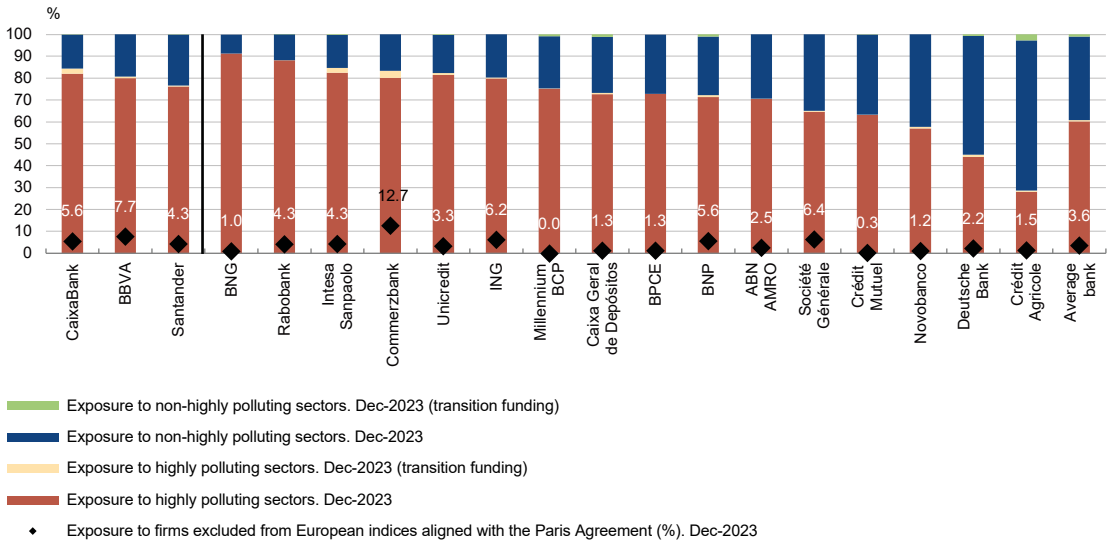
This subsection analyses exposures subject to transition risk within the Pillar 3 framework, in the NFC portfolio and in the portfolio of loans collateralised by (commercial and residential) real estate and repossessed real estate. To this end, in the first case, reported exposures to sectors that significantly contribute to climate change (hereafter, highly polluting sectors) via scope 1 and 2 emissions,[6] are analysed, as are exposures to counterparties excluded from the Paris-aligned benchmarks.[7] In the case of the portfolio of loans collateralised by real estate and repossessed real estate, the energy efficiency of the real estate portfolio is analysed. The methodology used does not include financed emissions nor involve a comprehensive analysis of the portfolios or financing decisions aimed at selecting projects or institutions that are more efficient from a climate-related standpoint or have made more progress in their transition. Therefore, this is a broad and rough estimate of the real exposure to transition risk.

In the NFC portfolio, exposures to highly polluting sectors account for 60% of the total, on average, although there are significant variations between banks. Chart 2.1.3 shows for the sample banks, and for an average bank calculated as described above, exposures to highly polluting and other sectors, differentiating those aligned with the Taxonomy Regulation, and exposures to excluded counterparties. This information is provided for 2023. The banks that are most exposed to highly polluting sectors are BNG (91%), Intesa Sanpaolo (85%), CaixaBank (84%), BBVA (81%) and ING (80%). Crédit Agricole and Deutsche

6 These sectors are defined in Recital 6 of Commission Delegated Regulation (EU) 2020/1818 of 17 July 2020 supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards minimum standards for EU Climate Transition Benchmarks and EU Paris-aligned Benchmarks. They include all sectors that contribute significantly to climate change, listed in Sections A to H and Section L of Annex I of Regulation (EC) No 1893/2006 of the European Parliament and of the Council of 20 December 2006 establishing the statistical classification of economic activities NACE Revision 2.

7 These counterparties are defined in Article 12 of Commission Delegated Regulation (EU) 2020/1818 of 17 July 2020. Specifically, companies that obtain: (i) 1% or more of their revenues from exploration, mining, extraction, distribution or refining of hard coal and lignite; (ii) 10% or more of their revenues from the exploration, extraction, distribution or refining of oil fuels; (iii) 50% or more of their revenues from the exploration, extraction, distribution or refining of gaseous fuels; or (iv) 50% or more of their revenues from electricity generation with a GHG intensity of more than 100g of CO_2 e/kWh.

Chart 2.1.3 Transition risk for European systemically important institutions. Exposures to NFCs



SOURCE: Authors' calculations drawing on information published on the banks' websites.

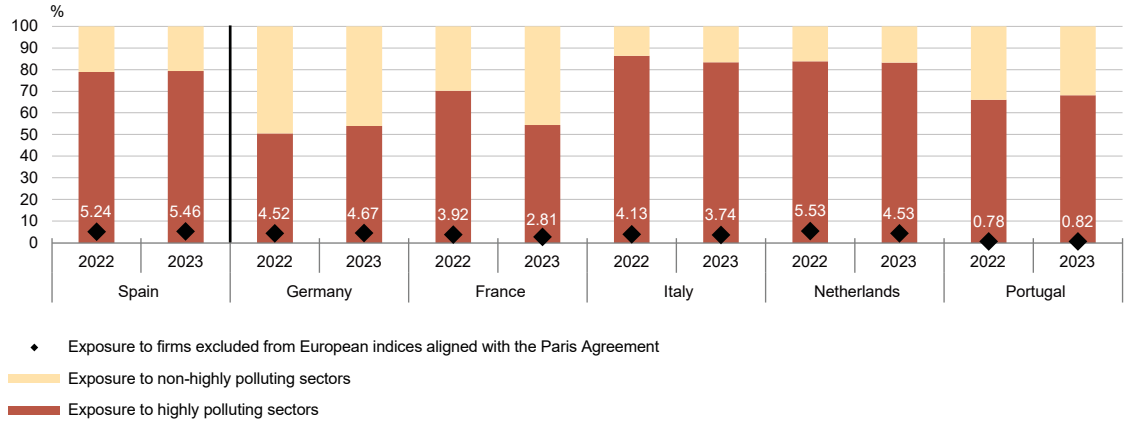
Bank report the lowest exposures (29% and 45%, respectively). 2023 was the first year in which credit institutions reported the amount of their taxonomy-aligned exposures to NFCs, to contribute to the goal of mitigating climate change risk. On average, these exposures make up 1% of the financing granted to highly polluting sectors and 2.5% of that granted to other sectors.

The share of exposures to excluded NFC counterparties is much lower (only 3.6% of the total for the average bank). However, it amounts to 12.7% at Commerzbank, and is only 0.3% at Crédit Mutuel. The Spanish banks stand above the average.

Overall, the distribution of exposures between highly polluting and other sectors, as well as the exposures to excluded counterparties, remain similar to those recorded the previous year. Chart 2.1.4 shows in aggregate terms, by country of origin of the sample banks, exposures to highly polluting sectors and to excluded counterparties for 2022 and 2023. In Germany, exposures to highly polluting sectors are slightly lower (around 50% of the total) than in the other countries. Italy and the Netherlands, where these exposures exceed 80%, stand out. Also noteworthy is France, where the share of highly polluting sectors (54%) declined by 16 pp compared with the previous year, mainly due to Crédit Agricole, which significantly increased its exposures to other sectors.

As regards the portfolio of loans collateralised by real estate and repossessed real estate, the percentage of collateral with an energy performance certificate (EPC) is low (38%) although it has risen by 14 pp compared with 2022. Charts 2.1.5 and 2.1.6 present, on aggregate for all the sample banks, the energy efficiency of all the collateral measured both through

Chart 2.1.4 Transition risk for European systemically important institutions. Exposures to NFCs, in country-level aggregate terms



SOURCE: Authors' calculations drawing on information published on the banks' websites.

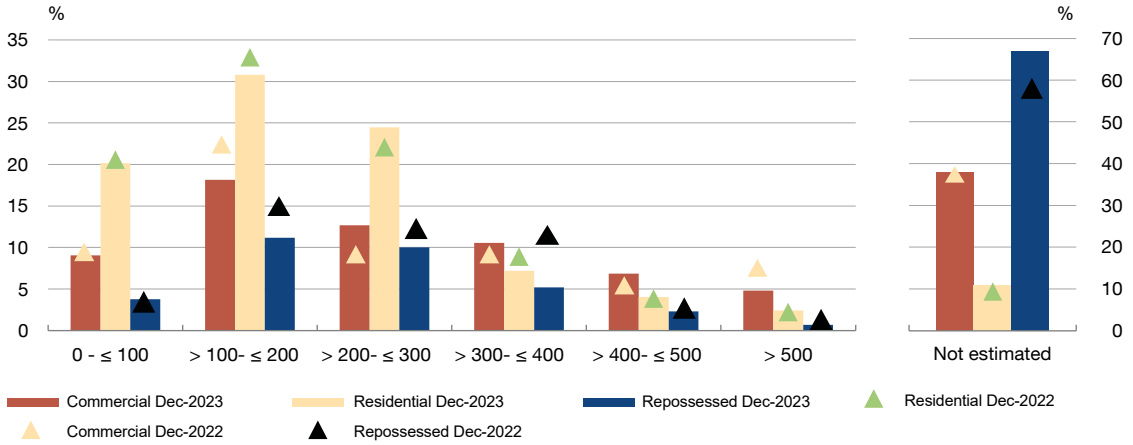
Chart 2.1.5 Transition risk for European systemically important institutions. EPCs for property used as collateral in the EU, in aggregate terms. Dec-2023 and Dec-2022

SOURCE: Authors' calculations drawing on information published on the banks' websites.

the EPC and in terms of energy consumption in kWh/m2 for 2022 and 2023. Chart 2.1.5 shows an increase in properties with an EPC in response to the entry into force of Royal Decree 390/2021.[8] The increase in residential assets with energy labels was especially notable in the C and D categories. In 2023 the higher quality

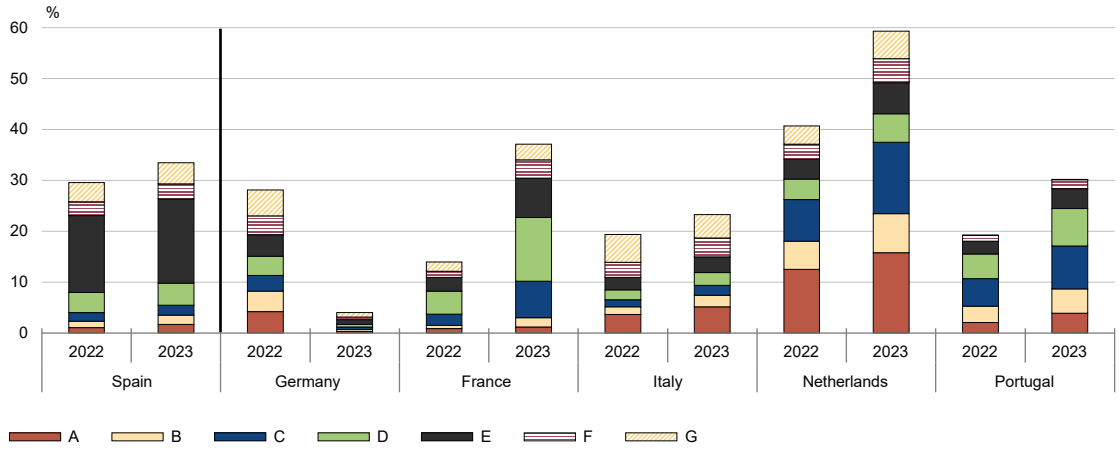
8 Directive 2010/31/EU and its latest revision, Directive (EU) 2024/1275, set out the framework for the energy performance of buildings. The EPC is mandatory Union-wide for new buildings and for existing buildings that are sold or rented out, pursuant to Directive 2010/31/EU on the energy performance of buildings. This regulation was partially transposed into Spanish law through Royal Decree 390/2021 of 1 June 2021 which sets out the basic procedure for energy performance certification of buildings. At EU level, the recent Directive (EU) 2024/1275 reinforces these requirements and sets a more stringent framework, aiming to achieve a zero-emission building stock by 2050.

Chart 2.1.6 **Transition risk for European systemically important institutions. Energy efficiency (kWH/m²) of property used as collateral in the EU, in aggregate terms. Dec-2023 and Dec-2022**



SOURCE: Authors' calculations drawing on information published on the banks' websites.

Chart 2.1.7 **Transition risk for European systemically important institutions. EPCs of property used as collateral in the EU, in country-level aggregate terms**



SOURCE: Authors' calculations drawing on information published on the banks' websites.

labels (A, B and C) accounted for 42% of those reported. Chart 2.1.6 uses energy consumption in kWh/m² as an energy efficiency metric for property. This metric provides more harmonised information across countries and incorporates into the analysis both the banks' estimates and the EPC data. Thus, it is observed that the data provided by the banks increase significantly, covering 89% of their residential property portfolio, compared with 38% of the portfolio with an EPC. The most efficient properties (with energy consumption of up to 200 kWh/m²) account for 45% of the total portfolio for which data are reported.

In the past year the number of buildings with an EPC has increased across all the countries in the sample. Chart 2.1.7 shows aggregate data on EPC status

by each bank's country of origin. France, the Netherlands and Portugal are the countries with the highest increase in the number of certificates (22 pp, 17 pp and 11 pp, respectively). In 2023 the portfolio of properties with an EPC in these countries had grown to 37%, 59% and 30%, respectively. At the other end of the scale is Germany, where collateral with EPCs barely accounted for 4% of the real estate portfolio in 2023, having decreased by 24 pp compared with 2022. This was largely due to the fall in Commerzbank's real estate portfolio in the EU. Lastly, the high percentage of collateral with labels A (16%) and C (14%) in the Netherlands, E (16%) in Spain and D (13%) in France stands out.

2.2 Insurance. Frequency and cost of climate-related events drawing on information from the insurance sector

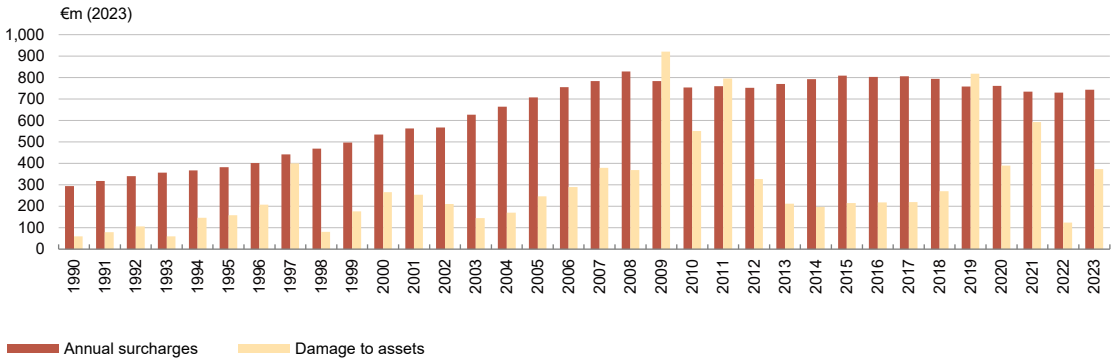
Spain has two climate risk mitigating mechanisms that help safeguard the financial stability of the Spanish insurance sector in particular and of the financial sector in general: combined agricultural insurance and the Insurance Compensation Consortium (CCS). The latter minimises the coverage gap (as extraordinary risk coverage is not optional) and protects both the insured and government budgets (as it covers damage that would otherwise need to be directly subsidised). Also, by contractually ensuring compensation for losses, it maximises responsiveness and reduces vulnerability and, therefore, risk.

The CCS acts as a direct insurer of extraordinary risks. Extraordinary risk coverage is mandatory in certain damage insurance policies, thus ensuring the possibility of mutualising claims which, while infrequent, have a significant impact.

The CCS has its own legal personality, full legal capacity and its own assets and operates independently of the Spanish State budget. The CCS is funded out of private contributions through surcharges paid by individuals and firms in their policies (mainly car, home, multi-risk and life insurance). The mutualisation of risk among insureds, events, regions and over time allows the CCS to pay out compensation for risks characterised by their extraordinary volatility and infrequency. Chart 2.2.1 analyses the claims incurred and the funds obtained by the CCS through its policy surcharges.

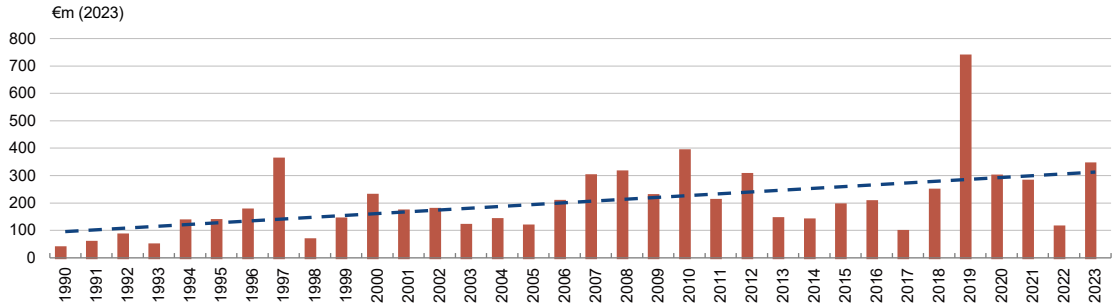
The CCS covers damage caused by natural and anthropogenic risks to insured assets and individuals in Spain. The following natural hazards are covered: coastal, river and rainwater flooding, lashing waves, tsunamis, volcanic eruptions, gales and tornadoes (severe cyclonic storms) and objects falling from space and meteorites. Given the coverage it provides, the CCS is a key source of data on the frequency and cost of climate-related events and, therefore, on the impact of climate change.

Chart 2.2.1 Surcharges and compensation



SOURCE: CCS.
NOTE: Data in constant euro.

Chart 2.2.2 Flood damage covered by the CCS



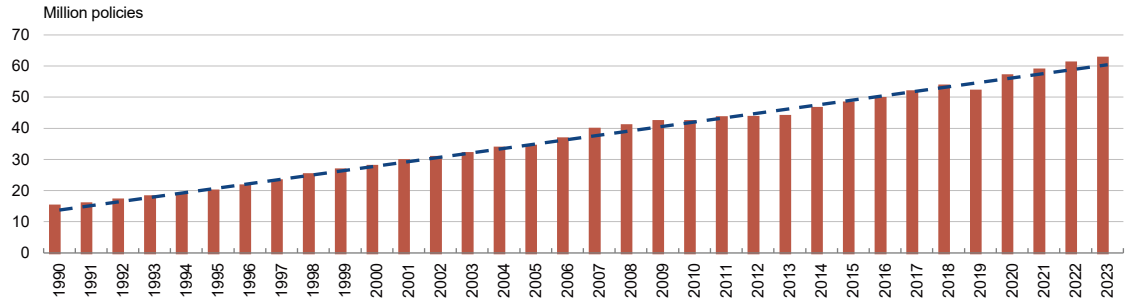
SOURCE: CCS.
NOTE: Data in constant euro.

Climate change is not a risk in itself, but it does exacerbate risk. Risk is comprised of three factors: (i) the hazard (e.g. heavy rainfall or droughts), which is exacerbated by climate change; (ii) exposure (assets and individuals exposed to hazards) and vulnerability, in turn comprised of susceptibility (the fact of an asset being more or less likely to suffer damage from a hazard); and (iii) responsiveness (a social factor that determines how long it takes for a community to recover from the impact of a hazard).

Analysis of the factors determining the worsening of risk requires the exposure to the covered event to be uniform over time. For this reason, claims for flood damage are analysed below, since floods are the only hazard for which the coverage provided by the CCS has not changed (compared, for instance, with the thresholds for wind-related damage). As shown in Chart 2.2.2, damage from flooding covered by the CCS has grown approximately threefold since 1990.

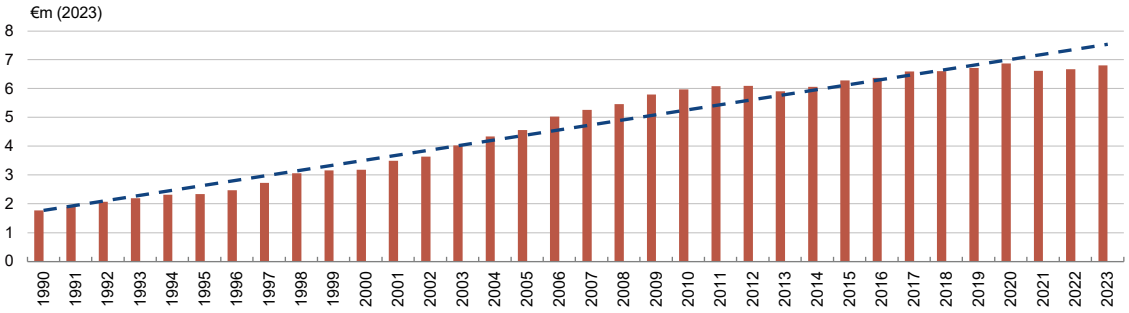
Exposure data (sum insured and number of policies) have quadrupled since then. In other words, the reason behind the increase in damages is, above all, the rise in exposure.

Chart 2.2.3 Policies for property covered by extraordinary risk insurance



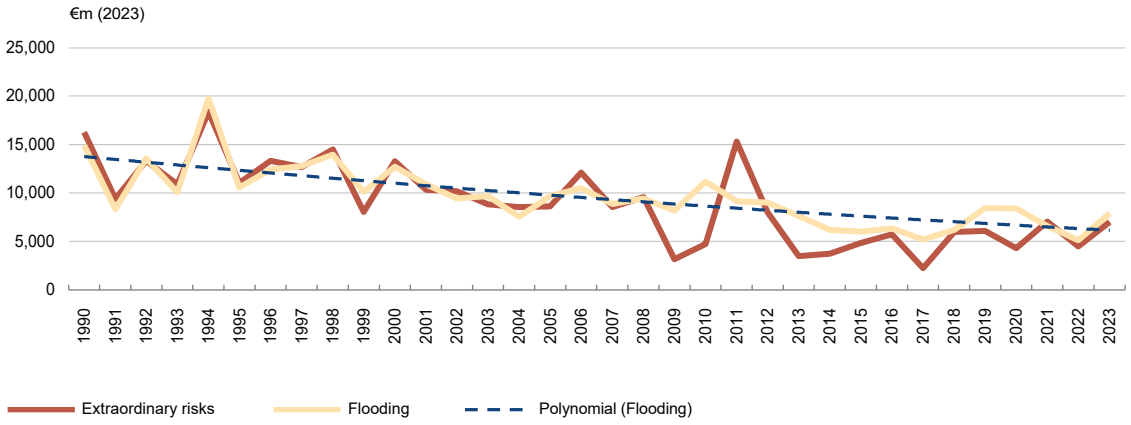
SOURCE: CCS.

Chart 2.2.4 Sum insured on property covered by extraordinary risk insurance



SOURCE: CCS.
NOTE: Data in constant euro.

Chart 2.2.5 Average cost per flood insurance claim (1990-2023)



SOURCE: CCS.
NOTE: Data in constant euro.

Unit costs of flooding claims declined between 1990 and 2023. There are various reasons for this decrease in average unit costs, such as the universalisation of insurance (leading to lower cover for assets) or the headway made in managing claims, among others. However, as shown in Chart 2.2.5,

since 2018 average costs have shifted upwards, possibly in response to the greater intensity and severity of floods and flood damage. The inclusion of data on the October 2024 flooding will likely evidence more clearly this increase.

Therefore, of the three factors mentioned above, the greater exposure and the worsening of hazards are the ultimate cause of the increase in risk and in the damage caused.

Climate change is increasingly affecting both the agricultural sector and insurance in the sector. Among other reasons, this is due to the hazards covered, which are both hydrometeorological (direct damage from rainfall, flooding, strong winds, etc.) and climate-related (such as droughts, cold spells and heat waves). This increases the likelihood that agricultural production, which is highly vulnerable, will be affected.

Combined agricultural insurance is structured as a coinsurance alliance made up of some twenty insurers. It is managed by Agroseguro, with CCS as the mandatory reinsurer (with a 10% share of the risk in the coinsurance pool) and with lines and subsidies that are established by the State Entity for Agricultural Insurance, which can be complemented by the regional governments. The system boasts over 40 years of experience, mostly involving voluntary arrangement of policies, and a very high level of penetration compared with other European countries.

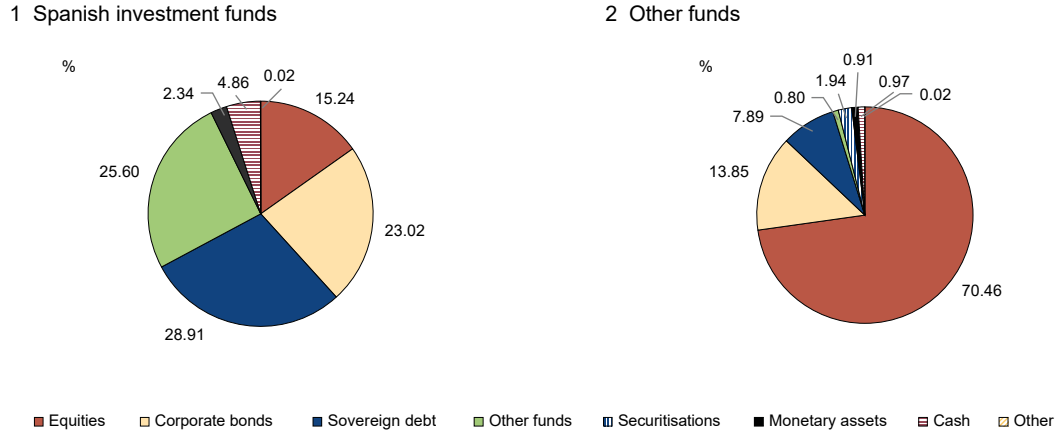
The system has successfully absorbed a significant volume of claims. However, in recent years the trend has shifted to an increase in claims incurred, together with a major rise in exposure. This has revealed the need to review the system, both to ensure its own sustainability and to enable farmers to adapt to the increasingly adverse effects of climate change.

2.3 Investment funds. Exposures to sectors with differing emission levels

The data presented in this analysis were mainly drawn from the returns that are periodically reported to the CNMV and from other commercial databases to include, primarily, financial and sustainability characteristics of the issuers of investment funds' portfolio assets.[9] The analysis includes information based on the International Securities Identification Numbers (ISINs) of the portfolios of 1,716 investment funds with total assets of €337 billion at end-2023.[10] As Chart 2.3.1 (panel 1) shows, sovereign debt is the main asset type in investments funds' portfolios, accounting for almost 29% of total assets, followed by other investment

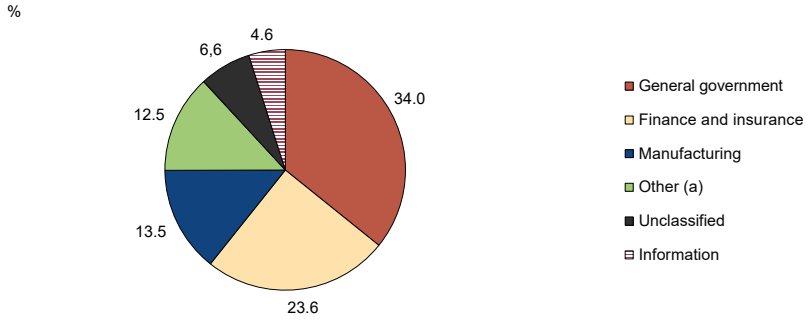
9 Refinitiv, Lipper and the World Bank.
10 Data as at September.

Chart 2.3.1 Portfolio breakdown of investment funds domiciled in Spain and of others in which Spanish funds invest, respectively



SOURCE: CNMV.

Chart 2.3.2 Sectoral breakdown of the Spanish funds portfolio



SOURCES: CNMV and EIKON Refinitiv.

a The following sectors in the "Other" category are noteworthy: public services (2%), retail trade (2%), and real estate, rentals and leases (2%).

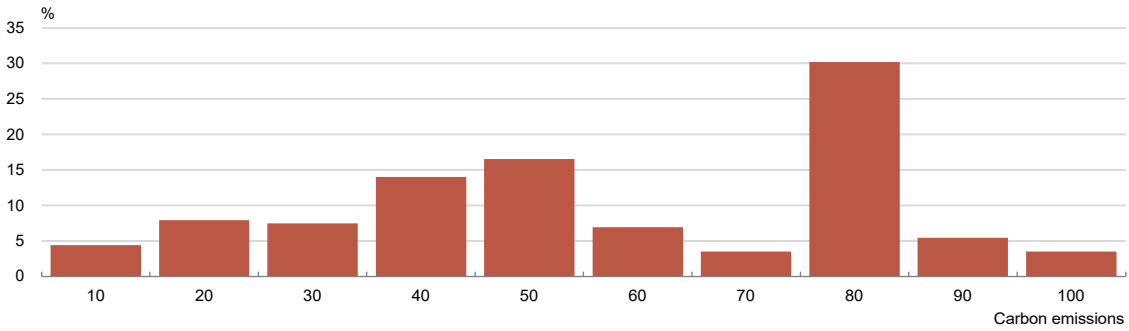
funds (25%), corporate bonds (23%) and equities (15%). The prominence of investment funds' investments in other funds (exceeding 30% of total assets in previous years) warranted including in the analysis the portfolio assets of these other collective investment undertakings (CIUs). Chart 2.3.1 (panel 2) shows that the CIU portfolio is mainly comprised of equities (70%),[11] followed by corporate debt (14%) and sovereign debt (8%).

The assets in the investment fund portfolio are mainly in general government (34%), financial services (24%) and the manufacturing industry (14%). This is taking into account both direct investments and indirect investments through other CIUs (Chart 2.3.2).[12]

11 Including exchange-traded funds (ETFs).

12 There is no sectoral information available for 7% of the assets.

Chart 2.3.3 Distribution of investment funds' portfolios based on the carbon emission intensity of the banks in the portfolio



SOURCE: CNMV.
NOTE: Owing to data limitations, the chart includes 87% of the assets of investment funds domiciled in Spain. The data on CO_2 emissions have been divided into 10 intervals, where the first interval contains the exposure to the 10% of issuers with the lowest CO_2 emission intensity and the last one contains the information on issuers with the highest CO_2 emission intensity.

Spanish investment funds are highly exposed to financial assets of entities with high carbon emission levels. This exposure was calculated by analysing the level of emissions relative to revenue in the case of equities and corporate debt, and total emissions in that of sovereign debt.[13] Thus, it has been estimated[14] that approximately 40% of the assets managed by investment funds correspond to entities with high carbon emissions (over 80) (see Chart 2.3.3), while 50% correspond to entities whose carbon emissions are below the median. Only 50 funds have high exposure to high-emission firms (over 75 in the carbon emission intensity indicator). This figure would rise to 190 if the emissions threshold were lowered to 70, all these funds being larger than the median.

2.4 Financing the green transition

The transition to a carbon-neutral economy requires substantial mobilisation of financial resources. While part of this financing is provided by the public sector, the private sector – and financial institutions in particular – play an essential role. This section presents evidence on the headway being made by the financial sector in this respect.

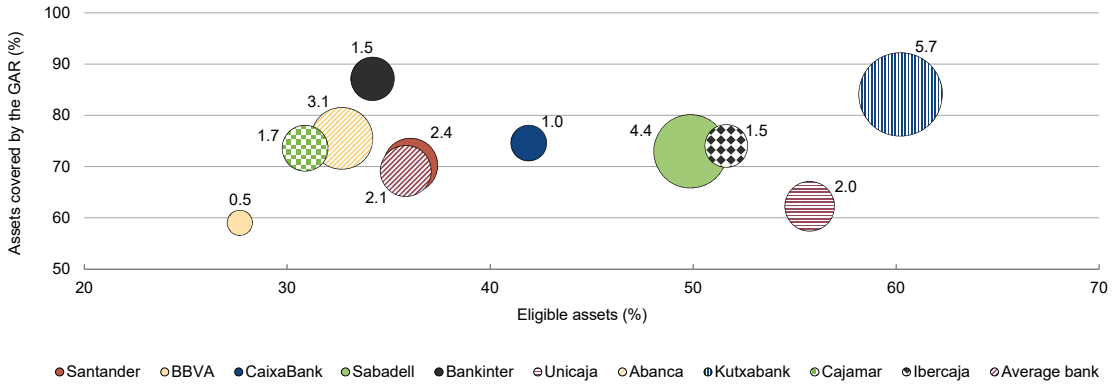
2.4.1 Green asset ratio

The GAR refers to the proportion of a credit institution's assets that are invested in sustainable economic activities. The GAR is established in Article 8

13 For equities and corporate debt CO_2 equivalent emissions relative to revenue ($tCO_2e/\$m$) are used; for sovereign debt total carbon emissions reported by the Word Bank (kt) are used.

14 CO_2 emission values have been transformed based on the percentiles identified, taking into account their respective distribution.

Chart 2.4.1 Green asset ratio of big Spanish banks. Assets covered by the GAR, eligible assets and GAR



SOURCE: Authors' calculations drawing on banks' reported data.
NOTE: Consolidated data at 31 December 2023. Bubble size: GAR (%).

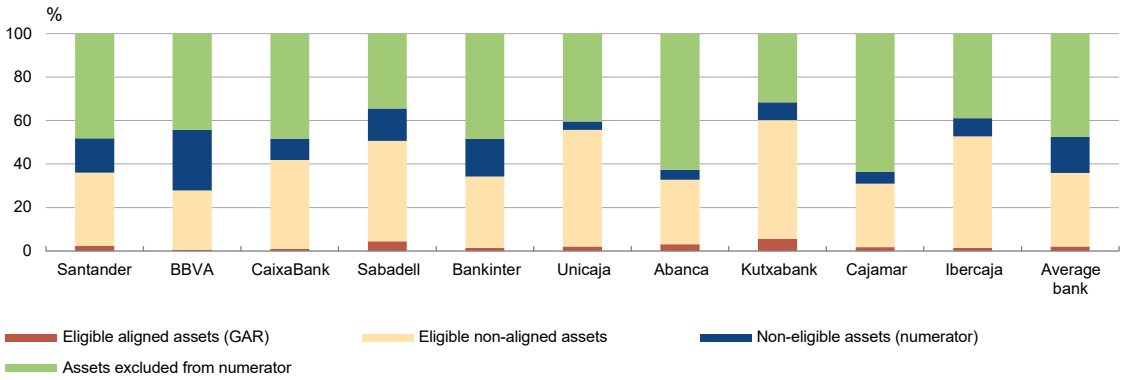
of the Taxonomy Regulation[15] and aims to provide a standard and comparable measure of the proportion of a bank's assets that are invested in taxonomy-aligned projects and activities, that is, in projects and activities that meet the technical criteria established in the Regulation and its implementing provisions. The ratio is calculated as the proportion of a bank's taxonomy-aligned exposures as a share of the total covered assets (off-balance sheet items, the trading book and exposures to sovereigns and central banks are all excluded from calculation of the GAR).

The calculation of the GAR has some important limitations that should be considered to ensure its correct interpretation and representativeness.[16] For the time being at least, the Taxonomy Regulation Delegated Act does not permit inclusion in the numerator of the GAR of counterparties that are not required to provide sustainability reporting under the Corporate Sustainability Reporting Directive (CSRD). This mainly affects small and medium-sized enterprises (SMEs) and non-EU companies and generates a degree of asymmetry that gives rise to differences in the indicator, depending on a financial institution's business model, customer base and geographical footprint. It may mean that some taxonomy-aligned financing is excluded from the indicator. In consequence, by definition, the GAR will never cover 100% of a bank's assets, and banks that have more business with SMEs or outside the EU may, by design, have a lower ratio.

15 Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 (European Taxonomy Regulation).

16 On 26 February 2025 the European Commission published the Omnibus legislative package, which includes a public consultation on possible changes to Delegated Regulation (EU) 2021/2178 (which covers calculation of the GAR). The possible changes include excluding exposures relating to firms outside the scope of the future CSRD (firms with more than 1,000 employees) from the denominator of the GAR.

Chart 2.4.2 Breakdown of assets covered by the GAR - Spanish banks



SOURCE: Authors' calculations drawing on banks' reported data.
NOTE: Consolidated data at 31 December 2023.

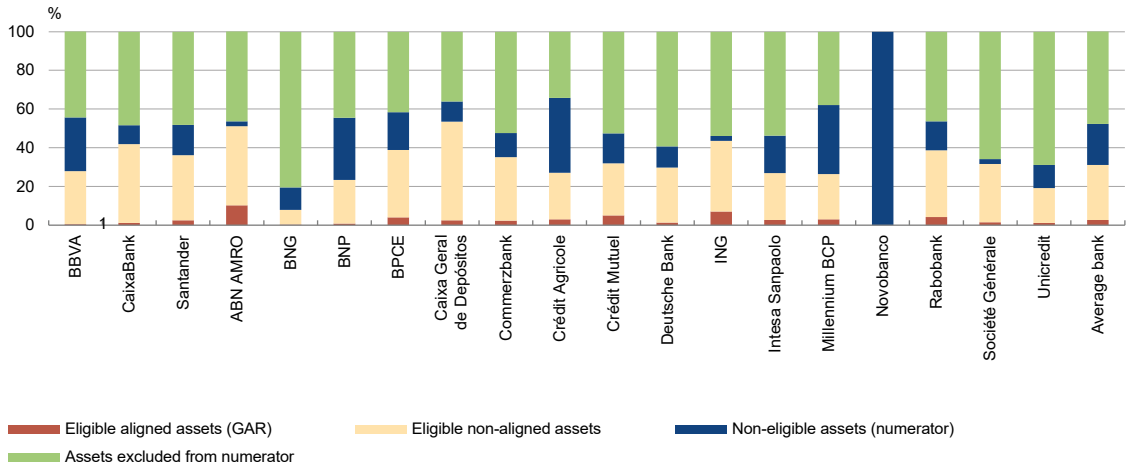
In 2023 Spanish banks' average GAR, in terms of turnover, stood at 2.13%, with balance sheet coverage of around 70%[17] and eligibility of 34.8%. Chart 2.4.1 analyses the GAR published by the big Spanish banks – specifically, Santander, BBVA, CaixaBank, Sabadell, Bankinter, Unicaja, Abanca, Kutxabank, Cajamar and Ibercaja – under the Pillar 3 framework. The chart reflects the relationship between the percentage of eligible assets, that is, the percentage of assets covered by the GAR, and each individual bank's GAR.

The decomposition of all the assets included in the calculation of the GAR reflects considerable homogeneity in the distribution, with certain exceptions. Thus, as shown in Chart 2.4.2, eligible taxonomy-aligned assets amount to 2.13% on average, while eligible non-taxonomy-aligned assets account for 34.8%, non-taxonomy-eligible assets for 17% and assets included in the GAR calculation (denominator) but excluded from the numerator for 48%.

The GAR is also low for most of the European banks analysed, standing at 3% on average, compared with 32% for eligible assets. The assets covered by the GAR amount to 61% of their total assets. Chart 2.4.3 presents a decomposition of GAR assets for the same sample of European systemic institutions as that used in the physical and transition risk analysis. The breakdown of the different assets that make up the GAR, in average terms, is as follows: eligible aligned assets, 3%; eligible non-aligned assets, 29%; non-eligible assets, 21%; and assets excluded from the numerator, 49%. Some banks have particularly high ratios – ABN AMRO (10.2%), ING (7%) and Crédit Mutuel (5.1%) – while in the lower band, with a GAR below 1%, BNP (0.8%), BBVA (0.5%) and BNG (0.3%) stand out.

17 The covered assets are those that are eligible for calculation of the GAR. They make up the denominator of the ratio. A coverage ratio of around 70% means that 30% of balance sheet assets are not included in the calculation (either in the numerator or the denominator).

Chart 2.4.3 Green asset ratio of sample of systemically important institutions. Breakdown of assets covered by the GAR for EU O-SIIs



SOURCE: Banco de España.
NOTE: Consolidated data at 31 December 2023.

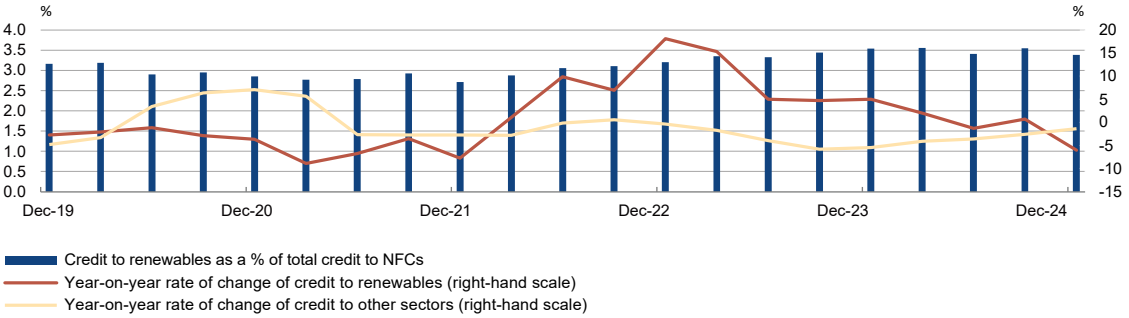
2.4.2 Lending to the renewables sector

The Spanish renewables sector has grown significantly since 2019 when the agreements that led to the European Green Deal (signed in 2020) were reached. In absolute terms, renewable energy consumption[18] rose by 28.2% between December 2018 (the last year before the agreements were reached)[19] and December 2023[20] (the last date for which figures are available). It also increased as a proportion of gross final energy consumption (from 17% in 2018 to 24.9% in 2023),[21] driven by the need to reduce carbon emissions and meet international climate change goals.[22]

Analysing lending to the renewables sector is essential to understand the degree of financial institutions' commitment to the green transition. However, to obtain a more complete picture, all lending to the energy sector must be considered. This analysis reveals the extent to which bank lending is used to meet investment needs, whether this financing is concentrated among certain financial institutions, and how the credit quality of the energy sector evolves, enabling potential financial risks to be identified. Drawing on data from the Banco de España's Central Credit Register (CCR), this section examines how Spanish banks' credit exposure to the sector (based on the National Classification of

18 Primary energy consumption of renewable electricity and biofuels combined.
19 European Council.
20 Statistical Review of World Energy, 2024.
21 Eurostat.
22 The EU aims to reduce CO_2 emissions by at least 55% by 2030, up from the current 40% goal. See "Reducing carbon emissions: EU targets and policies", July 2023, European Parliament.

Chart 2.4.4 Renewables as a proportion of total NFCs and year-on-year rates of change



SOURCE: Banco de España.

Economic Activities (CNAE)),[23] and the credit quality of these loans, have evolved. The analysis also includes a study of certain characteristics of loans granted to a closed list of firms identified as owners of renewable energy generation facilities.

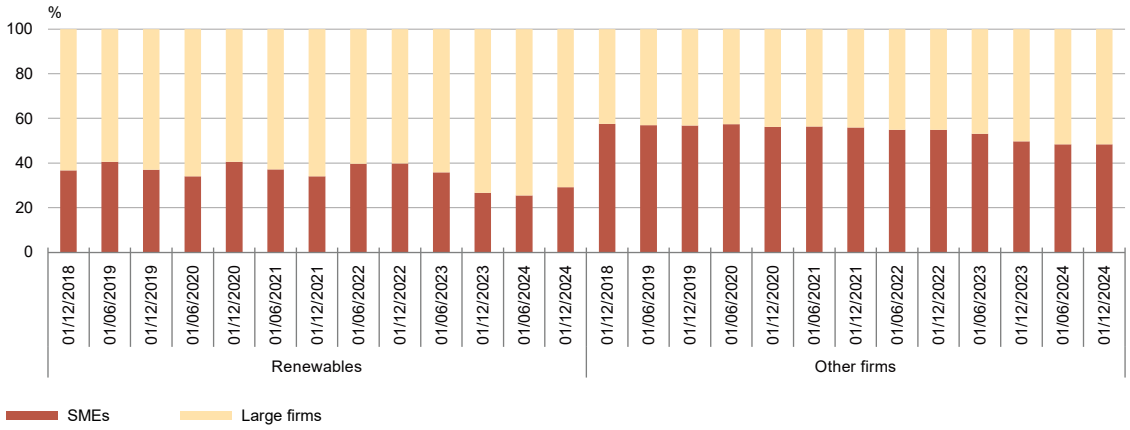
Lending to the renewables sector has grown in Spain, both in absolute and relative terms, in recent years, especially since December 2021. The stock of credit extended to the renewables sector by deposit institutions rose by 0.7%, according to CCR data, between December 2018 and December 2024, while credit to firms for other activities fell by 7.9%. In consequence, lending to the renewables sector as a proportion of credit to firms overall increased from 3.1% to 3.4% in that period (see Chart 2.4.4). More recently, since December 2021, credit to the firms considered has risen by 16.6%, while credit to other business activities has fallen by 7.2%. This rapid expansion possibly reflects the growth in investment in renewables, driven both by the measures introduced to support the green transition and the increase in electricity prices observed some years ago, which helped to boost investment interest in the sector.

In terms of distribution by size, the renewables firms receiving loans are larger than the other NFCs receiving financing. At December 2024, 70.9% of the stock of loans granted to the renewables sector was channelled through large firms, and the remaining 29.1% through SMEs (see Chart 2.4.5).[24] This contrasts

23 For the purposes of this study, firms engaged in renewable energy generation are those that declare as their main activity CNAE codes 3518 (wind power generation) and 3519 (electricity generation other than conventional thermal power, nuclear power and hydroelectric power). Identifying firms in this way may result in a subset of firms that does not entirely match those that make up the renewables sector, due to imprecise CNAE statements that classify some firms under other headings and thus exclude them from the scope of the analysis, but it can be considered a reasonable characterisation of the economic activity involved. To mitigate any bias this might cause, complementary to this analysis, and as indicated, a closed list of firms included in the Administrative Register of Electricity Generation Facilities (the PRETOR Register) has also been considered. Registration is mandatory, as regulated in Article 38 of Royal Decree 413/2014 of 6 June 2014.

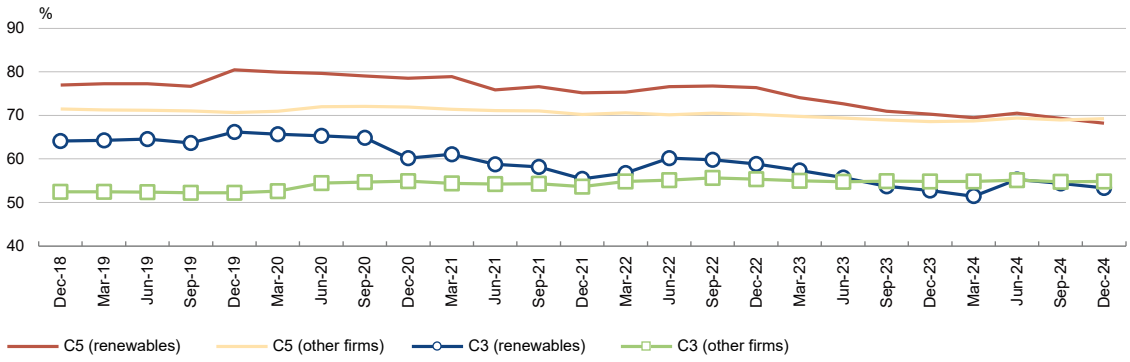
24 This is not due to a compositional effect. Indeed, according to the information available from the Central Balance Sheet Data Office, if asset volume is used to proxy size, renewables firms are somewhat smaller than other firms in the economy overall and less disperse in terms of size.

Chart 2.4.5 Distribution by firm size



SOURCE: Banco de España.

Chart 2.4.6 Concentration of credit to renewables

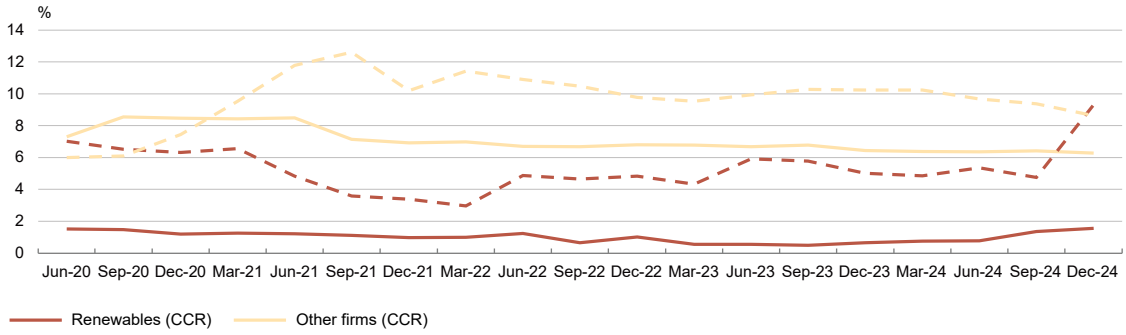


SOURCE: Banco de España.

with the distribution observed for all other loans to non-financial business activities, where SMEs account for 48.3% of the total.

Initially, lending to the renewables sector was concentrated among fewer deposit institutions than other bank credit, but in recent years it has tended to even out. Credit concentration has been higher in renewables than in other activities in the recent period. However, it has tended to become more even such that, at December 2024, there was a difference of barely 0.4 pp between the proportion of lending to renewables firms by the big five banks and the share of credit extended to other sectors. The five banks providing most financing to renewables account for more than 68.2% of total credit at December 2024, while the three largest banks account for more than 53.3%. This compares with 76.9% and 64.1%, respectively, in 2018 (see Chart 2.4.6). Meanwhile, significant institutions account for 80.9% of credit to renewables at December 2024 and for a very similar share (81.1%) of loans to other business sectors. This seems to suggest that certain banks initially specialised in lending to renewables, but that

Chart 2.4.7 Credit to renewables. NPL and stage 2 ratios (a)



SOURCE: Banco de España.

a The solid lines denote NPL ratios and the broken lines stage 2 ratios.

as the sector grew, the range of lenders broadened to cover the entire banking system[25] and the bias in favour of larger banks disappeared.

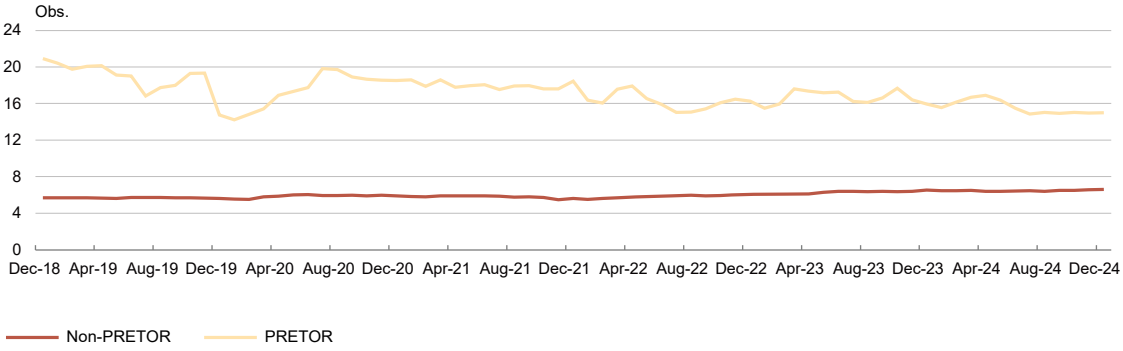
Credit to the renewables sector is higher quality than that extended to other business sectors. Loans to firms engaged in renewable energy generation are lower risk than loans to other firms, both in terms of non-performing (stage 3) and stage 2 loans. The non-performing loan (NPL) ratio has been significantly lower in recent years: 1.6% for renewables compared with 6.3% for all other sectors at December 2024 (see Chart 2.4.7). The differences are somewhat smaller for stage 2 ratios: 9.3% for renewables and 8.6% for all other sectors at the same date. However, more recently, against a backdrop of falling electricity prices, some deterioration has begun to appear. Between December 2023 and December 2024 the NPL ratio increased by 0.9 pp and the NPL volume also rose, although with no significant impact on banking sector solvency owing to the relatively small size of this loan portfolio.

To complement the analysis at CNAE level, a sample of firms specifically linked to the renewables sector, known as PRETOR, was analysed. The aim was to examine the characteristics of loans associated with a list of renewables firms that own renewable energy generation facilities. These firms are registered in the PRETOR Register, managed by the Ministry for the Ecological Transition and the Demographic Challenge. This Register is used to record and manage the data of facilities that generate electricity from renewables, cogeneration and waste. Registration is mandatory for all authorised facilities and includes key information on such facilities.[26] Specifically, from

25 Bank financing as a proportion of total interest-bearing financing is higher for renewables firms than for others, although it has declined more for them than for other firms, especially between 2018 and 2020.

26 The PRETOR Register enables the competent authorities to closely monitor electricity generation facilities, ensuring that they comply with the necessary legal and technical requirements. In addition, it provides information on the characteristics and conditions of the facilities, including their capacity and type of energy used. This helps to plan and develop energy policies and allows both regulators and firms to adjust their strategies based on installed capacity and real electricity generation. Registration is essential in order for facilities to access economic benefits, such as subsidies or special tariffs designed to foster renewable energy generation. It also means that registration data can be passed between the different tiers of government and makes it easier for these data to be amended.

Chart 2.4.8 Average number of banking groups extending credit to PRETOR firms (a)



SOURCES: Banco de España and authors' calculations drawing on CCR data and the PRETOR Register.

a The average number of banking groups that have extended credit to firms at each date is calculated as the average number of groups that have extended credit to each firm, weighted by the share of credit held by each firm at each date as a proportion of the volume of credit at that date for PRETOR and non-PRETOR firms.

the information available in the PRETOR Register, 1,600 firms can be identified by their tax identification number.[27] Drawing on CCR data, credit granted to firms listed in the PRETOR Register amounts to around 58% of credit granted to firms classified as renewable energy generators according to their CNAE code.[28]

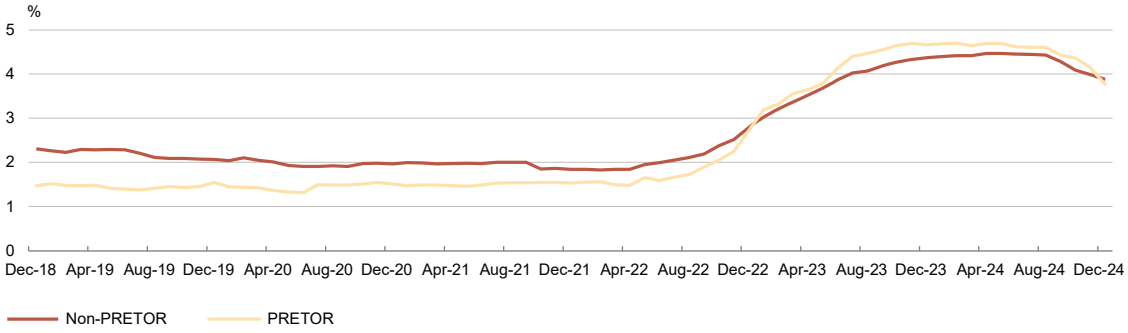
The firms in the PRETOR sample have more banking relationships. The scale of the investment needed to construct renewable energy generation facilities – in some cases entailing complex financial operations with high financing costs instrumented through project finance contracts – means that several banks may be involved. This may explain why, on average, the firms in the PRETOR Register appear to have more banking relationships (around 15) than other firms (around six), although the differences between the two groups of firms have narrowed in recent years (see Chart 2.4.8).

As for the characteristics of the credit granted, historically the cost of borrowing for PRETOR firms has been lower than for other firms, although recently this appears to have changed. Taking the narrowly defined effective interest rate, weighted by loan volume, the cost of borrowing was lower for PRETOR firms than for other firms up to December 2022 (see Chart 2.4.9), but since then the reverse appears to be the case, with some convergence at December 2024.

27 These firms appear in the Register as owners of a total of 2,101 renewable energy generation facilities (whether new or extensions of existing ones) that use a range of energy generation technologies (onshore wind power, biogas, biomass, hydropower and solar power). The total power (measured in kWh) of each of these facilities also varies considerably, from 1.5 kWh to 512,381 kWh.

28 However, not all firms that own facilities that generate electricity from renewables, cogeneration and waste included in the Register are classified in the CCR with a CNAE code associated with renewable energy generation. Specifically, at September 2024, only 43.3% of the credit granted to firms listed in the PRETOR Register is classified by its CNAE code as being credit granted to firms engaged in renewable energy generation.

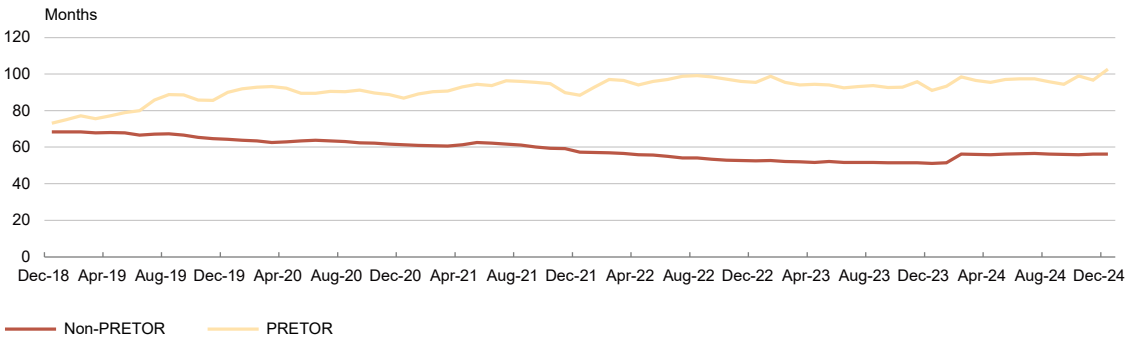
Chart 2.4.9 Average interest rate on credit granted to PRETOR firms. Stock of credit (a)



SOURCES: Banco de España and authors' calculations drawing on CCR data and the PRETOR Register.

a The average cost of borrowing is calculated as the average narrowly defined effective rate at each date, weighted by the share of outstanding credit at that date as a proportion of the outstanding stock of credit for PRETOR and non-PRETOR firms.

Chart 2.4.10 Average residual maturity of credit granted to PRETOR firms. Stock of credit (a)



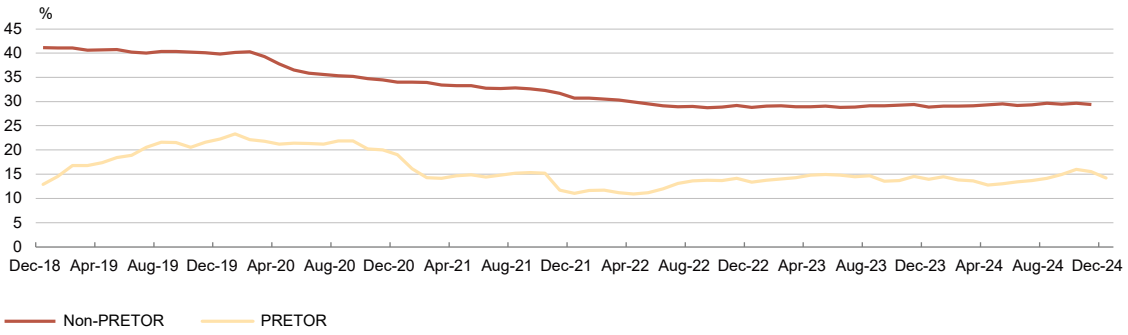
SOURCES: Banco de España and authors' calculations drawing on CCR data and the PRETOR Register.

a The average residual period is calculated as the average number of months to maturity of the outstanding credit at each date, weighted by its share of the outstanding stock of credit for PRETOR and non-PRETOR firms.

PRETOR firms' debts tend to be longer term and less collateralised. The average residual maturity of the stock of credit of PRETOR firms (see Chart 2.4.10) stood at around 102 months (some 8.5 years) at December 2024. Compared with other firms, their outstanding debts are longer term, and that term has increased over the period considered. In addition, PRETOR firms have a lower proportion of collateralised exposures (around 14.2% at December 2024) than other firms (24.6%) (see Chart 2.4.11). The longer maturities are linked to the maturity and depreciation periods of these projects, while the lower demand for collateral could reflect the financial sector's perception of the energy sector as lower risk, although it could also make it higher risk should financial difficulties arise.

To conclude, renewables have shown robust growth and good credit quality compared with other sectors. A higher proportion of their borrowing has been

Chart 2.4.11 Stock of collateralised credit of PRETOR firms



SOURCES: Banco de España and authors' calculations drawing on CCR data and the PRETOR Register.

channelled through large firms and has been granted mainly by the bigger banks. In addition, credit quality has been better than in other sectors, despite having deteriorated somewhat in the recent period.

2.4.3 Spanish issuers of taxonomy-aligned and eligible securities

The Taxonomy Regulation establishes the requirements that an economic activity must meet for it to be considered to be making a substantial contribution to one or more of the environmental objectives, including those relating to climate change mitigation and adaptation. For an activity to be considered eligible and taxonomy-aligned – and therefore sustainable – it must be included in the exhaustive list of activities set out in the legislation. These activities will be considered aligned when they comply with the technical screening criteria established, including that they do not significantly harm any of the other environmental objectives and that they comply with minimum safeguards insofar as human and labour rights are concerned.

Once a firm's eligible and aligned activities are identified, the degree of eligibility and alignment is measured as the proportion of their turnover, capital expenditure (CapEx) or operating expenditure (OpEx) that is associated with such activities.

The EU Taxonomy is also a useful tool for financial and non-financial firms to plan and convey their business strategies, transition plans and investment and financing activities geared towards a low-carbon economy. This is particularly important in view of the growing risks facing firms and financial sector players, arising from the emergence of stranded assets as a result of climate change and environmental degradation.

As certain assets become obsolete, highly polluting or vulnerable to the physical effects of climate change, the risk of unexpected or advance depreciation, or

Table 2.4.1 Eligibility and alignment of Spanish issuers

Eligibility (%)

	2023			2022		
	Turnover (a)	CapEx (b)	OpEx (c)	Turnover (a)	CapEx (b)	OpEx (c)
Financial sector	30	30	n. a.	n. a.	n. a.	n.a.
Non-financial sector	37	60	47	36	42	41

Alignment (%)

	2023			2022		
	Turnover (a)	CapEx (b)	OpEx (c)	Turnover (a)	CapEx (b)	OpEx (c)
Financial sector	2	2	n. a.	n. a.	n. a.	n.a.
Non-financial sector	17	53	22	17	36	18

SOURCE: CNMV.

a Percentages weighted by turnover at each year-end.
b Percentages weighted by CapEx at each year-end.
c Percentages weighted by OpEx at each year-end.

devaluation, of assets, or even of their becoming liabilities, will increase. Economic activities that comply with the taxonomy criteria can reduce this risk, by granting firms greater bargaining power or making it easier for them to attract financing, for example by issuing green bonds earmarked for EU taxonomy-aligned projects.

As shown in Table 2.4.1, which presents information on the degree of taxonomy-alignment and eligibility of Spanish issuers, there are key differences between financial and non-financial sector firms (with different specificities and reporting calendars). Non-financial issuers have a much higher level of taxonomy alignment and eligibility than financial issuers. Moreover, between 2022 and 2023, the eligibility and alignment ratios of non-financial institutions rose significantly, especially when measured via CapEx. This indicator, which links the degree of alignment of business investments with the Taxonomy, may be more representative than others when it comes to assessing firms' level of commitment to the fight against climate change, particularly when it is part of an investment plan that is, in turn, aligned with a credible and complete transition plan.

At European level, the results of the first two years of taxonomy alignment disclosures show that taxonomy-aligned turnover rose by 25% between 2022 and 2023, amounting to €760 billion in 2023. The economic sectors that reported the highest percentage of taxonomy-aligned turnover in 2023 were manufacturing (36%), electricity supply (33%) and construction (9%). In that same year, 2,180 firms reported CapEx of €1,527 billion, of which 56% (€848 billion) was taxonomy-eligible expenditure and 16% (€250 billion) was taxonomy-aligned expenditure. This is a 34% increase in taxonomy-aligned CapEx between 2022 and 2023.

In the financial sector[29] there is a significant gap between eligibility and alignment levels, with the degree of alignment being particularly low (2%). The information in the table was compiled drawing on the data available for the 76 issuers that are required to disclose information on the taxonomy of their activities. Of these, 64 issuers (84%) disclosed eligible activities above zero in terms of turnover, 72 (95%) in terms of CapEx and 57 (75%) in terms of OpEx.

29 Data compiled from firms in the banking and insurance sectors.

3 New developments in evaluating climate risks to the Spanish financial system

This chapter sets out new developments in evaluating climate risks that affect the Spanish financial system. Since the publication of the 2023 biennial report, the bodies comprising AMCESFI have performed multiple analyses to help better understand the economic and financial implications of both physical and transition risks.

The first section examines the studies aimed at understanding the implications of physical risks. This includes a preliminary analysis of the economic effects of the deadly flooding that affected various regions of the country in October 2024, focusing on the role of the Insurance Compensation Consortium (CCS by its Spanish initialism). There is also an analysis of how desertification and forest fires affect lending and economic activity. Further, there is a discussion of the economic impact of climate change and environmental degradation, with a spotlight on how these factors, along with the public perception of the environment, affect asset values (such as housing prices).

The second part of the chapter revolves around transition risks, assessing the resilience of investment funds, Spanish insurers and pension funds to adverse climate scenarios linked to the implementation of the EU "Fit for 55" strategy in order to assess their climate resilience and their ability to support the green transition even under stressed conditions. In addition, there is a box that looks at the impact of energy efficiency on house prices.

3.1 New evidence on physical risks

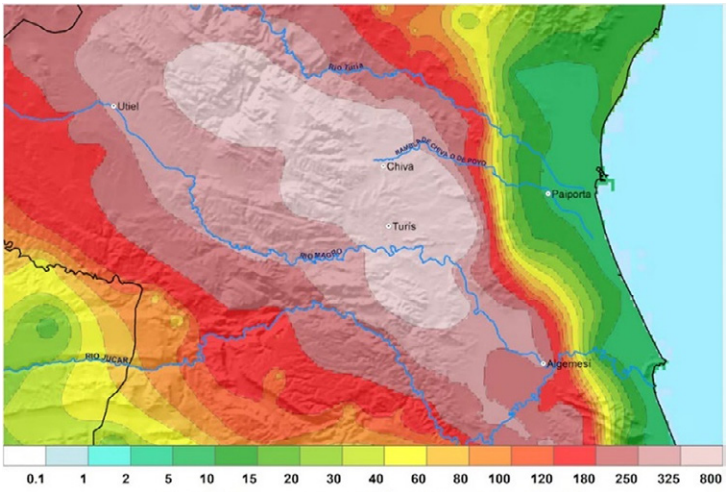
3.1.1 The October 2024 flash floods and climate change

Climate change is intensifying the frequency and severity of extreme weather events.[30] In 2024 Spain suffered one of the worst natural disasters of recent decades: a "cut-off low" – a meteorological phenomenon that caused flash floods in several areas of the country on 29 October 2024. Valencia, a region historically vulnerable to these occurrences, was particularly hard hit.[31] This had a profound

30 Intergovernmental Panel on Climate Change. (2023). "Summary for Policymakers", in *Climate Change 2023: Synthesis Report*. https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf

31 Similar disasters in the history books include the flooding in Valencia in 1957, when more than 80 died; the 1982 rainfall that caused the river Júcar to burst its banks and led to the failure of the Tous Dam, resulting in 38 fatalities; and the flooding in 2012 in Murcia, Andalusia and Valencia, leaving 13 dead.

Figure 3.1.1 Cumulative rainfall (L/m2) - 29 October 2024



SOURCE: AEMET.

social impact and tragic consequences – 235 people lost their lives. Many families were forced to abandon their homes and there was significant damage to critical infrastructure, including roads, railways, schools and healthcare centres, as well as a considerable economic and financial impact.

The cut-off low – a phenomenon known for causing torrential rainfall and catastrophic flooding – had devastating consequences. The system that affected the Iberian Peninsula from 28 October to 4 November was marked by intense rainfall along Spain's Mediterranean coast. It was particularly severe in Valencia, where rainfall exceeded 490 L/m^2 in Chiva and 390 L/m^2 in Cheste in under 24 hours. With the drainage network of small rivers and gullies in the area overwhelmed by such a large volume of water, the deluge caused watercourses to burst their banks, resulting in significant damage from both flooding and debris carried by the torrents The flow in the Poyo gully increased sixfold in just two hours, reaching a volume equivalent to four times that of the river Ebro. This was an exceptionally rare meteorological event, with a recurrence interval of over 200 years, and was considerably more severe than other recent cut-off low episodes.

The economic impact of the floods

Evidence from other comparable catastrophic events

The frequency of natural disasters has been rising in recent years and they are now occurring in places previously unaffected.[32] Evidence suggests that

32 James P. Kossin, Kerry A. Emanuel and Gabriel A. Vecchi. (2014). "The poleward migration of the location of tropical cyclone maximum intensity". *Nature,* 509, pp. 349-352. https://doi.org/10.1038/nature13278

floods have a greater impact compared to other weather events such as storms and droughts.[33]

There is a consensus in the literature that disasters like floods have significant negative impacts on GDP in the short term, but do not have adverse effects in the long term.[34] That is to say, the historical evidence available suggests that the negative impact of floods is essentially temporary, as it is subsequently offset by the fiscal stimulus from the various support measures deployed and the increased spending by firms and households on replenishing capital and durable goods. Nevertheless, these estimates are clouded by considerable uncertainty.

To accelerate the recovery, it is essential that there be no financial friction and that aid for reconstruction be effective.[35] The swiftness and effectiveness of the response from the government and financial institutions are key in mitigating the negative economic impact and supporting the recovery.

Short-term impact indicators

The flash floods have had a significant impact on the economy of the municipalities concerned, which account for around 2% of the national total by various metrics (e.g. population, employment and business activity).

Given the significance of the affected area, the Banco de España has been monitoring a range of high-frequency indicators to measure the economic effects of the flooding in real time. The supply bottlenecks index is a particularly notable example.[36] This indicator pointed to a severe initial negative impact of the flash floods (like that observed in the United States after Hurricane Katrina in 2005) that diminished relatively sharply after a fortnight (see Chart 3.1.1). Employment developments are another important indicator. On the one hand, the impact on employment has been limited, given that recent social security registrations in Valencia show a pattern similar to that observed twelve months earlier, following the small shortfall that appeared in November 2024 as a result of the floods (see Chart 3.1.2). On the other hand, as many as 32,000 workers were placed on furlough under job retention schemes (known in Spanish as ERTEs) representing around 1.5% of employment in Valencia region. Tourism was one of the sectors

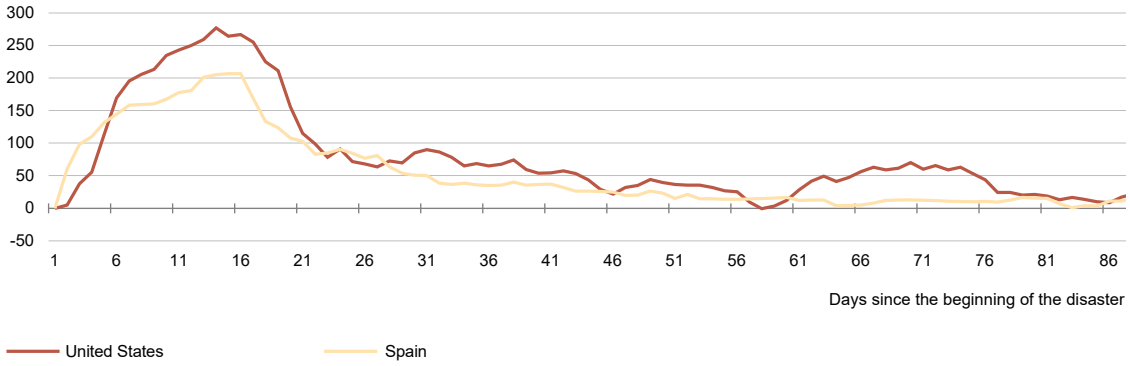
33 Tamim Bayoumi, Saad N. Quayyum and Sibabrata Das. (2021). "Growth at Risk from Natural Disasters". IMF Working Paper, 2021/234, International Monetary Fund. https://www.imf.org/en/Publications/WP/Issues/2021/09/17/Growth-at-Risk-from-Natural-Disasters-465825

34 Eduardo A. Cavallo and Ilan Noy. (2011). "The Economics of Natural Disasters: A Survey". IDB Working Paper Series, IDB-WP-124, Inter-American Development Bank. https://doi.org/10.18235/0010924

35 Sehrish Usman, Guzmán González-Torres and Miles Parker. (2024). "Going NUTS: The Regional Impact of Extreme Climate Events Over the Medium Term". ECB Working Paper, 2024/3002, European Central Bank. http://doi.org/10.2139/ssrn.5050906

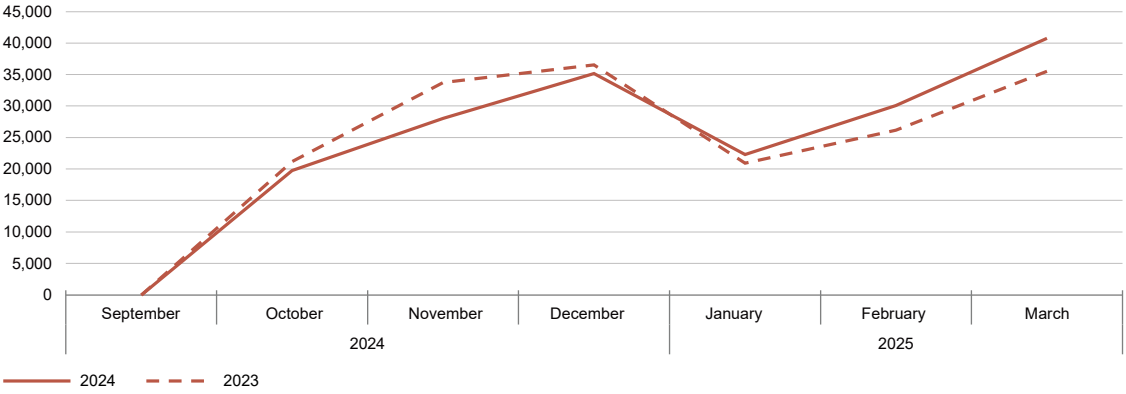
36 Constructed using the methodology described in Pablo Burriel, Iván Kataryniuk, Carlos Moreno Pérez and Francesca Viani. (2023). "A New Supply Bottlenecks Index Based on Newspaper Data". Documentos de Trabajo, 2304, Banco de España. https://doi.org/10.53479/25166

Chart 3.1.1 Bottlenecks index in the United States after Katrina and in Spain after the flash floods



SOURCE: Devised by authors using the methodology described in Burriel, Kataryniuk, Moreno Pérez and Viani (2024).

Chart 3.1.2 Change in average social security registrations in Valencia since September 2024

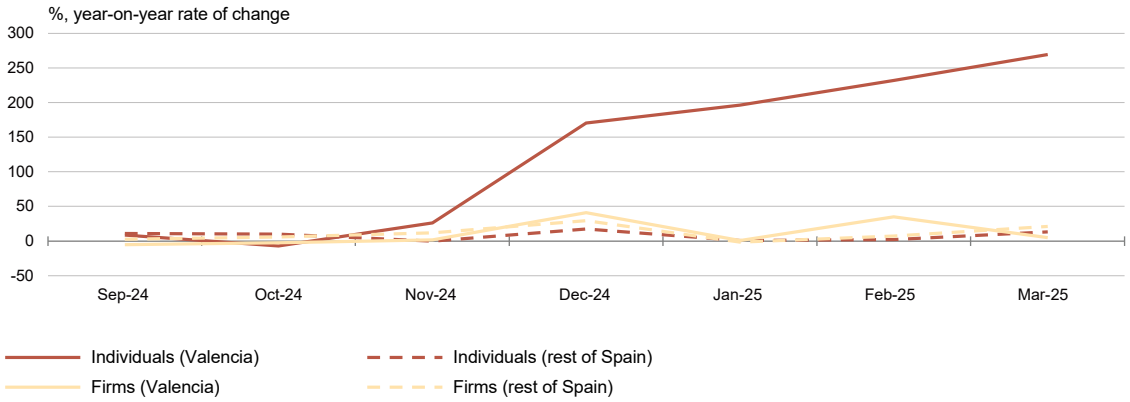


SOURCE: Ministerio de Inclusión, Seguridad Social y Migraciones.

most affected by the floods, as it suffered from constraints on travel in certain areas on account of damaged infrastructure.

Overall, the evidence available suggests that the negative impact of the flash floods on GDP growth in Spain in 2024 Q4 was relatively contained (between 0.1 pp and 0.2 pp). In any event, based on the historical evidence available for similar events, this adverse impact could be transitory and reversed, provided the support measures for affected households and firms are rolled out swiftly and effectively in 2025 H1. One of the indicators that showed this rebound effect in the wake of the flash floods is the vehicle registrations series. For instance, car registrations in Valencia province shot up between December 2024 and March 2025 in the individuals segment in comparison with more sedate developments in the rest of Spain (see Chart 3.1.3).

Chart 3.1.3 Vehicle registrations



SOURCES: Asociación Española de Fabricantes de Automóviles y Camiones.

The role of the insurance sector

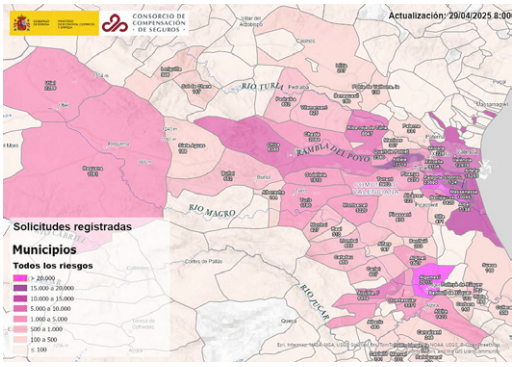
Impact and management of the flash flooding in October-November 2024

The flash floods in late October 2024 were characterised by the extensive damage they caused, which led to a huge number of compensation claims submitted to the CCS (more than 246,000 claims as at 30 April 2025), mostly in Valencia region (95.8% of the total). Figures 3.1.2, 3.1.3 and 3.1.4 illustrate the high number of policies affected by this event. By coverage type, the breakdown of the claims received is as follows: homes and homeowner associations (32.8%); vehicles (58.4%); small businesses, warehouses and other risks (6.4%); offices (0.4%); industrial risks (2.1%); and civil engineering works, with 77 claims (0.03%). The estimated damage in Valencia as at 28 February amounted to €4,865 million.

Comparing these numbers against claims for other natural disasters processed by the CCS clearly demonstrates the scale and exceptional nature of this catastrophe (see Charts 3.1.4, 3.1.5 and 3.1.6). The aggregate amount of payments up to 30 April is 11 times higher than the total resulting from the volcanic eruption in La Palma, while the accumulated number of payments is six times higher than the total from the Lorca earthquake and the La Palma eruption combined.

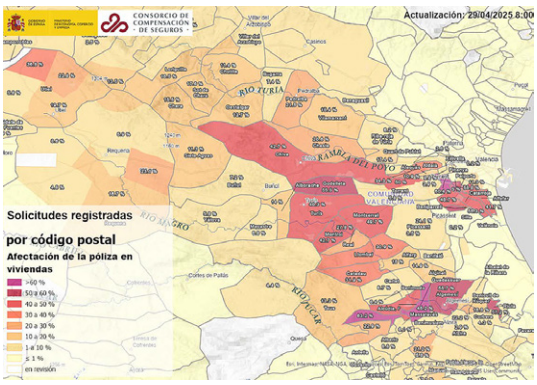
As with all extraordinary risks covered by the CCS, claims stemming from the flash floods follow the standard processing procedure and, therefore, require: i) assessing the damaged property for particularly complex claims, such as industrial or civil engineering projects; ii) preparing the report by loss adjusters; iii) verifying the general and specific contractual terms agreed upon by the insured party and payment of the corresponding extraordinary risk premiums; iv) verifying ownership of the damaged good and the current account.

Figure 3.1.2 Number of claims received, by municipality



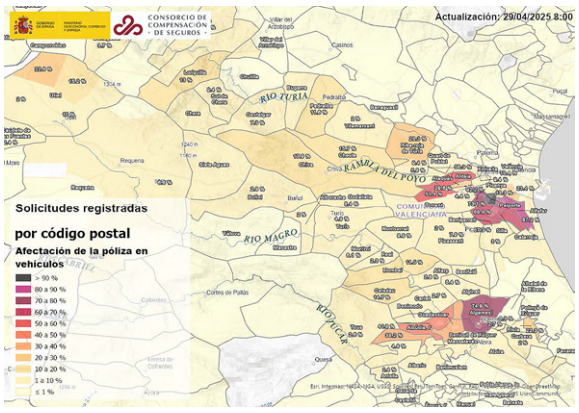
SOURCE: CCS.

Figure 3.1.3 Percentage of home insurance policies affected



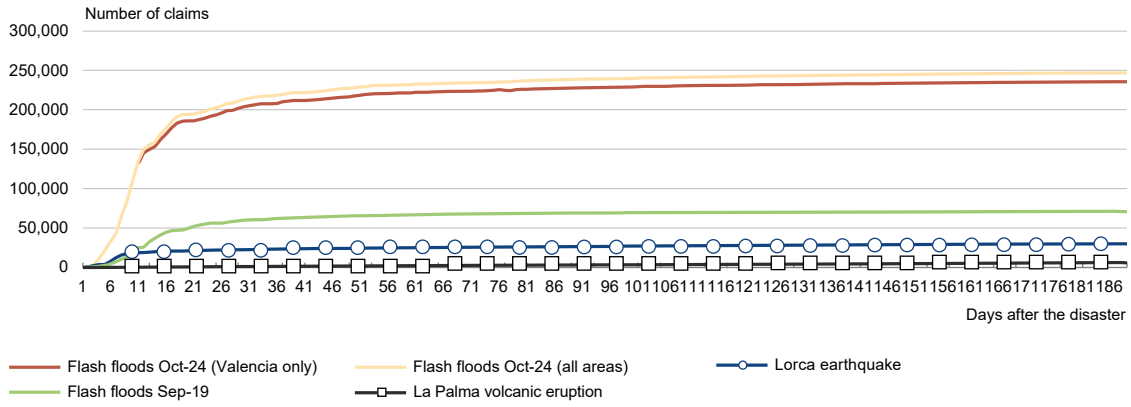
SOURCE: CCS.

Figure 3.1.4 Percentage of vehicle insurance policies affected



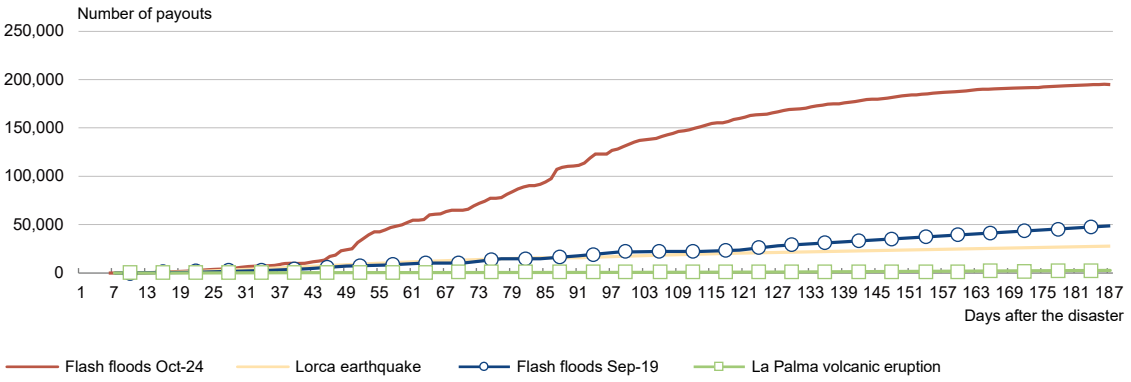
SOURCE: CCS.

Chart 3.1.4 Cumulative number of claims. Comparison with other natural disasters



SOURCE: CCS.

Chart 3.1.5 Cumulative number of payouts. Comparison with other natural disasters

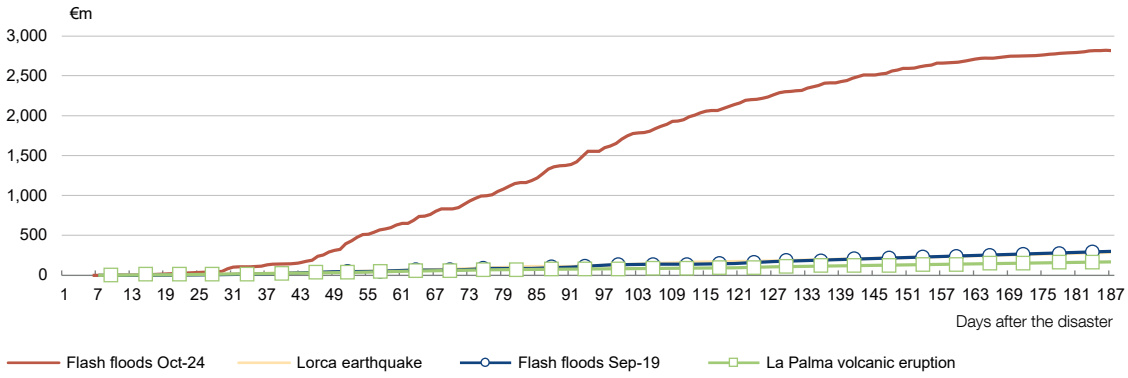


SOURCE: CCS.

Various steps have been taken with the ultimate aim of expediting the work of the CCS, thereby ensuring that compensation reaches insured claimants as swiftly as possible.

In this regard, the following measures stand out: the CCS multiplied the number of loss adjusters it typically works with by five, it boosted the number of telephone serviced positions by a factor of ten and it bolstered its IT systems to enhance their capacity for processing these claims. Additionally, the workforce was reinforced with the recruitment of 101 additional claims handlers (a mix of temporary and permanent hires). Additionally, given the scale of the disaster and the urgency of processing claims as rapidly as possible to enable the public to recover more quickly, public-private collaboration for such claims was increased. This was achieved through an agreement on 13 November 2024 between the Spanish Association of Insurers and Reinsurers (UNESPA by its Spanish acronym) and insurance companies and the CCS, which established the special operational procedure. This has significantly enhanced the handling and assessment resources available

Chart 3.1.6 Cumulative value of payouts. Comparison with other natural disasters



SOURCE: CCS.

by combining the operational resources of the CCS with those of the participating insurers. This has facilitated faster response times and earlier payouts to insured parties. 38 insurers signed up to the special operational procedure of 13 November 2024. The CCS assigned to them the management and assessment of 134,858 claims (out of a total of more than 246,000 filed).

As of 30 April 2025, insurers had submitted 104,949 payment proposals to the CCS out of the 134,858 claims assigned to them. These proposals gave rise to payments in excess of €1,157 million, accounting for 95.5% of motor vehicle claims and 91.3% of multi-risk claims. These claims are in addition to those managed and disbursed directly by the CCS, which resulted in a total payment amount of more than €2,765 million (the estimated damage in Valencia amounts to €4,865 million). Overall, this represents a significant milestone in the management of large-scale claims events by the CCS, with payments equivalent to nine years of ordinary work being made by 30 April.

Support and reconstruction measures

The emergency caused by the flash floods was so severe that it necessitated an extraordinary number of actions and a remarkable mobilisation of resources. In the financial sector, notable measures include the implementation of payment moratoria covering both interest payments and principal repayments for loans with or without mortgage collateral, as well as the guarantee facility provided by the Official Credit Institute (ICO by its Spanish acronym). Both measures are laid down in Royal Decree-Law 6/2024.

First, a mortgage and non-mortgage moratorium was approved that involved suspending interest payments and principal repayments for three months. It applied to individuals and to firms with a turnover of less than €6 million. After the three months, the moratorium was extended by an additional nine months for principal repayments. This approach addressed the liquidity issues

BOX 3.A The role of the Insurance Compensation Consortium in the coverage of extraordinary risks

The Insurance Compensation Consortium (CCS by its Spanish acronym), attached to the Ministry of Economy, Trade and Business, is a public-sector insurance entity that takes the form of a public enterprise.

As such, and pursuant to Articles 6 et seq. of Royal Legislative Decree 7/2004 of 29 October 2004, approving the consolidated text of the Statute of the Insurance Compensation Consortium, the CCS pays compensation for the losses from extraordinary risks that are covered by private insurance policies and arise from natural phenomena such as extraordinary flooding. The CCS's risk coverage therefore includes the damage caused throughout the country by the flash floods that occurred between 28 October and 4 November 2024.

The measures adopted by the CCS to address extraordinary risk events (earthquakes, seaquakes, extraordinary flooding, atypical cyclonic storms, falling space objects, etc.) clearly attest to a public-private partnership that is key to:

- Preserving the stability of the Spanish insurance sector, since there is no transfer by the CCS of extraordinary risks to insurance companies. This avoids placing strain on their solvency ratios in the event of natural disasters.
- Providing broad access to extraordinary risk insurance, by mutualising the cost of such coverage through risk compensation based on the nature of the event (types of events covered), the nature of the risk (homes and home-owner associations, offices, small businesses, industrial premises, civil engineering infrastructure, vehicles, among others) and the geographical location of the risk within Spain, helping to bridge the insurance gap in the event of natural disasters that would otherwise have a direct impact on society and the economy.

The CCS is funded through the mandatory surcharges applied to private insurance policies (taken out with private insurance companies), essentially for property damage or personal injury. This is a simple funding mechanism that is highly sensitive to changes in surcharge fees, since it applies to all insurance policies in Spain. Should the CCS need additional funds to address high-impact events, slightly raising the surcharge fee would lead to an immediate and substantial increase in CCS income, thus ensuring financial stability. Moreover, the CCS is ultimately backed by State guarantees.

faced by those affected by the flash floods and ensured business continuity in a context of severe economic disruption and grave material destruction. Second, a general extension of one year was approved for the Code of Good Practice vis-à-vis urgent measures for mortgage debtors at risk of vulnerability, as laid down in Royal Decree-Law 19/2022. Individuals residing in the area affected by the flash floods benefited from an additional six-month extension, meaning that the Code of Good Practice would apply to them for 42 months.

Second, the Ministry of Economy, Trade and Business approved a new ICO guarantee facility to alleviate the economic impact of the flash floods. A guarantee facility of up to €5 billion was activated to provide State backing for financing granted by financial institutions to households, firms and the self-employed. An initial tranche of €1 billion was activated with three categories of financing: credit backed by aid and compensation receivable by households, credit backed by aid and compensation receivable by firms and the self-employed, and credit aimed at restoring firms' productive capacity. In addition, a second tranche of the ICO guarantee facility was activated, amounting to €240 million. This tranche was intended for the self-employed and industrial or commercial firms and included an interest rate subsidy from the State Secretary for Trade.

Bank exposures

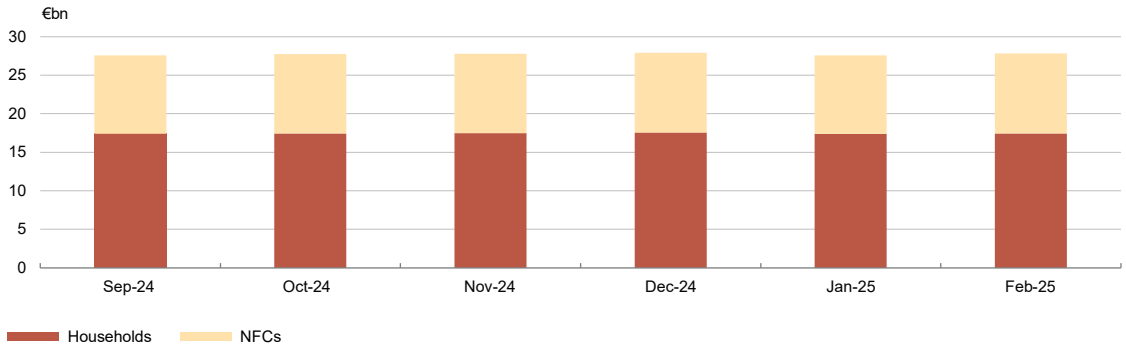
According to data up to the end of September 2024, banks operating in Spain had an exposure of approximately €27.5 billion in the affected municipalities (see Chart 3.1.7).[37] Efforts have been made to ensure that no affected borrowers are overlooked, which is why a transaction is deemed to have been affected by the flash floods if any counterparty belongs to one of the postcodes identified as an affected area or if a property located in an affected area serves as mortgage collateral for the loan or credit in question.

In relative terms, the volume of loans potentially affected by the flash floods represented 2.2% of the national total, a proportion broadly in line with other indicators of the economy's exposure to the event. Breaking down borrowers by their legal form (see Chart 3.1.1), it can be seen that €17.4 billion corresponded to households (representing 2.5% of all households) and just over €10 billion to NFCs (representing 1.7% of all NFCs). Of this latter group, 56% (€5.7 billion) pertained to small and medium-sized enterprises. Among households, lending for house purchase represented 74% of the affected loans (an exposure amounting to nearly €13 billion), while consumer loans accounted for 14% (just over €1.7 billion).

In any case, no significant changes have been observed in the bank exposures in the months following the flash floods. As seen in Chart 3.1.8, exposures remain similar to levels in September, with no significant changes in the subsequent months. This could suggest that neither credit supply nor demand has been affected following the disaster, although a more detailed analysis might reveal different patterns. In December 2024, the total exposure in the affected areas increased by 1.2% vis-à-vis September 2024, a figure slightly higher than the growth in lending in Spain overall.

37 In this analysis, the monetary volume of loans granted by any bank operating in Spain is considered. The affected areas are classified according to the postcodes of the municipalities listed in Royal Decree-Law 6/2024 (which are mostly in Valencia province, except for three which are located in the provinces of Albacete, Cuenca and Malaga).

Chart 3.1.7 Credit exposure. Affected areas (a)



SOURCES: CCR and the Banco de España's Central Balance Sheet Data Office.

a Exposure is shown in billions of euro in the areas affected by the flash floods. "Households" includes individuals, sole proprietors, homeowner associations and other households (excluding non-profit institutions serving households) that either reside in the affected areas or hold loans secured by real estate collateral located there. "NFCs" includes all NFCs with loans in the affected areas or with loans secured by real estate collateral located there.

3.1.2 Impact of increasing aridity on developments in lending and economic activity

Spain is among the European countries most vulnerable to desertification, with nearly three-quarters of its territory consisting of vulnerable drylands.[38] Desertification is defined as the degradation of land in arid, semi-arid and dry sub-humid areas caused by various factors related both to climate change and human activities. This phenomenon can be classified as a chronic physical risk, as it is a gradual process that takes place over a long time span.

Desertification can have significant economic and financial consequences. Empirical evidence shows that its chronic nature can lead, for example, to migration away from the affected areas, among other socio-economic changes. In turn, these could have an indirect effect on banks by affecting economic growth and, ultimately, borrowers' creditworthiness.

However, the net impact of desertification on bank lending is not clear, as it can be positive or negative. As suggested by previous empirical studies analysing the impact of climate change on lending, there are two potential effects on demand. On the one hand, demand can be constrained owing to a fall in collateral values. On the other hand, credit demand can grow as firms seek to replace physical capital that has been eroded or destroyed or invest in mitigation strategies to protect against the consequences of climate change.[39] On the supply side, banks

38 Ministry for the Ecological Transition and the Demographic Challenge. (2022). "Estrategia Nacional de Lucha contra la Desertificación". https://www.miteco.gob.es/content/dam/miteco/es/biodiversidad/temas/desertificacion-restauracion/estrategia_nacional_lucha_desertificacion_web_2022_tcm30-542085.pdf

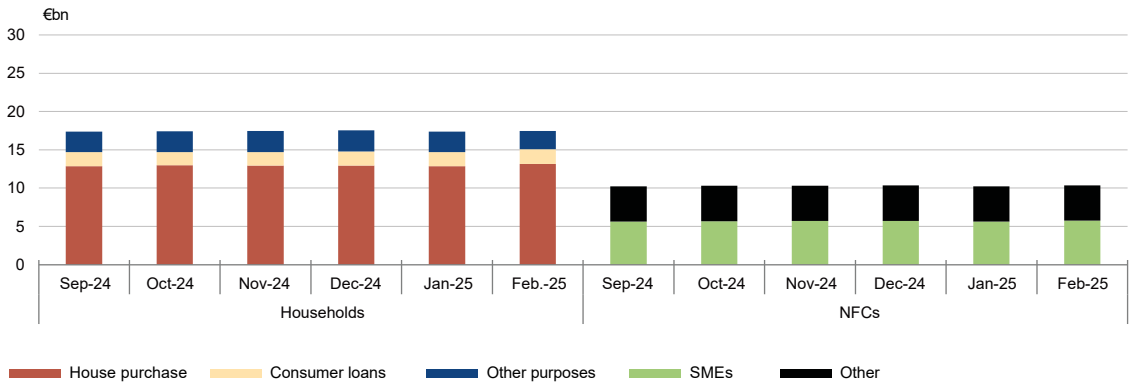
39 See James R. Brown, Matthew T. Gustavson and Ivan T. Ivanov. (2020). "Weathering Cash Flow Shocks". *Journal of Finance*, 76(4), pp. 1731-1772. https://onlinelibrary.wiley.com/doi/full/10.1111/jofi.13024

Table 3.1.1 Credit exposure. Affected areas

Sector	Purpose	Exposure	Exposure (%)
Households and NFCs	All loans	27,554.14	2.2
Households (excluding NPISHs)	**Total**	**17,380.25**	**2.5**
	House purchase	12,974.86	2.6
	Consumer loans	1,716.11	2.6
	Other purposes	2,689.28	2.4
NFCs	**Total**	**10,173.90**	**1.7**
	SMEs	5,703.79	2.5
	Other purposes	4,470.11	1.2

SOURCE: Devised by authors drawing on CCR data.

Chart 3.1.8 Credit exposure. Affected areas. Breakdown by institutional sector and purpose (a) (b)



SOURCES: CCR and the Banco de España's Central Balance Sheet Data Office.

a Exposure is shown in billions of euro in the areas affected by the flash floods. "Households" includes individuals, sole proprietors, homeowner associations and other households (excluding non-profit institutions serving households) that either reside in the affected areas or hold loans secured by real estate collateral located there. "NFCs" includes all NFCs with loans in the affected areas or with loans secured by real estate collateral located there.
b "Other purposes" for loans to households includes all lending to the self-employed.

might cut credit to affected areas because firms' compromised creditworthiness would negatively impact the bank's balance sheet.[40]

A recent study by the Banco de España examines how the gradual desertification of Spanish territory affects bank lending to firms. This analysis represents an initial approach to estimating the impact of this process on economic growth and employment. To explore the relationship, Broto and Hubert (2025)[41] use data on lending to NFCs in municipalities between 1984 and 2019 as the

40 See Benjamin L. Collier and Volodymyr O. Babich. (2019). "Financing Recovery After Disasters: Explaining Community Credit Market Responses to Severe Events". *Journal of Risk & Insurance,* 86(2), pp. 479-520. https://doi.org/10.1111/jori.12221

41 Carmen Broto and Olivier Hubert. (2025). "Desertification in Spain: Is there any impact on credit to firms?". Documentos de Trabajo, 2513, Banco de España. https://doi.org/10.53479/39119

dependent variable, sourced from the Central Credit Register (CCR). The CCR is a database containing granular transaction-level data on the credit exposures that reporting banks have with all their customers. This database provides much more precise information on the impact of meteorological variables compared to previous studies that used GDP as the variable of interest.

The primary explanatory variable in this analysis is an aridity index calculated for each municipality and year. The aridity index is defined as the ratio between annual precipitation and the potential evapotranspiration index.[42] This index measures the atmosphere's capacity to remove water through soil evaporation and plant transpiration. Broto and Hubert (2025) derive this index from daily geocoded data on temperature, precipitation and latitude, drawn from the Copernicus database, with a resolution of 0.1 degrees.[43] The aridity index is calculated for each cell of the grid using the methodology proposed by Thornthwaite (1948), which is the reference method for the United Nations Environment Programme (UNEP).[44] To obtain the aridity index for each municipality, these observations are correlated with the geographical boundaries of Spain's 8,132 municipalities. As with the approach of the Ministry for the Ecological Transition and the Demographic Challenge, municipalities can be grouped into six climate zones based on the aridity indices obtained: hyper-arid, arid, semi-arid, dry sub-humid, humid sub-humid and humid.[45]

The aridity indices obtained in the study indicate that the degree of aridity has been worsening throughout almost the entirety of Spain since the 1970s. For instance, the proportion of semi-arid areas has increased from 29% in the 1970s to 53% in the 2010s. This means that just over 40% of the territory classified as dry sub-humid in the 1970s was semi-arid in the 2010s. However, this deterioration is highly heterogeneous across regions. The most recent aridity map shows that it has also worsened in the humid areas of the northern Iberian Peninsula. Conversely, some areas around the Pyrenees and the Ebro delta exhibit lower levels of aridity than in the past. Almería stands out at province level, since 25% of its territory is classified as arid, accounting for 56% of the total arid or hyper-arid surface area in Spain. The remainder of Spain's arid or hyper-arid territory is located in the Canary Islands (28%) and in certain areas of Murcia and Valencia (16%).

According to this study, in general, increased aridity is linked to a reduced volume of lending to NFCs. However, these effects tend to manifest slowly. For

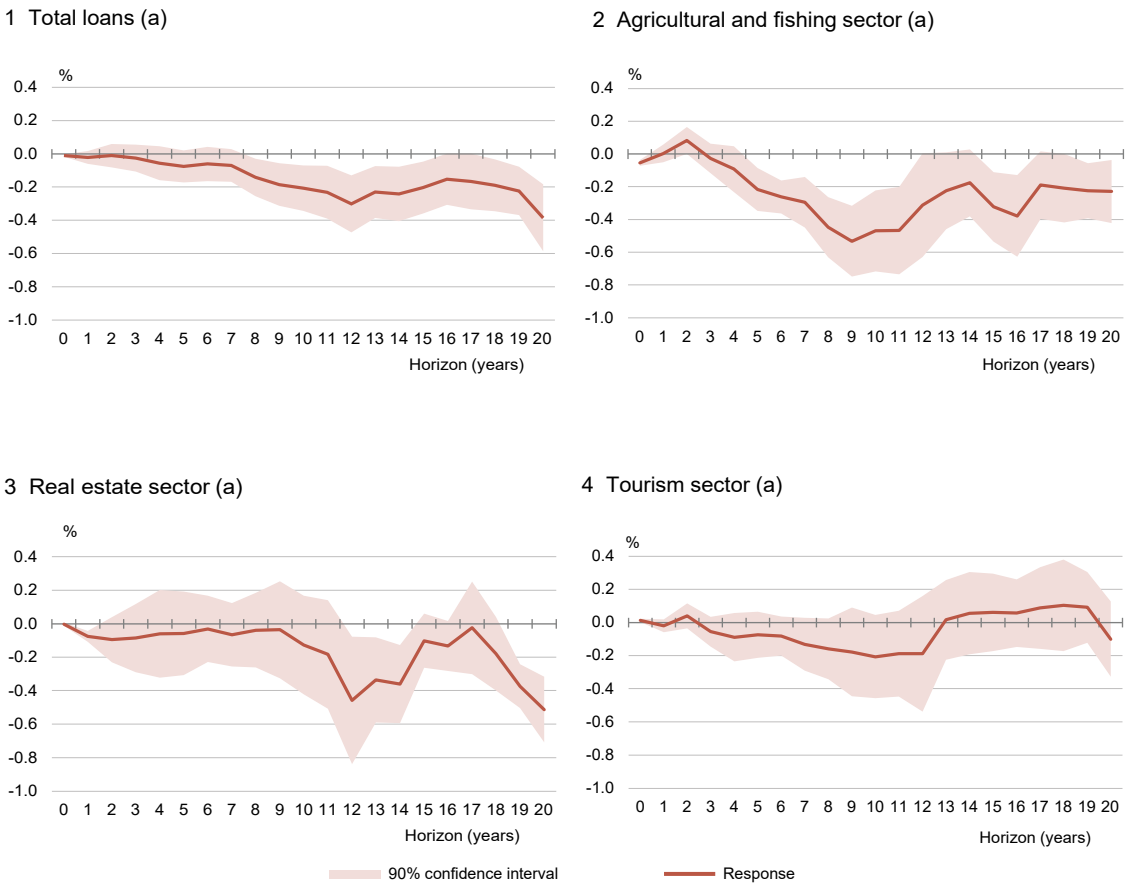
42 See the work of Emmanuel de Martonne (1926). "Aréisme et indice d'aridité". *Compte Rendus de l'Académie des Sciences,* 182, pp. 1395-1398. https://www.persee.fr/doc/bagf_0004-5322_1926_num_3_9_6321 and C. W. Thornthwaite (1948). "An Approach toward a Rational Classification of Climate". *Geographical Review,* 38(1), pp. 55-94, https://www.jstor.org/stable/210739, which defined these aridity indices.

43 See Richard C. Cornes, Gerard van der Schrier, Else J. M. van den Besselaar and Philip D. Jones. (2018), "An ensemble version of the E-OBS temperature and precipitation data sets". *Journal of Geophysical Research: Atmospheres, 123(17), pp. 9391-9409.* https://doi.org/10.1029/2017JD028200

44 United Nations Environment Programme. (1992). *World atlas of desertification.* https://digitallibrary.un.org/record/246740?ln=en

45 This classification is in line with that established in UNEP (1992).

Chart 3.1.9 Impact of increased aridity in Spain on loans to NFCs



SOURCE: Carmen Broto and Olivier Hubert. (2025). "Desertification in Spain: Is there any impact on credit to firms?". Documentos de Trabajo, 2513, Banco de España. https://doi.org/10.53479/39119

a The impulse response functions illustrate the percentage change in per capita loans to NFCs following a 1% increase in the aridity index, as estimated from local projections. The model is estimated as a panel combining municipalities and years and includes fixed effects for province, year and province-year. Standard errors are clustered at the provincial level and are robust to heteroscedasticity and autocorrelation.

example, the effect only becomes statistically significant for total credit to NFCs after more than eight years (see Chart 3.1.9). For each 1 pp increase in aridity, lending declines by approximately 25 basis points (bp) over a horizon of eight to 20 years.

The impact of aridity on lending varies by sector. The agricultural sector is the most affected, with bank credit to this sector expected to fall by approximately 25 bp on average over a 20-year period following a 1 pp increase in the aridity index. Credit to firms in the real estate sector has also been negatively impacted by increased aridity, albeit to a lesser extent than the agricultural sector. Lastly, the Spanish tourism sector has proven to be relatively immune to increased aridity in aggregate terms, as it has managed to accommodate the effects of rising temperatures and decreased rainfall.

The climate zone of a municipality also influences the aridity-sensitivity of credit to firms. Drier climate zones are the most affected, whereas more humid

regions show greater resilience to increased aridity. Specifically, the most arid and driest areas experience a decline in credit ranging from 17 bp to 24 bp that begins eight years after a 1 pp increase in aridity, displaying a pattern similar to that of lending overall.

Similarly, sectoral lending can respond differently to increased aridity depending on the climate zone. This is evident in the tourism sector: while lending in the driest areas remains unaffected by this phenomenon, intermediate and humid zones even benefit, albeit temporarily. In the case of lending to the agricultural sector, the response is similar across climate zones, in line with the broadly negative impact of increased aridity on this sector.

These findings are consistent with those obtained using other economic activity indicators as alternative dependent variables. To test the robustness of the above results, the authors analysed the impact of increased aridity on the unemployment rate, the number of new hires and the number of social security registrations. Employment reacts more quickly than lending to increased aridity, with the unemployment rate rising by 4 bp after four years. The number of employment contracts and social security registrations also fall in response to increased aridity.

The findings point to gradual desertification having a significant effect on the supply of lending to firms. However, these results should be interpreted with caution when extrapolated into the future, as non-linear negative effects may materialise if desertification continues and certain aridity thresholds are exceeded. Regarding potential policies, it is important to consider that the economic impact of chronic physical risks, such as desertification, reveals itself over a long time span. As a result, avoiding the "tragedy of the horizon" is crucial.[46] Given that the impact of these risks is slow, lagged and extends well beyond the political cycle, it is crucial to ensure that measures are not implemented too late.

Impact of more frequent and severe wildfires on developments in lending and economic activity

Extreme wildfires are becoming more frequent and severe due to climate change,[47] with Spain being one of the worst affected countries in Europe.[48] Indeed, this can be seen in the fact that in 2022 around 40% of the area in the EU devastated by wildfires was in Spain. Additionally, the duration of the wildfire season has extended worldwide, with the Mediterranean experiencing one of the largest increases (an

46 Mark Carney raised the issue of the "tragedy of the horizon" in his speech on 29 September 2015. "Breaking the tragedy of the horizon – climate change and financial stability".

47 Organization for Economic Co-operation and Development. (2023). "Taming Wildfires in the Context of Climate Change". OECD Publishing. https://doi.org/10.1787/dd00c367-en

48 For more details, see Costa, Hugo, Daniele De Rigo, Giorgio Libertà, Tracy Houston Durrant and Jesús San-Miguel-Ayanz. (2020). "European wildfire danger and vulnerability in a changing climate. Towards integrating risk dimensions: JRC PESETA IV project: Task 9 - forest fires". Publications Office of the European Union. https://data.europa.eu/doi/10.2760/46951

additional 29 days per year).[49] Looking to the future, the number of days per year with high fire risk is expected to rise significantly, especially in southern European countries, worsening as global warming intensifies. Consequently, the already significant negative impacts of these climate events on the economy and business activity could be profoundly amplified in the coming years.[50]

In this context, it is crucial to assess the financial sector's response to the increasing physical risks associated with climate change. The effects of physical climate risks on the supply of credit are not straightforward. In the wake of a climate-related disaster, banks may reduce lending owing to factors such as the diminished value of collateral or uncertainty regarding the economic outlook of affected areas.[51] Conversely, banks may also increase lending to support recovery efforts in disaster-affected areas.[52] However, the factors influencing banks' credit allocation strategies in response to physical risks, particularly when the data are flawed, require further research.

A recent study by the Banco de España analyses developments in bank loans to firms affected by wildfires and the role played by more local banks. In particular, Álvarez-Román et al. (2024)[53] investigate changes in bank lending following a climate-related event, as well as the role of lenders' access to data on borrowers in a context of informational asymmetry.[54] The study distinguishes between local banks, whose loans are concentrated in a specific province, and non-local banks, which

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49 Matthew W. Jones, John T. Abatzoglou, Sander Veraverbeke, Niels Andela, Gitta Lasslop, Matthias Forkel, Chantelle Burton Adam J. P. Smith, Richard A. Betts, Guido R. van der Werf, Stephen Sitch, Josep G. Canadell, Cristina Santín, Crystal Kolden, Stefan H. Doerr and Corinne Le Quéré. (2022). "Global and Regional Trends and Drivers of Fire Under Climate Change". *Reviews of Geophysics,* 60. https://doi.org/10.1029/2020RG000726

50 Alvarez-Román et al. (2024) find that sales on total assets of companies affected by fires are around 7 pp lower than similar unaffected firms one year after the fire. Laura Álvarez-Román, Sergio Mayordomo, Carles Vergara-Alert and Xavier Vives (2024). (2024). "Climate risk, soft information and credit supply". Documentos de Trabajo, 2406, Banco de España. https://doi.org/10.53479/36112. Likewise, Addoum et al. (2023) find that smoke from forest fires negatively affect firms' sales by dampening local demand. See Jawad M. Addoum, Dimitrios Gounopoulos, Matthew Gustafson, Ryan Lewis and Tam Nguyen. (2023). "Does Wildfire Smoke Choke Local Business?". Available at SSRN 4564296.

51 Some related references in the literature include Mark J. Garmaise and Tobias J. Moskowitz. (2009). "Catastrophic Risk and Credit Markets". *The Journal of Finance, 64(2), pp. 657-707.* https://doi.org/10.1111/j.1540-6261.2009.01446.x; Kaoru Hosono, Daisuke Miyakawa, Taisuke Uchino, Makoto Hazama, Arito Ono, Hirofumi Uchida and Iichiro Uesugi. (2016). "Natural disasters, damage to banks, and firm investment". *International Economic Review, 57(4), pp. 1335-1370.* https://doi.org/10.1111/iere.12200; and Justin Gallagher and Daniel Hartley. (2017). "Household Finance after a Natural Disaster: The Case of Hurricane Katrina". *American Economic Journal: Economic Policy, 9(3), pp. 199-228.* https://doi.org/10.1257/pol.20140273

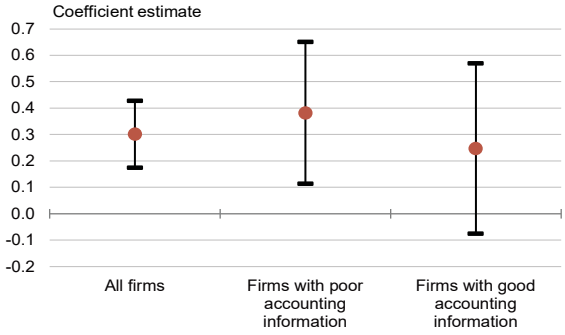
52 See, for example, Matthieu Chavaz. (2016). "Dis-integrating Credit Markets: Diversification, Securitization, and Lending in a Recovery". Bank of England Working Paper, 617. https://doi.org/10.2139/ssrn.2843683; Kristle Romero Cortés and Philip E. Strahan. (2017). "Tracing out capital flows: How financially integrated banks respond to natural disasters". *Journal of Financial Economics, 125(1), pp. 182-199.* https://doi.org/10.1016/j.jfineco.2017.04.011; and Michael Koetter, Felix Noth and Oliver Rehbein. (2020). "Borrowers under water! Rare disasters, regional banks, and recovery lending". *Journal of Financial Intermediation, 43(100811).* https://doi.org/10.1016/j.jfi.2019.01.003

53 Laura Álvarez-Román, Sergio Mayordomo, Carles Vergara-Alert and Xavier Vives. (2024). "Climate risk, soft information and credit supply". Documentos de Trabajo, 2406, Banco de España. https://doi.org/10.53479/36112

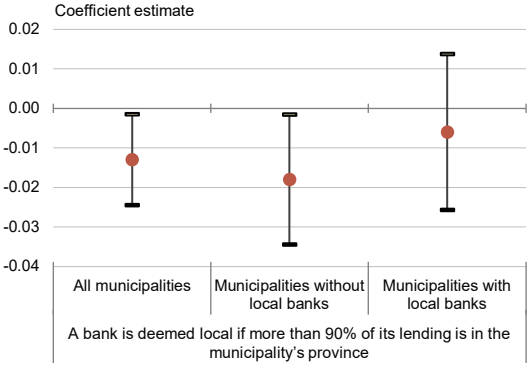
54 To evaluate how fires affect credit supply, the study uses granular information on firms, banks and their credit relationships, as well as data on wildfires in Spain between 2004 and 2017.

Chart 3.1.10 Spanish firms affected by major wildfires in Spain: impact on credit supply and employment

1 Change in the credit supply of local banks compared with that of non-local banks after a fire (a) (b)



2 Change in firms' employment (a)



SOURCE: Laura Álvarez-Román, Sergio Mayordomo, Carles Vergara-Alert and Xavier Vives. (2024). "Climate risk, soft information and credit supply". Documentos de Trabajo, 2406, Banco de España. https://doi.org/10.53479/36112

a Includes fires in Spain between 2004 and 2007 in which an area was burned equal to or greater than 500 hectares. Includes firms located within 10 km of a fire and those between 20 km and 40 km away. A firm is deemed to be affected if it is within 10 km of a fire. The bars indicate 90% confidence intervals.

b The explanatory variable is derived from the interaction between a dummy variable (which equals 1 if the firm was affected by a fire in year t) and the share of loans from bank b in December of year t-1 in the province where the firm is located. Given that a firm's accounting quality affects lenders, a proxy is used based on how easily the firm's earnings can be predicted. Thus, firms are classified into two categories: those with poor accounting information and those with good accounting information. The former are firms for which earnings predictability falls within the lower quintile of the distribution of firms in the sample used, while the latter fall within the upper quintile.

are larger and more diversified. Likewise, two categories of firms are considered: transparent and opaque. Transparent firms provide sufficient information for banks to understand how the firm operates and make decisions driven by reliable data. In contrast, opaque firms operate with limited data disclosure. Local banks are better equipped to assess opaque firms, as they have greater access to soft information[55] than non-local banks and can perform better analysis of such firms.

Fires negatively affect firms' access to bank financing. Overall, the results show that firms affected by fires experience a reduction of around 6% in the volume of loans granted, compared with similar firms that were unaffected. This is mainly attributable to non-local banks, which, unable to accurately assess the impact of fires on opaque firms (whose future income is more difficult to estimate due to poorer accounting information), opt to significantly restrict their lending.

Local banks' greater ability to monitor the effect of fires on more opaque firms helps cushion the decline in lending. Thus, local banks, with greater access to soft information, reduce their loans to more opaque wildfire-affected firms to a lesser extent than non-local banks (see Chart 3.1.10, panel 1). Furthermore, it is important to highlight that local banks do supply credit to opaque firms, but not to those in financial distress, meaning these banks are not misallocating credit.

55 Soft or qualitative information includes all information that is difficult to measure or verify, but allows the lender to better estimate the borrower's creditworthiness.

Local banks' better access to soft information also allows them to restrict credit to opaque firms to a lesser extent without incurring greater risks. The value of soft information is revealed by the fact that local banks cut lending to opaque firms in a more measured way without incurring greater deterioration of their credit portfolio. Additionally, previous studies have shown that geographical proximity allows banks to gather soft information about firms.[56] These studies found that the local banks are significantly nearer to fire-affected firms than non-local banks, facilitating local banks' access to this soft information. Moreover, the possibility that the credit supply from local banks to affected firms is driven by other factors (such as differences in risk management capacity between local and non-local banks, banking specialisation, relationship lending or the lack of credit opportunities outside the fire-affected area, which would force them to lend to affected firms) is explicitly ruled out.

Further, when the fire-affected firms are domiciled in municipalities with active local banks, the adverse effects on employment are reduced. Regarding the effects on the real economy, the results show a hit to employment two years after the fire in the affected areas (see Chart 3.1.10, panel 2). However, the decline in employment after a fire is specific to municipalities where local banks are not active lenders, while there are no significant changes in employment when local banks are present in the affected areas. These findings underscore the fundamental role of local banks in mitigating the repercussions of climate-related shocks on the real economy. Thanks to their greater access to soft information, such banks can extend recovery loans to profitable firms affected by climate disasters.

There is a feedback loop between aridity, desertification and wildfires that has not been addressed by these studies. Desertification can increase aridity by reducing the land's ability to retain moisture and support vegetation. Increased aridity, in turn, can lead to more frequent and intense wildfires, which further degrade the land and contribute to desertification.[57]

Climate change and ecosystem degradation. Implications for house prices

In recent decades the frequency and severity of extreme climate change-related events has increased across the world. These include episodes of intense rainfall, which in agricultural areas can cause fertilisers, such as nitrates and phosphates, to run off into bodies of water and potentially trigger harmful algal blooms (HABs). This is especially problematic for vulnerable ecosystems, above all those under significant human pressure.

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56 Sumit Agarwal and Robert Hauswald. (2010). "Distance and private information in lending". *The Review of Financial Studies,* 23, pp. 2757-2788. https://doi.org/10.1093/rfs/hhq001

57 D. G. Neary. (2018). "Wildfire contribution to desertification at local, regional, and global scales". In Victor Roy Squires and Ali Ariapour (eds.). *Desertification: Desertification: Past, Current and Future Trends. Hauppauge, NY: Nova Science Publishers, Inc., pp. 199-222.* https://research.fs.usda.gov/treesearch/58221

A recent article[58] explores the adverse economic impact of a HAB in 2015 in the Mar Menor, Europe's largest salt-water lagoon. Under the EU Habitats Directive,[59] coastal lagoons, such as the Mar Menor, are designated as vulnerable areas in need of urgent environmental protection. Nevertheless, these areas and their surroundings are often subject to significant pressures, with potentially devastating impacts on ecosystems.

The Mar Menor in particular has suffered as a result of unchecked growth in agriculture and the agrifood industry, leading to a progressive decline in water quality due to the accumulation of nutrients such as nitrates and phosphates. The tourism-driven urban development that began in the 1960s has also adversely affected the ecosystem due to wastewater discharges and other impacts, particularly during the summer months.[60]

More frequent flooding and extreme temperatures, possibly associated with climate change, have also contributed to HABs, including the 2015 episode. According to the Spanish Institute of Oceanography, the end of 2015 marked a turning point in the Mar Menor's ecological health, and by early 2016 its water quality and benthic communities (organisms living on or near the lagoon floor) had deteriorated to alarming levels.

The 2015 HAB episode in the Mar Menor was particularly damaging and visible to the public. Several other conspicuous changes have taken place since 2015, including "green soup" water discolouration, marine fauna die-offs (e.g. dead fish washing up on the shore) and foul smells. It comes as no surprise then that the public perception of the Mar Menor's condition has deteriorated significantly in that time. Using Factiva, a news database, we find a significant increase since 2015 in the number of news items about the Mar Menor (both in absolute terms and news items relating to the region of Murcia), as well as an increase in posts expressing more "negative" sentiment concerning the lagoon (see Chart 3.1.11, panel 1).

A good way of measuring the economic impact of a crisis like the one affecting the Mar Menor is to consider how much individuals are willing to pay for the environment where they live or spend their holidays. House prices provide valuable information on quality of life in a given area[61] and can be used to analyse the economic cost of environmental degradation. The Mar Menor provides an

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58 Matías Lamas Rodríguez, Mari Luz García Lorenzo, Manuel Medina Magro and Gabriel Pérez Quirós. (2023). "Impact of climate risk materialization and ecological deterioration on house prices in Mar Menor, Spain". *Scientific Reports,* 13(11772). https://doi.org/10.1038/s41598-023-39022-8

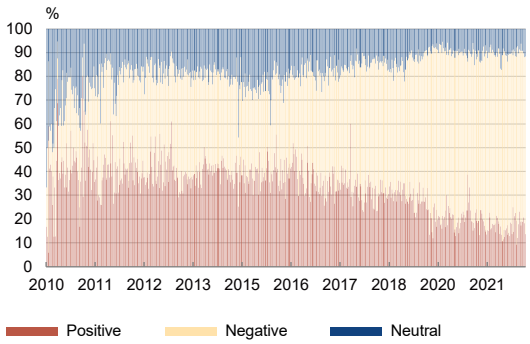
59 Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, L 206, pp. 7-50.

60 See the report by Spain's Ministry for the Ecological Transition and the Demographic Challenge. At present wastewater discharges are under control, although they can still happen during rainfall events or in isolated cases.

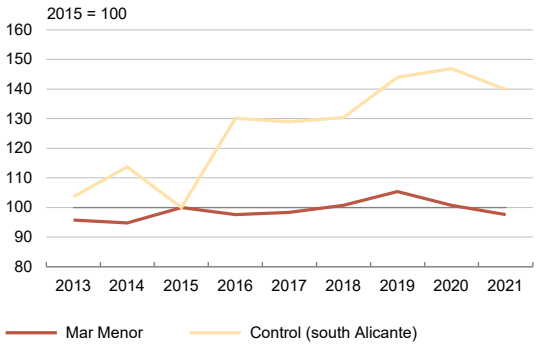
61 Katherine A. Kiel and Jeffrey E. Zabel. (2008). "Location, location, location: The 3L Approach to house price determination". *Journal of Housing Economics, 17(2), pp. 175-190.* https://doi.org/10.1016/j.jhe.2007.12.002

Chart 3.1.11 Ecological degradation: impact on sentiment and house prices

1 Sentiment regarding the Mar Menor (a)



2 Price per m^2 (b)



SOURCES: Devised by authors, drawing on X and Association of Registrars.

a Share of posts about the Mar Menor with positive, negatve or neutral sentiment.
b Median price per square metre. The Mar Menor zone includes the Mar Menor postcodes, excluding La Manga. The control group includes the postcodes for south Alicante.

ideal framework for such analysis. First, the 2015 HAB significantly altered the public's perception of the lagoon's environmental condition. Second, adjacent to the Mar Menor lies south Alicante, an area with high levels of tourism and home to similar dwellings that was not affected by this environmental deterioration. Thus, house prices in south Alicante serve as a useful counterfactual benchmark for analysing how house prices in the Mar Menor might have performed had the ecological deterioration not occurred.

When the public realised the severity of the environmental degradation in the Mar Menor, house prices suffered. Six years after the 2015 HAB, the return on housing investment was 43% lower in the area around the lagoon than in similar neighbouring zones (see Chart 3.1.11 panel 2). Given the number of dwellings in the area, this represents a loss in real estate asset value of more than €4 billion, around ten times greater than the gains made in that time by the agricultural sector as a result of the shift from dry-farming to irrigated crops, which contributed to the lagoon's degradation.

The situation in the Mar Menor illustrates some of the economic consequences of climate-related environmental degradation. It is a reminder that urgent measures are needed to protect our ecosystems and mitigate the risks posed by climate change, which often only become apparent once they have materialised.

Not only is environmental protection crucial for species' survival and biodiversity preservation, it also has significant economic and financial implications. Investing in protecting the environment can be costly in the short term, but the long-term benefits – both in terms of ecosystem health and economic and financial stability – could be pivotal. Likewise, lower property values can

have repercussions for financial intermediation, an aspect that is important to understand and requires further research.

3.2 New evidence on transition risks

Climate stress tests for the financial sector

The last edition of the report,[62] published in 2023, presented an initial analysis of the impact of transition risks on the financial system through a joint stress test exercise (although each supervisor used methodologies tailored to each segment). That first exercise concluded that the adverse effects, particularly for the financial system, varied depending on the transition strategies employed. It also illustrated that the later mitigation measures are adopted – e.g. in the event of CO_2 prices rising abruptly – the less time firms and households will have to adapt and the greater the disruptive impact. As a result, a disorderly climate transition would have far more severe adverse effects on the various financial intermediaries than a more gradual and well-planned transition. Finally, the report noted that without measures to support the transition, climate change would foreseeably lead to very high costs for financial intermediaries in the long term – higher even than those envisaged in the transition scenarios.

Since 2023 both the CNMV and the DGSFP have introduced methodological developments in the transition risk stress tests for the segments under their remit. In the case of investment funds, among other improvements, both static effects (direct and indirect) and dynamic effects are now considered, modelling the behaviour of investors and fund managers. In the insurance sector, the effects on insurance companies' own funds are now considered jointly, taking into account developments in their assets and liabilities. In addition, given their particular nature, the transition and physical risks are assessed in an integrated manner, along with the CCS's role in managing these risks.

The resilience tests detailed in the 2023 edition of this report showed a limited impact on the Spanish banking sector's solvency, even under a disorderly transition scenario. The macroeconomic deterioration associated with a disorderly transition – aligned with the scenarios envisaged by the Network of Central Banks and Supervisors for Greening the Financial System (NGFS) – would generate losses on the banking sector's loan book. Combined with the lower market value of banks' investment portfolios, this would reduce their solvency by 1.2 pp over a three-year horizon. However, this deterioration would be considerably more moderate if measures to foster economic decarbonisation were implemented early and in a non-disruptive manner, in line with the

62 See Biennial report on climate change risks to the financial system 2023. AMCESFI.

macroeconomic scenarios used in the stress tests as part of the EU's Fit for 55 programme.[63] Under the orderly transition scenario, the estimated impact on the sector's CET1 ratio is -0.15 pp in three years. Given the limited scope of the methodological developments in the Banco de España's climate transition risk stress testing framework and that the 2023 results have been qualitatively validated by other exercises, those results remain a sound benchmark for the impact of transition risks on the Spanish banking sector.

Spanish investment funds

The CNMV has further developed the methodology for assessing the resilience of Spanish investment funds to the risks associated with a disorderly climate transition. The initial methodology[64] has been expanded to include dynamic effects that model how both investors and fund managers respond to the portfolio shocks,[65] based on a study published by the European Securities and Markets Authority (ESMA).[66] In addition, the results are presented differentiating between "sustainable" and "non-sustainable" investment funds to determine if there are significant differences between them.

Three climate change scenarios have been considered for the stress tests: one baseline scenario and two adverse scenarios. All of the scenarios, developed by the European Systemic Risk Board (ESRB) for a one-off stress test of the EU financial sector,[67] reflect the European Commission mandate by assuming that the Fit for 55 objectives will be fully achieved by 2030,[68] while simultaneously incorporating severe but plausible transition risks that could adversely impact the financial system in the period to 2030. Under the baseline scenario (B), the objectives of the Fit for 55 package are achieved in an economic environment that reflects the baseline economic forecasts. The first adverse scenario (A1) focuses on short-term climate-related risks in the form of asset price corrections triggered by a sudden reassessment of transition risk (known as a "run on brown"). The second adverse scenario (A2) combines the same climate-related risks with additional macroeconomic stress factors.

The primary aim of the exercise is, therefore, to estimate the total losses under the three scenarios envisaged for Spanish investment funds,

63 See *Fit-for-55 climate scenario analysis.* This analysis also shows that transition risks are, by themselves, unlikely to pose a threat to the EU's financial stability.

64 See Ricardo Crisóstomo. (2022). "Measuring Transition Risk in Investment Funds". Working Paper, 81, CNMV. https://www.cnmv.es/DocPortal/Publicaciones/MONOGRAFIAS/DT_81_Measuring_Transition_Risken.pdf

65 The methodology and full results of this exercise will be detailed in a forthcoming CNMV working paper by Diana Mykhalyuk.

66 Available at https://www.esma.europa.eu/sites/default/files/2023-12/ESMA50-524821-3073_TRV_Article_Dynamic_modelling_climate_shocks_fund_sector.pdf

67 Available at https://www.esma.europa.eu/sites/default/files/library/Mandate_for_the_FF55_one-off_exercise.pdf

68 The European Climate Law makes the EU's goal of reducing emissions by at least 55% by 2030 legally binding.

aggregating the losses from static effects (post-shock price declines) and from dynamic effects (caused by the responses of investors and fund managers). Losses associated with the static aspects represent first-round effects, while losses from dynamic aspects capture, at least in part, second-round effects. The analysis was conducted assuming a static balance sheet based on portfolio information for each investment fund (identified using their ISIN) and considering both climate and financial variables, information broken down by geographical area and sector, firm-level information and credit and market risk metrics (credit quality, duration and convexity) obtained for each portfolio instrument.

In the static exercise, each counterparty's sensitivity to the climate transition depends on the security issuer's CO_2 emissions, economic sector, country and credit quality, while the dynamic exercise models investors' subscriptions and redemptions based on each fund's performance and sustainability level. The investment flows of investors are assumed to be a linear function that varies among different tiers of returns and depends on whether a fund has been classified as sustainable or not, based on certain coefficients[69] and on the carbon intensity of its investments.[70] Two further methods for classifying sustainable funds are also considered – as a guideline and for the purposes of this exercise – based on the ESG ratings of their portfolios and whether they adhere to Articles 8 or 9 of the Sustainable Finance Disclosure Regulation (SFDR).[71] Similarly, portfolio rebalancing by fund managers is modelled in two steps. First, by simulating the divestment of the worst-performing 20% of assets in the portfolio. The proceeds are then reinvested in new assets from the top 20% of performers within a benchmark group of funds. Lastly, the portfolio is adjusted to include the new assets and balance the weights.

In the static exercise and under the most adverse scenario (A2), the breakdown by asset type reveals that equity assets would incur the largest losses. This was likewise observed in the first exercise of this kind, with the significant sectoral heterogeneity and intrasectoral dispersion of the CO_2 emissions of equity issuers playing a decisive role in these findings. The average losses estimated for each asset class are as follows: -16.1% for equity, -9.5% for investments in other funds, -5.2% for corporate bonds and -4.4% for sovereign debt. There is also substantial variability across financial instruments in each asset class, especially in equity and shares/units in other funds (see Chart 3.2.1).

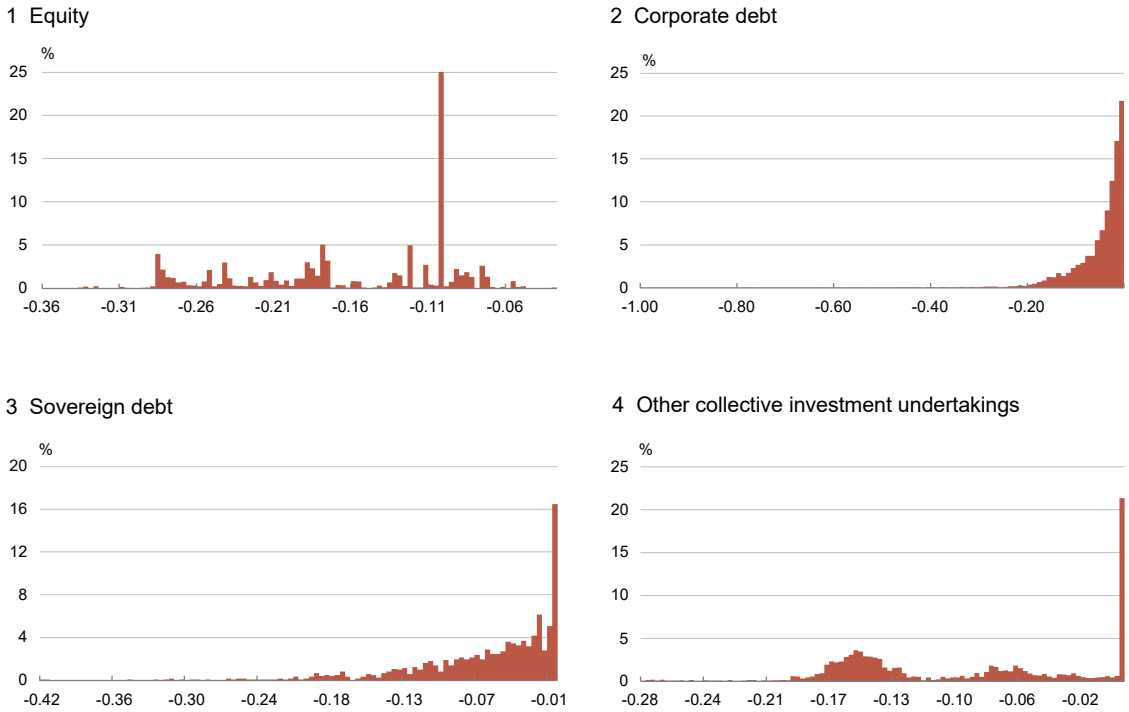
The wide dispersion of losses in equity assets and in investments in other funds owes to the significant heterogeneity in exposure to high and low-

69 Luc Renneboog, Jenke Ter Horst and Chendi Zhang. (2011). "Is ethical money financially smart? Nonfinancial attributes and money flows of socially responsible investment funds". *Journal of Financial Intermediation,* 20(4), pp. 562-588. https://doi.org/10.1016/j.jfi.2010.12.003

70 Investments are deemed sustainable when they have an average carbon intensity weighted by net asset value below 35, a value close to the first quartile of the sample.

71 When classified based on ESG ratings, funds are considered sustainable when their weighted average ESG rating is above 60 (around the first quartile). For the classification based on the SFDR, funds classified under Articles 8 and 9 of that regulation are considered sustainable.

Chart 3.2.1 Distribution of losses under the A2 disorderly transition scenario, by asset class



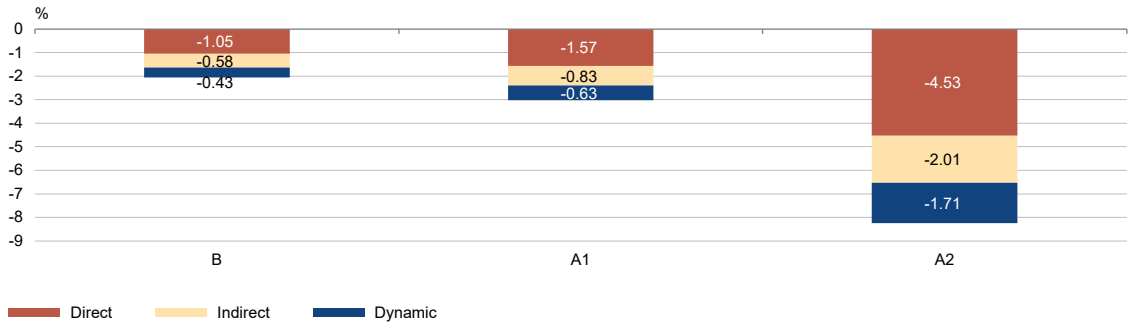
SOURCE: CNMV.

polluting sectors. This is particularly true of the manufacturing sector, which not only has a very large quantitative presence in investment funds but also exhibits very significant variability in its exposure to issuers with differing carbon intensities[72] (and ESG ratings). This explains the losses observed in investments in other investment funds, whose equity positions show an average loss of 15.8%, exceeding that of direct investment in equity. It could be inferred that Spanish investment funds' indirect equity exposures (via other funds) are more concentrated in higher-polluting sectors than their direct exposures.

A large percentage of both corporate and sovereign debt assets would record minor losses. In the case of corporate debt (and in addition to the mitigating effect of bonds from low-carbon footprint issuers), more than half of bonds (52%) have short maturities and incur small losses under a scenario of widening credit spreads. By contrast, corporate bonds issued by firms in more vulnerable sectors, such as manufacturing and utilities, and with long maturities incur larger losses. A similar pattern is observed in sovereign debt, where a considerable portion (almost

72 Carbon intensity data are defined as total direct (Scope 1) and indirect (Scope 2) CO_2 equivalent emissions in normalised tonnes to net sales or revenues in millions of US dollars ($tCO_2e/m\$$). Scope 3 is not included due to a lack of data. For sovereign debt, carbon intensity is found as tCO_2e/GDP. For comparison purposes, the carbon intensity of sovereign countries is shown on the $tCO_2e/m\$$ scale by mapping the quantile that each country occupies in the distribution for sovereign issuers with the corresponding quantile in the global distribution in $tCO_2e/m\$$.

Chart 3.2.2 Estimated first and second-round losses (weighted by net asset value) for investment funds



SOURCE: CNMV.

half) has short-term maturities and the issuing countries are predominantly those less exposed to the climate transition.[73] Overall, 56% of sovereign bonds held by investment funds would incur a loss of less than 5%.

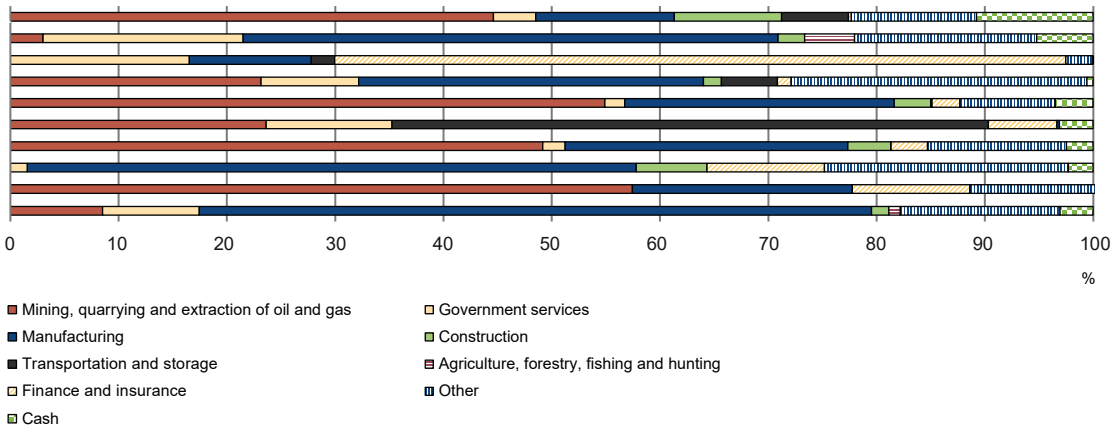
As Chart 3.2.2 shows, the estimated losses for Spanish investment funds range from 2.1% under the baseline scenario to 8.2% under the most adverse (3.0% under the intermediate scenario). These results represent the cumulative first and second-round losses. Across all of the scenarios, the first-round losses are more sizeable than the second-round losses, and within the first-round losses those from direct exposures are larger those from indirect exposures (i.e. via investments in other funds). Thus, of the total estimated losses under the most adverse scenario (8.2%), 6.5 pp would be attributable to first-round effects (4.5 pp from direct exposures and 2.0 pp from indirect exposures) and the rest (1.7 pp) to second-round effects.

Under the most adverse scenario, the estimated average loss for the investment fund sector (-8.2%, equivalent to approximately €27,770 million in aggregate terms) is higher than was estimated in the previous exercise (-5.7%, equivalent to €17,500 million). This partly owes to the inclusion of the dynamic simulation (absent in the first test), which results in almost 2 pp of additional losses, although the losses for the static simulation are also higher (-6.5% versus -5.7%). In addition to the dynamic component, the estimated indirect first-round losses – which required an analysis of funds' investments in other investment funds – added a further 2 pp in losses to the overall exercise.

The funds incurring the largest losses invest in highly polluting sectors. Looking at the ten funds with the largest losses, at least 70% of their portfolios

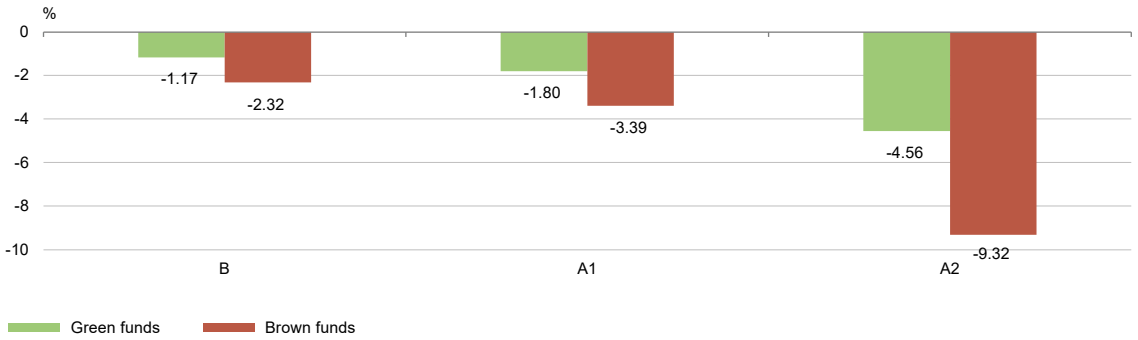
73 To assess countries' ESG ratings (for sovereign debt), five representative variables for each dimension (environmental, social and governance) are taken from the World Bank, selected according to data availability and their relevance for the 2030 Agenda. Each variable has been rescaled observing their original distribution, while the final rating is obtained by calculating the average of the rescaled values.

Chart 3.2.3 Sectoral breakdown of the ten worst-performing funds



SOURCE: CNMV.

Chart 3.2.4 Relative losses of sustainable and non-sustainable funds (a)



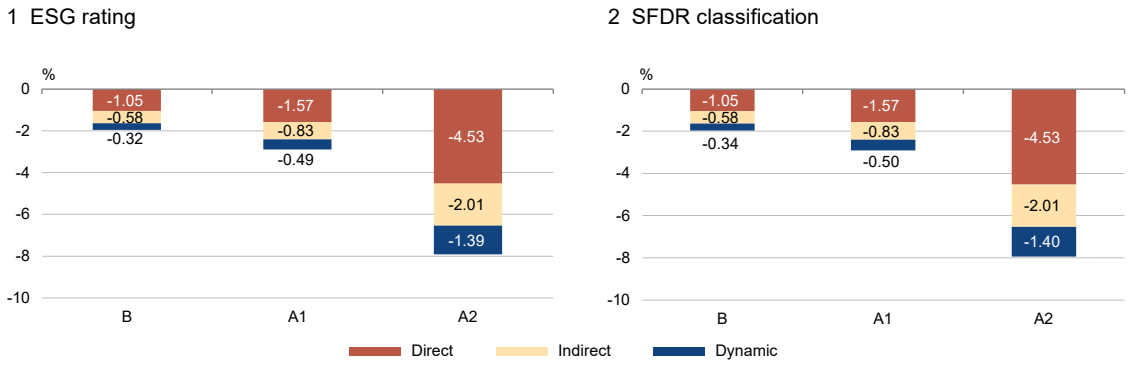
SOURCE: CNMV.

a Funds segmented based on the carbon intensity of issuers within the portfolio.

consist of assets issued by firms in sectors such as mining, manufacturing, utilities, construction and transportation (see Chart 3.2.3). These funds have high carbon intensities (equal to 66) and 91% of their portfolios are invested in equity. Conversely, the ten best-performing funds have a carbon intensity of 45, with the majority of their assets invested in government debt (57%), repos (16%) and cash (8%).

When investment funds are grouped by the carbon intensity of their portfolio assets, significant differences are observed between the losses for sustainable funds and for others. Under the three scenarios analysed, the funds classified as non-sustainable present higher losses than sustainable ones. This difference is particularly marked under the most adverse scenario (see Chart 3.2.4), where non-sustainable funds would incur an average loss of 9.3%, which is more than double that estimated for sustainable funds (4.5%).

Chart 3.2.5 First and second-round losses under different ESG-related fund classification criteria



SOURCE: CNMV.

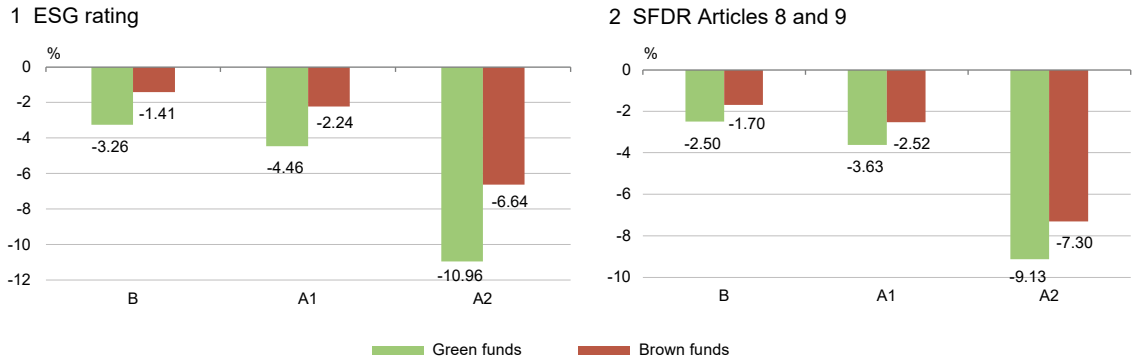
Alternative methods of grouping sustainable and non-sustainable funds do not significantly alter the aggregate losses for the funds (see Chart 3.2.5), but they do lead to marked changes in the relative losses of each group. The losses associated with second-round effects – which vary depending on the criterion used to segment sustainable funds – amount to 1.4 pp under the most adverse scenario whether sustainable funds are segmented based on ESG ratings or SFDR disclosure requirements (for the purposes of this exercise, funds classified as Articles 8 and 9 funds are considered sustainable funds). The losses are slightly larger in the central scenario (1.7 pp). Accordingly, based on these alternative classifications, the total loss estimated for investment funds would, under the most adverse scenario, be 7.9% in both cases.

Losses calculated under the two alternative classifications of sustainable and non-sustainable funds differ significantly from those obtained when funds are segmented by carbon intensity. Contrary to the findings of the main exercise, when segmented using the two alternative criteria sustainable funds incur greater losses than non-sustainable ones (see Chart 3.2.6), with the difference being somewhat less pronounced for the SFDR criterion. The similarity in both cases is consistent with the CNMV's supervisory experience,[74] with the majority of fund managers (93% in the case of equity) having used third-party ESG ratings to assess and classify their funds as SFDR Article 8 or 9 funds.

This apparent contradiction could be attributable to diverse factors, giving us an idea of the limitations of certain information sources. First, the carbon intensity criterion employed in the main analysis is measured as an absolute value (which facilitates comparisons) and captures a present attribute of issuers. Second,

74 CNMV. (2023). *Results of the review of the first phase of implementation on the CIS of regulations related to sustainability.* https://www.cnmv.es/portal/verDoc.axd?t=%7B88de383c-da78-426d-aaac-313963b8734b%7D

Chart 3.2.6 Relative losses of green and brown funds under different ESG-related fund classification criteria



SOURCE: CNMV.

some elements of the two alternative criteria may not be entirely suitable. For instance, ESG ratings contain information on present attributes, but also on future sustainability targets whose achievement is subject to a degree of uncertainty; in addition, these ratings are sometimes expressed in relative terms within the corresponding sector, which may result in companies in high-emission sectors receiving high ratings if they are positioned comparatively favourably within their industry. Moreover, ESG ratings assess entities' overall policies and practices, focusing largely on transparency and ESG aspects as a whole, but not necessarily on climate performance. The latter – which includes variables such as transition plans, actual emission reductions and alignment with the climate taxonomy – would be far more relevant for the exercise at hand. It is also worth considering that in some cases greenwashing practices may be at play.

Lastly, it should be recalled that Articles 8 and 9 of the SFDR do not constitute a formal classification of sustainable funds, but rather represent different means of recording financial products, each with specific disclosure requirements. Consequently, these articles do not establish minimum sustainable investment requirements and therefore inclusion in these categories is no guarantee of sustainability performance. This aligns with the CNMV's supervisory findings during the initial implementation phase for sustainability regulations applied to collective investment undertakings: only a small number of funds classified as Article 8 or 9 funds set sustainability goals directly related to climate change (and decarbonisation in particular).

The Spanish funds analysed are less exposed to their assets' transition risk than their EU peers. Under the most adverse scenario the expected loss for EU funds is 15.8% of their value,[75] higher than the 8.2% figure for Spanish funds.

75 See European Banking Authority (EBA), European Insurance and Occupational Pensions Authority (EIOPA), European Securities and Markets Authority (ESMA) and European Central Bank (ECB). (2024). *Fit-for-55 climate risk scenario analysis.* https://www.eba.europa.eu/risk-and-data-analysis/risk-analysis/risk-monitoring/climate-risk-stress-testing-eu-banks/one-fit-55-climate-risk-scenario-analysis

The Spanish insurance sector

The DGSFP has assessed climate change-related risks both to insurance companies and pension funds, likewise taking as a starting point the EU-wide stress tests conducted in 2024 by the three European Supervisory Authorities (ESAs) as part of the Fit for 55 exercise. For insurance companies, the impact of the physical and transition risks has been analysed, while for pension funds only transition risks have been evaluated since pension funds are assumed to be unaffected by physical risks. The analysis used data available at end-2023 for 178 insurance companies and 984 pension funds from 47 fund managers.

The key new aspects of the DGSFP study are:

— Effects on the insurance companies' own funds are considered jointly, along with assets and liabilities.

— Impacts on the CCS are included.

— The risk scope is extended to physical risks (the ESAs examine transition risks only).

This exercise builds on that conducted in the 2023 report by extending the effects to the CCS and improving the calibration, which is aligned with that used by the CCS in its Own Risk and Solvency Assessment (ORSA).

For insurance companies, the climate stress tests envisaged affect the main balance sheet items, both on the asset side through investment valuations (reducing the value of their assets: government debt, corporate debt, equity, investment funds and real estate) and on the liabilities side through technical provisions. Technical provisions are calculated by discounting the payment flows that the insurance company will have to make based on commitments assumed under insurance contracts. Higher interest rates, as envisaged in the technical specifications of the adverse scenarios, imply a higher discount rate and, therefore, decrease the amount of the provision.

For pension funds, the methodology exclusively analysed the effect of transition risks on the assets comprising the investment portfolios.

On the physical risks side, the analysis considered the impact on multi-risk insurance (covering potential damages to the insured assets of firms and individuals caused by severe storms, whose frequency, intensity and severity could be exacerbated by climate change) and on combined agricultural insurance (due to the rising incidence of drought, frost and hail). These impacts affect insurance companies' earnings and, therefore, their financial position and solvency.

Table 3.2.1 Insurance sector: results of the analysis and impact on the solvency ratio

%

Results for the insurance sector (including the CCS)			
Actual data at 31.12.2023	Baseline scenario	Adverse scenario 1	Adverse scenario 2
219	210	210	196

SOURCE: DGSFP.

Table 3.2.2 Insurance sector: results of the analysis and impact on own funds

%

Results for the insurance sector (including the CCS)		
Baseline scenario	Adverse scenario 1	Adverse scenario 2
-4.0	-4.1	-10.3

SOURCE: DGSFP.

Table 3.2.3 Pension funds: results of the analysis and impact on asset value

%

Results for pension funds		
Baseline scenario	Adverse scenario 1	Adverse scenario 2
-1.3	-2.34	-7.44

SOURCE: DGSFP.

The insurance sector could face disorderly transition scenarios such as those presented here under both the first and second adverse scenarios. The impact of physical and transition risks on insurance companies' solvency ratios (the ratio of own funds to the regulatory capital requirement) is analysed. Under the first adverse scenario (A1) the insurance sector's solvency ratio would decrease by 9 pp (compared to the actual data at end-2023), going from 219% at end-2023 to 210%, while under the second adverse scenario (A2) the solvency ratio would decline by 23 pp to 196%. These represent a drop of 4.1% and 10.3% in the insurance sector's own funds under scenarios A1 and A2, respectively.

The Spanish pension fund sector could face climate transition risks. For pension plans, the analysis considered how each fund's investments would be impacted under the adverse transition risk scenarios. The impact on total asset value is a decrease of -1.3% under the baseline scenario, -2.34% under A1 and -7.44% under A2.

BOX 3.B Impact of energy efficiency on house prices

Improving the energy performance of housing is essential to reduce its environmental impact,[1] increase its level of comfort[2] and generate economic savings for households, all of which boosts housing value. At September 2024 housing accounted for 68% of Spanish households' gross wealth while mortgage loans accounted for 73% of their bank debt.[3] These loans are an important part of the banking business and of bank portfolios and are also a key source of collateral. Moreover, housebuilding and renovation generate employment, investment and growth. In consequence, energy efficiency can have important implications both for the economy and for financial stability.

The environmental impact of residential buildings has prompted extensive regulation at European level, which has intensified in recent years with the European Green Deal.[4] Since 2002, several Directives on the energy performance of buildings have been adopted and transposed.[5] This has meant that all new housing (since 2007) and all second-hand homes that are rented, sold or extensively renovated (since 2013) have an energy performance certificate (EPC).[6] These certificates assign a rating – from A (most efficient) to G (least efficient) – based on household energy consumption[7] measured in kWh/m^2 per year. Of the existing Spanish housing stock, 86.5% has an E rating or lower,[8] which highlights the potential for energy rehabilitation.

Economic savings from improved energy efficiency are significant and have increased in recent years in line with rising energy prices. In a recent paper,[9] the Banco de España shows that, in 2022, a high energy-efficient dwelling (A-B certificate) saved around €75[10] on average per year per square metre (m^2) compared with a very low energy-efficient

1 In 2023, residential buildings accounted for around 6.5% of direct GHG emissions (22.9% including indirect emissions) in Spain, out of a total of 275.7 million tonnes of CO_2 equivalent emitted. See Ministerio para la Transición Ecológica y el Reto Demográfico. (2024). "Avance del Inventario de Gases de Efecto Invernadero: año 2023".

2 Improving energy efficiency entails better insulation and ventilation systems. This reduces problems of damp and keeps temperatures stable, fostering thermal comfort and good air quality. In addition, the use of more durable and harmless materials, which in turn decreases the risk of allergies and respiratory problems, makes living spaces healthier and more sustainable for the long term.

3 See headings 16.6 and 3.21, respectively, of the Banco de España's *Statistical Bulletin*.

4 The target set by the European Green Deal is to reduce net GHG emissions by at least 55% by 2030, compared with 1990 levels, and to achieve climate neutrality by 2050. In addition, the new EU Emissions Trading System (EU ETS2), to enter into force in 2027, will mean that fossil fuel suppliers for buildings will be subject to this cap and trade system for CO_2 equivalent emissions.

5 The latest Directive on the energy performance of buildings – Directive (EU) 2024/1275, in force since 28 May 2024 – is still to be transposed, so how it will be implemented to meet the targets set and whether it will place efficiency constraints on house sales and rentals remains unknown.

6 EPCs are issued following a visit to the dwelling by an accredited assessor and are recorded in the energy label registers held by the regional authorities. EPCs are valid for ten years, except for dwellings with a G rating for which, since 2021, they are valid for just five years.

7 EPCs also include a rating, analogous to the energy consumption rating, which includes CO_2/m^2 emissions and the age of the property.

8 Almost 58% of Spain's buildings pre-date the first regulations introducing minimum energy efficiency criteria: Royal Decree 2429/1979 of 6 July 1979 approving the basic building standard NBE-CT-79 on temperatures in buildings.

9 Pana Alves and Olivier Hubert. (2025). "¿Influye la eficiencia energética en el precio de la vivienda en España?". Documentos Ocasionales, 2508, Banco de España. https://doi.org/10.53479/39765

10 Estimate based on retail electricity prices, considering the percentage of households covered by the regulated tariff (PVPC, by its Spanish abbreviation) and those with a free market tariff.

BOX 3.B Impact of energy efficiency on house prices (cont'd)

one (F-G certificate), while the saving was €16 per year per m^2 compared with a property with medium energy efficiency (C-D certificate). Greater efficiency on account of lower costs also reduces energy poverty and fosters Spain's energy independence.

Greater energy efficiency appears to boost the relative value of housing, according to the estimates presented in the abovementioned Banco de España paper. The study analyses more than one million properties sold in the period 2015-22 and, using a hedonic econometric model, estimates the impact of the level of energy efficiency, measured by the EPC-based energy consumption rating, on the sale price of open-market housing. To isolate the effect of efficiency, the model distinguishes by type of housing, type of buyer and seller, and municipality.[11] It also includes fixed effects for census unit and time of sale (Q1, Q2, Q3 or Q4), to adjust for location and seasonal effects. The model captures 86% of house price variability, while the explanatory power of energy efficiency amounts to 3.2%. These results show that, compared with a very low-efficiency (F-G rated) property, a low-efficiency (E rated) one would warrant a price 3.3% higher, a medium-efficiency (C-D rated) one a price 5.7% higher, and a high-efficiency (A-B rated) one a price 9.7% higher (see Table 3.B.1).

Table 3.B.1 Impact of energy efficiency on house prices

	All housing	Housing without appurtenances	Housing with appurtenances	Terraced housing	Detached housing
A-B consumption rating	9.69%***	8.72%***	3.60%***	7.27%***	19.44%***
C-D consumption rating	5.66%***	5.55%***	3.63%***	3.16%***	3.63%***
E consumption rating	3.29%***	3.12%***	2.20%***	2.00%***	1.87%***
Controls	Yes	Yes	Yes	Yes	Yes
Fixed effects, census unit-quarter of year	Yes	Yes	Yes	Yes	Yes
Observations	1,032,960	803,849	93,394	35,597	12,262
R-squared	85.70%	85.84%	88.85%	86.95%	85.35%
R-squared adjusted	80.15%	79.73%	82.03%	79.78%	78.33%
Number of clusters	264,824	220,253	28,812	10,117	2,986

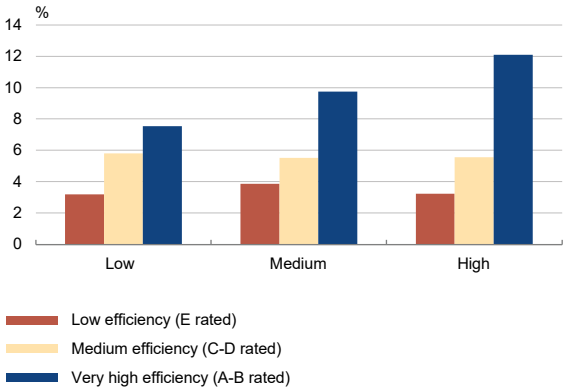
SOURCES: Colegio de Registradores de la Propiedad, Mercantiles y Bienes Muebles de España, Dirección General del Catastro, INE and Sociedad de Tasación, S.A.
NOTE: Regression for the period 2015-22. The coefficients are obtained using a hedonic log-linear regression model with fixed effects for census unit and quarter of each year. The standard errors are clustered at the census unit level. The asterisks *, ** and *** denote significance for confidence levels of 90%, 95% and 99%, respectively

11 The controls used include: floor area, age, storey, status (new or second-hand) and type of dwelling (with or without appurtenances (parking spaces or storerooms), a terraced house or a detached property), as well as construction period (1997-2007), distance from parkland, whether it has undergone rehabilitation or renovation, nationality of the seller, type of seller (individual, legal entity or public administration), nationality of the buyer, population growth in the municipality, population logarithm of the municipality and real estate activity momentum in the municipality.

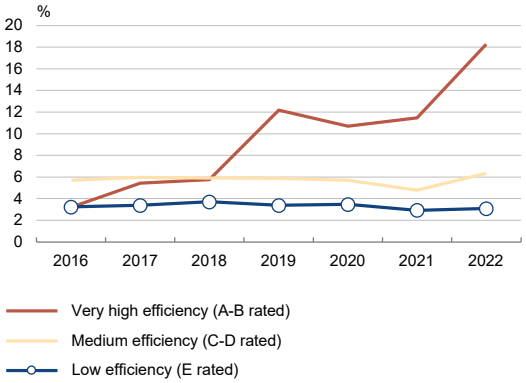
BOX 3.B Impact of energy efficiency on house prices (cont'd)

Chart 3.B.1 Impact of energy efficiency on house prices, by heating needs and year

1 Effect of energy efficiency by heating demand (a)



2 Effect of energy efficiency over time (a)



SOURCES: Colegio de Registradores de la Propiedad, Mercantiles y Bienes Muebles de España, Dirección General del Catastro, INE and Sociedad de Tasación, SA.

a Impacts on prices compared with the impact on housing with a very low energy efficiency rating (F-G). The coefficients are obtained using a hedonic log-linear regression model with fixed effects for census unit, quarter of each year and census unit-quarter of year.

These results highlight the importance of energy efficiency as an explanatory factor for house price heterogeneity. The Spanish Recovery, Transformation and Resilience Plan presents an excellent opportunity for households to make their homes more energy efficient, thanks to subsidies and personal income tax credits[12] that provide funding for 40% to 80% of the cost of rehabilitation.

12 The Recovery, Transformation and Resilience Plan, financed through the Next Generation EU funds, includes in its Housing Rehabilitation and Urban Regeneration Plan (Component 2), two investments mainly focused on improving the energy efficiency of residential buildings: the Rehabilitation Programme for Economic and Social Recovery in Residential Environments, with funds of €3.42 billion, and the Energy Rehabilitation for Buildings Programme, with funds of €300 million. Grants under these programmes for rehabilitation and energy efficiency improvements are channelled through the Rehabilitation Offices established by each regional government. In addition, Component 2 also includes the Programme for construction of social rental housing in energy efficient buildings, with funds of €1 billion.

4 Regulatory and supervisory initiatives

This chapter addresses the various regulatory and supervisory initiatives implemented in the last two years to tackle the climate change challenges in the financial sector.

It summarises the significant advances made in the regulatory framework on sustainable finance in 2023 and 2024, including the CSRD, the European Green Bond Regulation (EuGB) and the Regulation on ESG Ratings Providers. These initiatives seek to increase transparency, facilitate data comparability and promote the transition to a sustainable economy.

It should be noted that on 26 February 2025 the European Commission published the so-called Omnibus initiative, which aims to simplify corporate sustainability reporting requirements.

Also, this Chapter analyses the measures adopted by sectoral regulators in the areas of banking, investment funds, securities issuers, insurance companies and pension funds.

Lastly, it monitors the progress made with regard to the supervisory expectations on climate-related and environmental risk management published in 2020, detailing how these risks are integrated into strategy, business model and corporate governance procedures.

4.1 Status of the various regulatory initiatives

4.1.1 Cross-sector initiatives

In 2023 and 2024, there were significant advances in the regulatory framework for sustainable finance. In particular, it is worth noting the following legislative initiatives:

- **The Corporate Sustainability Reporting Directive (CSRD),**[76] which entered into force in January 2024, requires companies to publish detailed information on sustainability issues, which will enhance transparency and facilitate data comparability and the transition to a sustainable economy. The application of these obligations will be staggered in several phases,

76 European Union Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 amending Regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU, as regards corporate sustainability reporting. This Directive is subject to review by the European Commission in 2025.

the first phase being for financial years starting on or after 1 January 2024 (issuers that are large undertakings or parent undertakings of a large group and that exceed an average number of 500 employees). Furthermore, in July 2023 the European Commission formally adopted the first set of European Sustainability Reporting Standards (ESRS)[77] for use by all companies subject to the CSRD. However, the recent Omnibus initiative will lead to amendments in both the standards and their scope of application.

- **The EuGB was published in the Official Journal of the European Union (OJEU) in November 2023,**[78] laying the foundations for a common framework of rules concerning the use of the term "European Green Bond" or "EuGB" **for bonds that pursue environmentally sustainable objectives,** which is applicable from December 2024**.** This regulation establishes a voluntary standard based on the European taxonomy criteria. Thus, all companies and institutions that opt to use the standard when marketing a green bond will have to provide information on the alignment of revenue to the European taxonomy and how these investments are incorporated into the company's transition plans.

- **The Corporate Sustainability Due Diligence Directive (CSDDD)**[79] **was published in the OJEU in July 2024**. It aims to improve the protection of the environment and human rights inside and outside the EU and establishes obligations for large undertakings to identify, prevent, bring to an end or mitigate adverse human rights and environmental impacts of their activities. Its entry into application, expected to be staggered based on the size of the undertaking, was initially scheduled for July 2027 to 2029. However, the "Stop-the-clock" directive, included in the Omnibus package, would postpone its application by one year.

- **The ESG Ratings Regulation**[80] sets out new organisational and transparency requirements, as well as rules on the prevention of conflicts of interest for providers offering services to investors and undertakings in the EU, which must be authorised and supervised by European Securities and Markets Authority (ESMA). The objective of the ESG Ratings Regulation is to increase investor confidence in sustainable products.

77 Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023 supplementing Directive 2013/34/EU of the European Parliament and of the Council as regards sustainability reporting standards.

78 Regulation (EU) 2023/2631 of the European Parliament and of the Council of 22 November 2023 on European Green Bonds and optional disclosures for bonds marketed as environmentally sustainable and for sustainability-linked bonds.

79 Directive (EU) 2024/1760 of the European Parliament and of the Council of 13 June 2024 on corporate sustainability due diligence and amending Directive (EU) 2019/1937 and Regulation (EU) 2023/2859. This Directive is subject to review by the European Commission in 2025.

80 Regulation (EU) 2024/3005 of the European Parliament and of the Council of 27 November 2024 on the transparency and integrity of ESG rating activities, and amending Regulations (EU) 2019/2088 and (EU) 2023/2859.

- **Lastly, in November 2024, the Spanish Government adopted the Green Paper on Sustainable Finance in Spain and the Ministerial Order creating and regulating the Sustainable Finance Council**. The Green Paper is a strategic document to drive and guide the adaptation of the private sector to the sustainable finance framework. To this end, the Green Paper proposes eight actions, with special emphasis on SMEs. As part of the actions planned in the Green Paper on Sustainable Finance, the Sustainable Finance Council was created as a public-private coordination forum to address the challenges of climate transition and seize the opportunities offered by sustainable finance. The Council, which has already held its first meeting, has around 30 members from public bodies, financial sector associations and corporate representatives, and the three financial supervisors (Banco de España, CNMV and DGSFP) are ex officio members. Its creation reinforces the joint commitment to promote the decarbonisation of the economy, foster innovative financial instruments and launch initiatives such as a sustainability sandbox, a repository of best practices and sectoral guides.

In relation to other initiatives already approved, relevant advances were made affecting, inter alia, market participants or securities issuers:

- **In February 2023, Delegated Regulation 2023/363 amending and correcting the technical standards laid down in Delegated Regulation (EU) 2022/1288 (SFDR RTS)**[81] concerning pre-contractual and periodic information on investments in fossil gas and nuclear energy was published in the OJEU.

- **In June 2023, the European Commission launched a new package of measures to build on the sustainable finance framework, including Commission Recommendation (EU) 2023/1425 on facilitating finance for the transition to a sustainable economy**. The package included amendments to the Climate Delegated Act and the Delegated Regulation defining the technical screening criteria for four environmental objectives of the EU Taxonomy Regulation for sustainable activities (Regulation 2020/852): i) the sustainable use and protection of water and marine resources; ii) the transition to a circular economy; iii) pollution prevention and control; and iv) the protection and restoration of biodiversity and ecosystems.

81 Commission Delegated Regulation (EU) 2023/363 of 31 October 2022 amending and correcting the regulatory technical standards laid down in Delegated Regulation (EU) 2022/1288 as regards the content and presentation of information in relation to disclosure in pre-contractual documents and periodic reports for financial products investing in environmentally sustainable economic activities.

- **In addition, the Delegated Regulation amending the Climate Delegated Regulation[82] extends the technical screening criteria for climate change mitigation and adaptation objectives.** It aims to extend the scope of taxonomy-eligible activities, e.g. to broaden the activities covered by sectors such as transport or the manufacturing industry.

In February 2025, the Commission presented a reform of sustainability disclosure obligations, with the aim of simplifying and reducing costs and bureaucratic burdens and thus improving the competitiveness of European companies. The package contains amendments to the CSRD and the CSDDD, and proposes changes to implementation Level 2 of the Taxonomy Regulation. These changes are structured as follows:

- **The "Stop-the-clock" Directive, adopted by the European Parliament and the Council of the EU in April 2025, postpones the application of the CSRD by two years for large companies and listed SMEs that have not yet started their reporting obligations.** It also postpones the transposition and application of the CSDDD by one year for the largest companies. Member States must transpose this directive by 31 December 2025. The aim of this measure is to grant companies more time to adapt to the sustainability requirements, while substantive amendments to both regulations are being negotiated.

- The **substantive Omnibus Directive, which introduces amendments to the CSRD and the CSDDD**. This directive would follow the timelines of the ordinary legislative procedure. The most significant amendment to the CSRD concerns the quantitative application thresholds, reducing by 80% the number of qualifying companies (the minimum number of employees is raised from 250 to 1,000). In addition, the Commission undertakes to simplify reporting obligations through a review of the Level 2 standards (ESRS), reducing the number of data points and facilitating the materiality assessment. As regards the CSDDD, the amendments include: eliminating the EU civil liability regime; limiting risk identification and assessment obligations to the first tier of the chain of activities, with exceptions (instead of encompassing the entire chain); and deleting the reference to a potential future extension to include the provision of financial services.

- **The proposed review of the delegated regulations of the Taxonomy Regulation introduces significant adjustments to the reporting**

82 Commission Delegated Regulation (EU) 2023/2486 of 27 June 2023 supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to the sustainable use and protection of water and marine resources, to the transition to a circular economy, to pollution prevention and control, or to the protection and restoration of biodiversity and ecosystems and for determining whether that economic activity causes no significant harm to any of the other environmental objectives and amending Commission Delegated Regulation (EU) 2021/2178 as regards specific public disclosures for those economic activities.

framework. The main amendments include the proposal to limit the disclosure obligation for the key taxonomy indicators to undertakings with a turnover of more than €450 million. They also include the proposal to simplify the reporting requirements through a reduction in data points, including a simplified green asset ratio (GAR). In addition, materiality thresholds of 10% are introduced for alignment reporting on the key performance indicators (KPIs) turnover and CapEx, and 25% for OpEx. The proposal also suggests simplifying certain technical criteria, in particular the "do no significant harm" (DNSH) principle, to facilitate taxonomy alignment assessment.

4.1.2 Initiatives of each sectoral authority

Banking sector

In recent years, prudential regulators and supervisors have made considerable progress in integrating climate change risk into regulations. This section summarises the main regulatory initiatives on how financial risks stemming from climate change are being considered in the banking sector.

Climate change risk materialises (through various transmission channels)[83] **in banks' traditional financial risks, i.e. credit, market and operational risks.** Climate events could severely impact certain sectors, such as agriculture or tourism, increasing the probability of default of households and firms operating in these sectors and, therefore, negatively affecting credit institutions' results.

Regulators and supervisors are analysing these negative impacts on individual institutions and on financial stability, proposing the necessary measures to ensure the soundness of the banking system (NGFS, 2019; ECB/ESRB, 2022). To this end, they are acting in a coordinated manner at the global and European level through the main banking regulatory and supervisory fora. So far, a holistic approach has been followed, considering measures in all three pillars of the prudential framework,[84] although the most significant regulatory developments have taken place in Pillar 3 and Pillar 2.

Under Pillar 3, the European Capital Requirements Regulation (CRR) includes an obligation for banks to disclose both quantitative and qualitative information on their exposures to physical and transition risks. From 2023, large listed banks in Europe must disclose environmental (including climate-related), social and governance risks to the market. Also, following the latest

83 Climate risk drivers impact banks directly and indirectly through their counterparties, assets and the economy in which they operate (BCBS, *Climate-related risk drivers and their transmission channels*, 2021).

84 The banking prudential framework consists of Pillar 1 (minimum capital requirements), Pillar 2 (SREP) and Pillar 3 (prudential disclosure requirements).

review of the CRR, the European Banking Authority (EBA) is working to extend these obligations to all credit institutions. On a global scale, in early 2024 the Basel Committee on Banking Supervision (BCBS) conducted a public consultation proposing a disclosure framework for climate-related financial risks for all internationally active banks.

With regard to Pillar 2, the ECB is one of the authorities that has attached most importance not only to climate risk, but to environmental risk more broadly. Since 2019, the ECB has gradually included these risks in its supervisory review process, and in 2020 it published a very detailed guide on how institutions should reflect climate risks in their business strategies and risk management frameworks. This guide is addressed to significant institutions (SIs) directly supervised by the ECB. In 2020 the Banco de España issued its expectations in this area, in line with the ECB Guide, but in this case aimed at less significant institutions (LSIs), so the principle of proportionality was taken into account. In this regard, the latest amendment of the European Capital Requirements Directive (CRD) explicitly includes these risks in Pillar 2. In the development of the CRD provisions, the EBA submitted its Guidelines on the management of ESG risks for public consultation in 2024, and a review of the Guidelines on the Supervisory Review and Evaluation Process (SREP) is expected in the near future. At the global level, climate-related financial risks have been incorporated in the recent review of the Basel Core Principles.[85] In addition, in June 2022, the BCBS issued principles for the management of these risks.

Pillar 1 is the hardest area to address because the inclusion of climate change risk in the minimum capital requirements would be a paradigm shift. In short, this is due to the very characteristics of climate change risk, including the lack of historical information, the non-linearity of climate change risk and the need to consider longer horizons. First, it would be necessary to extend the materialisation horizon of financial risks for determining own funds parameters, which is currently one year. Second, a more forward-looking approach had to be adopted, as opposed to the more backward-looking approach of the current framework, which requires robust methodologies and sufficient data. The calibration of the Pillar 1 framework, taking into account these challenges, means that the minimum capital requirements do not, for the time being, explicitly consider climate change risk. However, both the BCBS and the EBA have been analysing feasible improvements to the current framework for some time with a view to filling the identified gaps.

Lastly, from a macroprudential perspective, the ESRB has published a report on the use of macroprudential tools to address climate risks. Capital buffers emerge as a potentially feasible tool for this purpose, and this is recognised in the latest CRD review which specifies that the systemic risk buffer could be used to address the systemic climate change risks.

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85 BCBS. (2024). *Core Principles for effective banking supervision.* https://www.bis.org/bcbs/publ/d573.pdf

Securities markets and their participants

In 2023 and 2024, the CNMV continued to work to promote the development of sustainable finance and thus contribute to the transition to a more sustainable and inclusive economy. This work falls within the CNMV's strategic priorities and objectives defined for the 2023-24 period, which included, as a strategic line of action, revitalising capital markets to foster growth and the transition to a sustainable economy.

In addition, in the exercise of its functions, the CNMV contributed to the regulatory development of sustainable finance through an increasingly intense presence in domestic and international discussions.

1 International sphere

The work carried out by ESMA in 2023 and 2024, in which the CNMV participated, was significant:

- **In March 2023, ESMA updated its product governance guidelines to include consideration of sustainability factors when defining the target market.**

- **In May 2023, ESMA published the *Greenwashing Progress Report,*** which responds to the European Commission's request for input on greenwashing risks and the supervision of sustainable finance policies. This report elaborates on the various dimensions of greenwashing risk and assesses the sustainable investment value chain with a view to identifying the most vulnerable areas. It also lays the groundwork for effective prevention, supervision and mitigation.

- **In May 2024, ESMA published Guidelines on funds' names using ESG or sustainability-related terms**.[86] These Guidelines adjust the guidance for the use of these terms.

- **In June 2024, as a follow-up to the above-mentioned progress report, ESMA published its *Final Report on Greenwashing,***[87] which elaborates on the role of supervision in mitigating greenwashing risks and proposes concrete actions for supervisors, underlining, inter alia, the need for increased resources, quality data, as well as supervisory convergence.

- **In June 2024, the ESAs published a Joint Opinion on the assessment of the Sustainable Finance Disclosure Regulation (SFDR).**[88] Among

86 See Final Report. Guidelines on funds' names using ESG or sustainability-related terms, 14 May 2024.

87 See Final Report on Greenwashing. Response to the European Commission's request for input on "greenwashing risks and the supervision of sustainable finance policies", 4 June 2024.

88 See Joint ESAs Opinion. On the assessment of the Sustainable Finance Disclosure Regulation, 18 June 2024.

other recommendations to the Commission, it proposes a categorisation system and/or an indicator of sustainability for financial products to allow for simplified disclosures and improve retailers' understanding of the sustainability profile.

- **In July 2024, the ESMA Opinion *Sustainable investments: Facilitating the investor journey - A holistic vision for the long term* was published.**[89] With the focus on investors' needs, it presents ESMA's long-term vision of how the sustainable finance regulatory framework should ideally work.

The International Organization of Securities Commissions (IOSCO), through its Sustainable Finance Task Force (STF),[90] has carried out relevant activities during this period:

- **In March 2023, the STF published an initial report on what an assurance framework for sustainability reporting should include.** The report highlighted that the framework should be professionally independent and that it should be completed by the end of 2024, with the aim of using it in 2025 to provide assurance for the end-2024 financial statements. Since then, the International Auditing and Assurance Standards Board and the International Ethics Standards Board for Accountants have published their drafts.

- **In July 2023, the STF publicly endorsed the sustainability standards issued by the International Sustainability Standards Board (ISSB) following a comprehensive review.** IOSCO also called on its 130 member jurisdictions to consider how to incorporate the new standards into their respective regulatory frameworks to ensure consistency and comparability of sustainability reporting worldwide.[91]

- **In 2022, the STF's carbon markets workstream published a consultation report on the establishment of regulated carbon markets, which was finalised in June 2023. It then published its key considerations for the sound functioning of regulated carbon markets.** At the end of 2023, during the 28th United Nations Climate Change Conference (COP), IOSCO launched a consultation report with its proposal for good practices for voluntary carbon markets. In November 2024, in the framework of COP29, the *Final Report on Voluntary Carbon Markets* was published.[92]

89 See ESMA Opinion Sustainable investments: Facilitating the investor journey - A holistic vision for the long term.

90 Chaired until December 2024 by the then Chair of the CNMV, Rodrigo Buenaventura.

91 Previously, on 26 June, the ISSB approved its two International Financial Reporting Standards, covering general requirements for disclosure of sustainability-related financial information (S1) and climate-related disclosures (S2).

92 See Voluntary Carbon Markets. Final Report.

- **In December 2023, IOSCO published the *Final Report on Supervisory Practices to Address Greenwashing.***[93] The report details regulatory initiatives addressing greenwashing, following IOSCO's 2021 recommendations. It presents an analysis of regulatory and supervisory strategies for asset managers and ESG ratings providers, as well as implementation challenges. The findings emphasise the relevance of these actions in various jurisdictions to strengthen confidence and transparency.

- **In April 2024, IOSCO updated its workplan,**[94] **in which it reported the creation of a new workstream called Green Finance and Innovation to identify trends and potential emerging risks from new green products.** It was also reported that the STF would continue its work on transition plans.

- **In November 2024, IOSCO published a *Report on Transition Plans.***[95]

2 CNMV actions

Actions to facilitate the role of the securities market in the transition towards a more sustainable and inclusive economy.

In the area of investment service provision, it is worth noting the publication in February 2023 of the *Good Practices Code for Investors.*[96] Although this code is voluntary, the CNMV considers it important that the institutions that have decided to adhere to it commit to applying all its principles. Given the newness of the code in the Spanish market, a transitional period of three years, counting from its approval, was established for compliance with all the principles.

In May 2023, the CNMV issued a statement on the results of the first phase of the implementation of sustainability regulations[97] **for collective investment institutions.** The results related to Article 8 funds – those funds that promote environmental or social characteristics or a combination of the two (provided that the investee companies observe good governance practices) – show that their ESG characteristics need to be more precise, as a generic description hampers the measurement of their achievement. Furthermore, the results obtained from studying the characteristics of Article 9 funds – those funds that pursue explicit sustainability objectives, seeking to generate a concrete and detailed impact – show that they

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93 See Supervisory Practices to Address Greenwashing. Final Report.

94 See IOSCO (2024). *IOSCO publishes an updated Workplan*.

95 See IOSCO (2024). *Report on Transition Plans*. Final Report.

96 See CNMV (2023). "Good Practices Code for Investors". In CNMV, Code of good practices for institutional investors, asset managers and proxy advisors in relation to their duties in respect of assets entrusted to or services provided by them.

97 See CNMV (2023). *Results of the review of the first phase of the implementation on the CIS of regulations related to sustainability.*

need to be more and better aligned with climate, transition and environmental objectives and with social objectives.

In October 2023, the CNMV notified ESMA that it would comply with the Guidelines on MiFID II product governance requirements.[98] These governance criteria are aimed at ensuring that financial products are only produced and distributed in the best interest of clients.

At the end of December 2024, the CNMV and the Spanish Accounting and Audit Institute (ICAC) published a joint statement pending the transposition of the CSRD into Spanish law, which could serve as a guide for the institutions subject to the CSRD and their verifiers in the event that the legislative process was not completed before 31 December 2024 (as ultimately occurred).

It is also worth noting certain supervisory activities carried out by the CNMV to contribute to the effective application of the sustainable finance regulatory framework.

First, the CNMV published for the first time its *Report on European Taxonomy disclosures. Financial Year 2022.*[99] On the basis of data disclosed by issuers, this document describes the degree of eligibility and alignment with the climate change taxonomy of the economic activities of Spanish securities issuers admitted to trading on EU regulated markets. It also includes certain general recommendations to help improve the information published.

In April 2024, the CNMV published the review of the implementation of the new obligations related to clients' sustainability preferences.[100] In addition, in 2024 the CNMV participated in the joint supervisory action announced by ESMA on client sustainability preferences across the EU and it will check the status of the issues raised with institutions.

Also in April 2024, the CNMV published its *Annual supervisory report on non-financial information and main areas of review for the following financial year. 2022.*[101] This report identifies good practices and, in certain cases, suggests improvements in areas such as the breakdown of risks, the value chain, sustainability objectives and the calculation of greenhouse gas emissions, especially in Scope 3. The report also establishes the priorities for the review of the 2023 non-financial disclosures.

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98 See CNMV adopts ESMA's Guidelines on the MiFID II's product governance requirements to reinforce investor protection, 11 October 2023.

99 See Report on European Taxonomy disclosures. Financial year 2022.

100 See The CNMV reviews the implementation of the new obligations related to clients' sustainability preferences, 4 April 2024.

101 See Informe sobre la supervisión por la CNMV de la información no financiera y principales áreas de revisión del ejercicio siguiente (available in Spanish only).

In October 2024, the CNMV notified ESMA of compliance with the "Guidelines on funds' names using ESG or sustainability-related terms". The CNMV has applied these new guidelines since 21 November 2024. New funds must comply with them immediately; existing funds will have until 21 May 2025.

Also, the CNMV published the *Report on European Taxonomy disclosures by financial institutions. 2023,* the first year in which financial issuers are required to report on the alignment of their activities with climate change mitigation and adaptation objectives. The findings show low levels of alignment compared to eligibility levels, reflecting limited investment in sustainability.

Insurers and pension funds

The Solvency II regulation included sustainability risk as one of the risks faced by insurance undertakings. In addition to the obligations to which insurance and reinsurance undertakings and pension fund managers are subject as regulated undertakings (e.g. SFDR,[102] CSRD and its delegated acts[103] or CSDDD), sustainability is very much present in the insurance and pension fund sector regulations.

Delegated Regulation (EU) 2021/1256[104] included, among other amendments, sustainability risk as one of the risks that insurance and reinsurance undertakings may face. Therefore, these entities must include sustainability risk, inter alia, in the actuarial and risk management functions, in the area of risk and investment management, in their remuneration policy and in the prudent person principle.

In addition, the agreement adopted for the amendment of the Solvency II Directive (Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of insurance and reinsurance) included numerous obligations on the part of insurance and reinsurance undertakings relating to sustainability. On the one hand, they must draw up specific plans for analysing and assessing sustainability risks in the short, medium and long term. In addition, in the ORSA report, an assessment must be made of whether there is significant exposure of the undertaking to climate change and, if so, at least two scenarios must be provided in which the impact is analysed. Sustainability requirements were also included in all other policies and reports to be published (e.g. *the Report on Solvency and Financial Condition*) as well as in the prudent person principle.

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102 Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector.

103 Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023 supplementing Directive 2013/34/EU of the European Parliament and of the Council as regards sustainability reporting standards.

104 Delegated Regulation 2021/1256.

The European Insurance and Occupational Pensions Authority (EIOPA) conducted an analysis and launched a public consultation to analyse whether certain assets considered to be polluting assets should have higher capital requirements than non-polluting assets in certain modules of the Solvency II standard formula.[105] The findings of this paper will be submitted to the European Commission to assess, in the light of the findings, whether a review of the capital requirements for polluting assets to reflect a higher risk is appropriate.

Regarding natural catastrophe risks, EIOPA has analysed and published a public consultation on reassessing certain natural catastrophe risks in certain countries in the Solvency II standard formula.[106] Natural catastrophes are becoming more frequent and severe in Europe due to climate change and the growth of economic capital in the affected areas. It is important that, in view of this situation, an analysis is carried out to determine whether insurance undertakings' capital requirements are sufficient to reflect the expected impact of climate change on them. EIOPA's opinion will be submitted to the European Commission.

EIOPA has also published public consultations on biodiversity risk management[107] **and on sustainability risk plans.**[108]

The Solvency II regulation requires EIOPA to assess the actions needed so that insurance and reinsurance undertakings assess their significant exposure to biodiversity risk.

For pension funds, and within the scope of domestic legislation, Royal Decree 1086/2024[109] **has clarified the content to be included in the comprehensive statement of investment policy principles on sustainability** in the case of occupational pension funds and personal pension funds.

As a result of all these regulatory amendments and given the importance of the subject matter, the Directorate General of Insurance and Pension Funds (DGSFP) has carried out a number of actions, including most notably:

- Inclusion of sustainability as one of the supervisory pillars for 2023-2025.[110]

- Creation of a cross-institutional sustainability department that unifies and centralises sustainability decisions and actions in insurance and pension plan undertakings.

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105 EIOPA consults on the prudential treatment of sustainability risks - EIOPA.

106 EIOPA consults on natural catastrophe risk reassessments in the standard formula.

107 EIOPA Consultation Paper on a Report on Biodiversity Risk Management by Insurers.

108 EIOPA Consultation Paper on the proposal for Regulatory Technical Standards on management of sustainability risks including sustainability risk plans.

109 Provision 21702 of BOE no 256 of 2024 (available in Spanish only).

110 See Prioridades de Supervisión 2023-2025 (available in Spanish only).

- Submission of numerous requests to insurance undertakings and pension fund managers to analyse the degree of compliance with regulations and the extent of the undertakings' adaptation.

- Close collaboration with the supervised sector to resolve doubts, transmit regulatory developments and achieve a greater degree of public-private cooperation.

- At the national level, ongoing and close communication with other supervisors (the Treasury, the Banco de España, the CNMV or the ICAC, inter alia), to achieve harmonisation in the messages given to supervised undertakings.

- At the international level, ongoing and close collaboration with supervisors and bodies to unify criteria across countries and establish priorities.

4.2 Monitoring of the Banco de España supervisory expectations relating to the risks posed by climate change and environmental degradation published in 2020

Growing concern over recent developments in climate and environmental risks,[111] together with the weight of the most carbon-intensive sectors in credit institutions' credit exposure and income, led the Banco de España to step up its supervisory activity in relation to these risks.

In October 2020, the Banco de España published its supervisory expectations on climate and environmental risk management for less significant institutions, setting out how to consider these risks in terms of strategy, business models, corporate governance procedures and risk appetite framework.

Subsequently, it monitored the progress made by the institutions in implementing these expectations through their responses to two questionnaires. The aspects analysed were: risk materiality assessment, business model, governance, risk management framework and disclosure.

The analysis of the first questionnaire, conducted in the second half of 2021, revealed that institutions were still in the early stages of incorporating climate-related risks into their management, and showed slight progress in

111 Increase in physical risks, as a result of continued temperature rises and ever more frequent and more intense extreme climate events (such as forest fires, droughts and floods). In addition, the delayed adoption of policies to meet climate objectives increases transition risks.

terms of materiality assessment (performed in a merely qualitative manner) and limited consideration of these aspects in terms of strategy and risk appetite. In general, they lacked processes to identify, assess, monitor and mitigate these risks, and did not include information on them in their internal capital and liquidity adequacy assessment reports or in their prudential disclosures.

The second questionnaire was sent in late 2022 and maintained the same structure as the first one. On this occasion, the institutions were asked to submit documentation supporting the answers given, together with their completed questionnaires. Information was also requested on any action plans that the institutions had in place to integrate climate risks into their respective organisations.

In the analysis conducted, certain progress was observed in relation to some of the supervisory expectations. In particular, progress was seen in the materiality analysis and the risk appetite framework (e.g. the incorporation of quantitative indicators in both cases) and improvements in the governance structure (e.g. with the creation of dedicated sustainability committees). In addition, institutions had also started to integrate ESG risk issues into their lending policies. Moreover, it was apparent that institutions tend to rely on third parties or adhere to sectoral agreements to equip themselves with the necessary tools and means to manage climate risk.

In contrast, this second review did not detect any progress with regard to the performance of scenario analysis and stress exercises, the implementation of which poses a challenge for institutions due to the scant availability and low quality of data and the absence of proven methodologies.

The findings of this second analysis were taken into account in the 2023 supervisory review and evaluation process. Thus, the 2023 capital decision letters communicated the weaknesses detected and made recommendations to resolve them, and these issues, logically, formed part of the supervisory dialogue.

In 2024, the Banco de España monitored compliance with the recommendations issued in 2023, focusing on those institutions whose interest income from polluting sectors had a greater weight with respect to total income.

These actions verify whether institutions integrate the risks stemming from climate change and environmental degradation into their risk management procedures through a global approach, applying to the entire organisation across the board. The objective of this review, which includes on-site visits to institutions, is to assess the progress made in the general framework, including the evolution of action plans, paying special attention to credit risk. In particular, it reviews the implementation of climate and environmental considerations in the lifecycle of loan transactions, including the availability of quality data supporting the measurement of climate risks in the loan portfolio.

As a result of this action, a final assessment is made of the institutions analysed, classifying them into four categories on the basis of the degree of progress achieved in six aspects of credit risk management: (i) customer onboarding and due diligence from an ESG risk perspective; (ii) loan origination and monitoring policies; (iii) qualitative and quantitative data gathering for risk classification on the basis of climate risk exposure; (iv) assessment of collateral for loan transactions; (v) control and, in particular, supervision mechanisms regarding potential risk concentration; and (vi) pricing framework.

In addition to these actions, the Banco de España participated in two actions led by the ECB to assess issues related to ESG risk, which were analysed in both SIs and LSIs. Specifically, the Banco de España participated in the thematic review on climate-related and environmental risks in the first half of 2022, and in the monitoring of market disclosure practices that was conducted in the last quarter of 2022 and the first quarter of 2023.

Box 4.A The role of macroprudential policy in the face of transition climate risks

Climate change and climate policies geared towards the green transition affect both the real economy and the financial sector. The situation of the financial system is, in turn, essential to fund and foster climate change mitigation and adaptation. Against this background, a recently published paper[1] seeks to understand the macro-financial effects of transition policies and the challenges facing macroprudential policy when addressing the risks that are passed through to the banking sector.

The paper investigates how certain macroprudential tools, particularly bank capital requirements, can be used to address the financial risks deriving from applying carbon taxes, and the potential complementarities between both policies. The authors embed transition risks in a dynamic stochastic general equilibrium (DSGE) model with financial frictions and bank failure risk, calibrated to reflect the characteristics of the euro area's macroeconomic aggregates over the last two decades. The model features two distinct production sectors: a standard intermediate goods sector and an energy sector combining green and fossil fuel energy. Each economic sector requires specific capital intermediated by the banking sector. Banks' portfolio returns are subject to two sources of risk: exogenous idiosyncratic risk and endogenous aggregate risk linked to changes in energy prices. These sources of risk, together with banks' limited liability, may lead to bank failures that would be highly costly for the economy.

The analysis considers CO_2 emission reduction policies that affect energy prices and have implications for households, firms and the financial sector. For example, introducing a carbon tax on fossil fuels affects fossil fuel and green energy prices, generating a reallocation of capital across economic sectors. At the same time, price changes in different energy sources spread to the financial system through their effect on the returns on banks' assets linked to each of the energy sectors.

Under this scenario, the macroprudential authority's optimal response is to adjust bank capital requirements in proportion to the transition risk assumed by each sectoral exposure. This policy maximises households' welfare as it limits financial risks arising from changes in energy prices. The authors calibrate the model for the euro area and simulate the introduction of a tax on fossil fuel energy inputs which would reduce carbon emissions by 35%, in line with the European Commission's goals for the next ten years.[2] The first column in Table 4.A.1 shows the environmental, macroeconomic and financial effects associated with the introduction of the carbon tax. The tax increases the price of fossil fuel inputs and, accordingly, the price of fossil fuel energy. Given the importance of the fossil fuel sector

1 Salomón García Villegas and Enric Martorell. (2024). "Climate transition risk and the role of bank capital requirements". Documentos de Trabajo, 2410, Banco de España. https://www.bde.es/wbe/en/publicaciones/analisis-economico-investigacion/documentos-trabajo/climate-transition-risk-and-the-role-of-bank-capital-requirements.html

2 The European Commission's proposal in 2023 sets the target of reducing greenhouse gas emissions by at least 55% by 2030, compared with 1990 levels. The progress made up to 2020 leaves a remaining reduction of approximately 35% to be achieved compared with 2020 levels.

Box 4.A The role of macroprudential policy in the face of transition climate risks (cont'd)

Table 4.A.1 Macro-financial effects of tax and macroprudential policies

	Carbon tax	Carbon tax plus macroprudential adjustment
Carbon emissions (%)	-35.3	-36.0
Fossil fuel prices (%)	25.7	26.0
Aggregate energy prices (%)	19.2	19.3
Fossil fuel energy ratio	68.2	67.8
Credit to the fossil fuel sector (%)	-21.2	-23.5
Credit to the green sector (%)	62.4	72.0
Bank failure rate (annual)	2.9	0.9

SOURCE: Salomón García-Villegas and Enric Martorell. (2024).
NOTE: Emissions, prices and credit are shown as percentage deviations from their respective levels in the baseline scenario's steady state. The fossil fuel energy ratio and the bank failure rate are shown at their levels in each of the scenarios.

in aggregate energy production, the final price of energy also increases, albeit to a lesser extent. Through this effect on energy prices, the tax sparks a reallocation of resources and credit from the fossil fuel sector to the green sector. However, higher energy prices lead to higher volatility of returns on banks' energy-linked assets, which drives up the annual bank failure rate from 0.67% under the baseline scenario to 2.9%. The second column of Table 4.A.1 considers a scenario in which, in addition to the carbon tax, the macroprudential authority implements a new optimal combination (maximising households' welfare) of capital requirements. This entails an adjustment proportional to the rise in bank risk stemming from the impact on prices in each sector, which results in an increase of 29 bp for green exposures and of 183 bp for fossil fuel exposures. The optimal macroprudential adjustment has a direct positive effect on financial stability, with the bank failure rate declining to 0.86%. At the same time, it indirectly complements the carbon tax by reducing emissions through the reallocation of resources to less polluting sectors.

Additionally, the authors show that the level of optimal capital requirements depends on the structural characteristics of the economy. In particular, the capacity to replace fossil fuel energy with green energy in the production of intermediate goods is crucial to determine the optimal level of capital requirements. This, in turn, affects the reallocation of resources between sectors. This result is relevant for macroprudential policy design, as it stresses the importance of considering the idiosyncratic characteristics of the economy in each jurisdiction.

The study also explores the impact of activating bank capital requirements as a climate policy tool in the event that the tax authority does not take action. In the absence of carbon taxes, capital surcharges on fossil fuel exposures (a brown penalising factor) have a limited impact on the redistribution of investment from the fossil fuel energy sector to the green energy sector and may have

Box 4.A The role of macroprudential policy in the face of transition climate risks (cont'd)

adverse effects on financial stability. While carbon taxes reduce the aggregate return on fossil fuel assets, capital requirements that penalise such exposures only reduce returns on banks' fossil fuel-linked assets. Therefore, penalising capital requirements lead to a disintermediation towards the non-bank financial sector, with a limited impact on the redistribution of investment between the green and the fossil fuel energy sectors.

Lastly, the authors investigate the complementarities between macroprudential policies and carbon taxes during the transition towards the emission reduction targets established by the European Commission. Preventively increasing capital requirements to their optimal long-term level (prior to the introduction of a carbon tax) reduces bank failure rates and gives rise to welfare gains in the medium term, at the expense of lower investment and credit contraction in the short term. This highlights the potential benefits for financial stability and economic welfare of using macroprudential tools to mitigate climate transition risks, as well as the potential adverse effects on credit supply.

Annex Relevant publications by AMCESFI member institutions on climate change

This annex compiles periodic papers and occasional articles on topics related to the analysis of climate change and its impact on the financial system, published by AMCESFI member institutions from April 2023 to the cut-off date of this report in 2025.

Banco de España

The Banco de España and climate change (webpage)

Financial Stability Report (half-yearly)

Supervision Report (annual)

Annual Report

Climate-related aspects of the Banco de España's non-monetary policy portfolios

The impact of drought on agricultural production in Spain
Isabel Molina Vileya and Matías J. Pacce
Economic Bulletin, 2025/Q2, Article 7, Banco de España (2025)

¿Influye la eficiencia energética en el precio de la vivienda en España?
Pana Alves and Olivier Hubert
Documentos Ocasionales, 2508, Banco de España (2025)

Desertification in Spain: Is there any impact on credit to firms?
Carmen Broto and Olivier Hubert
Documentos de Trabajo, 2513, Banco de España (2025)

Carbon pricing, border adjustment and renewable energy investment: a network approach
Mar Delgado-Téllez, Javier Quintana and Daniel Santabárbara
Documentos de Trabajo, 2506, Banco de España (2025)

CATALIST: A new, bigger, better model for evaluating climate change transition risks at Banco de España
Rubén Veiga Duarte, Samuel Hurtado, Pablo A. Aguilar García, Javier Quintana González and Carolina Menéndez Álvarez
Documentos de Trabajo, 2504, Banco de España (2025)

"El Niño" and "La Niña": Revisiting the impact on food commodity prices and euro area consumer prices
Fructuoso Borrallo, Lucía Cuadro-Sáez, Corinna Ghirelli and Javier J. Pérez
Documentos de Trabajo, 2432, Banco de España (2024)

The impact of renewable energies on wholesale electricity prices
Javier Quintana
Economic Bulletin, 2024/Q3, Article 9, Banco de España (2024)

Houston, we have a problem: can satellite information bridge the climate-related data gap?
Andrés Alonso-Robisco, José Manuel Carbo, Emily Kormanyos and Elena Triebskorn
Documentos Ocasionales, 2428, Banco de España (2024)

Green energy transition and vulnerability to external shocks
Rubén Domínguez-Díaz and Samuel Hurtado
Documentos de Trabajo, 2425, Banco de España (2024)

EU policies for the green transition, 2019-2024
Pilar L'Hotellerie-Fallois, Marta Manrique and Danilo Bianco
Documentos Ocasionales, 2424, Banco de España (2024)

What is the economic impact of climate change and environmental degradation? The case of house prices in the Mar Menor area
Gabriel Pérez Quirós and Matías Lamas
Banco de España blog (2024)

How green are our banknotes? The environmental impact of the euro
Carlos González Constán
Banco de España blog (2024)

Climate transition risk and the role of bank capital requirements
Salomón García Villegas and Enric Martorell
Documentos de Trabajo, 2410, Banco de España (2024)

Climate risk, soft information and credit supply
Laura Álvarez-Román, Sergio Mayordomo, Carles Vergara-Alert and Xavier Vives
Documentos de Trabajo, 2406, Banco de España (2024)

"Green regulation": a quantification of regulations related to renewable energy, sustainable transport, pollution and energy efficiency between 2000 and 2022
Juan S. Mora-Sanguinetti and Andrés Atienza-Maeso
Documentos de Trabajo, 2336, Banco de España (2023)

Is reducing carbon emissions compatible with economic growth?
Marta Suárez-Varela
Banco de España blog (2023)

Pillar 3 disclosures on ESG risks. First disclosures of Spanish and other European banks
Herminia Cuevas, Esther Palomeque and Beatriz Santa-Cruz
Financial Stability Review, 45, Autumn. Banco de España (2023)

Climate-conscious monetary policy
Anton Nakov and Carlos Thomas
Documentos de Trabajo, 2334, Banco de España (2023)

Disclosure of ESG risks under the Pillar 3 framework. Spanish banks
Banco de España.
Financial Stability Report, Box 3.3, Autumn (2023)

Effects of Carbon Pricing in Germany and Spain: An Assessment with EMuSe
Natascha Hinterlang
Documentos de Trabajo, 2328, Banco de España (2023)

Assessing the data challenges of climate-related disclosures in European banks. A text mining study
Ángel Iván Moreno and Teresa Caminero
Documentos de Trabajo, 2326, Banco de España (2023)

The road to net zero: the role of transition plans and forward-looking indicators in portfolio management
Clara I. González and Elena Triebskorn
Economic Bulletin, 2023/Q3, Article 14, Banco de España (2023)

How consumption carbon emission intensity varies across Spanish households
Henrique S. Basso, Ourania Dimakou and Myroslav Pidkuyko
Documentos Ocasionales, 2309, Banco de España (2024)

Climate change, financial risks and reporting: distant horizons?
Covadonga Martínez and Pablo Pérez Rodríguez
Financial Stability Review, 44, Spring, Banco de España (2023)

Spanish National Securities Market Commission (CNMV)

Dynamic modelling of climate-related shocks in the Spanish fund sector
Diana Mykhalyuk
Working Paper, 91, CNMV (2025)

Informe sobre los desgloses relativos a la Taxonomía Europea de entidades financieras Ejercicio 2023
CNMV (2024)

Defining Greenwashing
Ariadna Dumitrescu, Javier Gil-Bazo and Feng Zhou
Working Paper, 84, CNMV (2024)

Is there evidence of greenium in the debt assets of Spanish issuers?
María Isabel Cambón Murcia
Financial Stability Note No. 24 (June), CNMV (2023)

Report on European Taxonomy disclosures. Financial year 2022
CNMV (2023)

Spanish securities issuers and their relationship with climate change
Ramiro Losada López and Albert Martínez Pastor
Working Paper, 82, CNMV (2023)

Transition risk in Spanish investment funds
Ricardo Crisóstomo
CNMV Bulletin, May 2023, CNMV

Climate and sustainability benchmarks and their contribution to compliance with Sustainable Development Goals (part two)
María José Gómez Yubero, Bárbara Gullón Ojesto and Miguel Palomero Aguilar
CNMV Bulletin, May 2023, CNMV

Ministry of Economy, Trade and Business

Directorate General of Insurance and Pension Funds

Seguros y Fondos de Pensiones. Informe 2022

Seguros y Fondos de Pensiones. Informe 2023

Glossary

AEMET	Spanish Meteorological Agency
AMCESFI	Spanish macroprudential authority
BCBS	Basel Committee on Banking Supervision
bn	Billions
BOE	Official State Gazette
bp	Basis points
CapEx	Capital expenditure
CCR	Banco de España Central Credit Register
CCS	Insurance Compensation Consortium
CET1	Common Equity Tier 1
CNAE	National Classification of Economic Activities
CNMV	National Securities Market Commission
CRD	Capital Requirements Directive
CRR	Capital Requirements Regulation
CSDDD	Corporate Sustainability Due Diligence Directive
CSRD	Corporate Sustainability Reporting Directive
DGSFP	Directorate General of Insurance and Pension Funds
EBA	European Banking Authority
ECB	European Central Bank
EIOPA	European Insurance and Occupational Pensions Authority
EPC	Energy performance certificate
ESA	European Supervisory Authorities
ESG	Environmental, social and governance
ESMA	European Securities and Markets Authority
ESRB	European Systemic Risk Board
ESRS	European Sustainability Reporting Standards
EuGB	European Green Bond Regulation
FSB	Financial Stability Board
FSTC	AMCESFI Financial Stability Technical Committee
GAR	Green asset ratio
GDP	Gross domestic product
GHG	Greenhouse gas emissions
HAB	Harmful algal bloom
IAIS	International Association of Insurance Supervisors
ICAC	Spanish Accounting and Audit Institute
ICO	Official Credit Institute
IOSCO	International Organization of Securities Commissions
ISIN	International Securities Identification Number
ISSB	International Sustainability Standards Board
LSIs	Less significant institutions
LTV	Loan-to-value
m	Millions
n.a.	Not available

NFCs	Non-financial corporations
NGFS	Network for Greening the Financial System
NPISHs	Non-profit institutions serving households
NPLs	Non-performing loans
OJEU	Official Journal of the European Union
OpEx	Operating expenditure
ORSA	Own Risk and Solvency Assessment
O-SIIs	Other systemically important institutions
PNIEC	National Integrated Energy and Climate Plan
pp	Percentage points
SBTi	Science Based Targets Initiative
SFDR	Sustainable Finance Disclosure Regulation
SIs	Significant institutions
SMEs	Small and medium-sized enterprises
SREP	Supervisory Review and Evaluation Process
STF	Sustainable Finance Task Force
UNEP	United Nations Environment Programme
UNESPA	Spanish Association of Insurers and Reinsurers

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