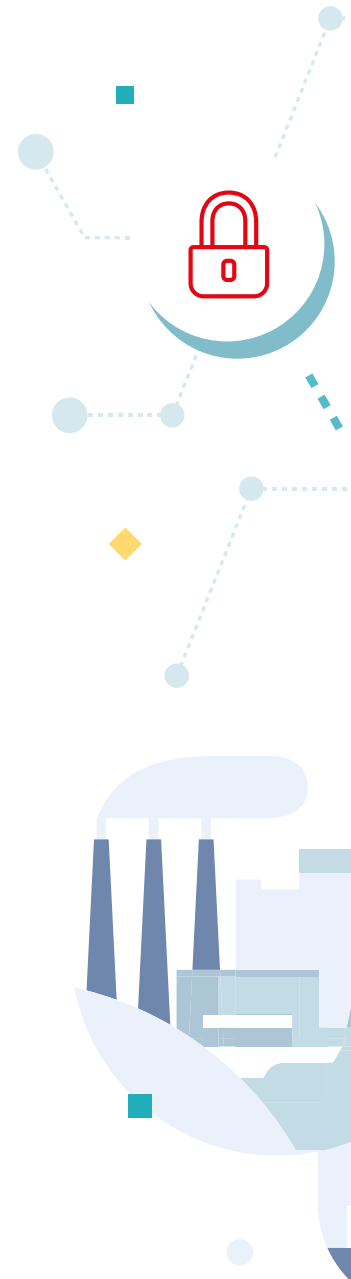


# Risk management

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This document is an extract of the 2018 annual report (the "2018 report") of Banco Santander, S.A. ("Santander") and, therefore, must always be read in conjunction with the full 2018 report, including the important information contained in the backcover, index and pages 2 and 3 of the 2018 report. The full 2018 report is available at our corporate website: [www.santander.com](http://www.santander.com). Please also note that links to other parts of the full 2018 report, including the glossary, will not work. Our 2018 report is provided in Spanish and English versions. In case of discrepancy the Spanish version prevails.

# 1. Risk management and control model

Risk management and control is key in ensuring that we remain a robust, safe and sustainable bank aligned with the interests of our employees, customers, shareholders and society.

In Santander we prioritise the execution of a forward-looking risk management. This has enabled the Group, since its foundation in 1857, to deal appropriately with changes in the economic, social and regulatory environment and continue helping people and businesses prosper.

Our risk management and control model is based on the principles below, taking into account regulatory expectations, and market best practices:

1. **Advanced risk management with a forward-looking approach** that ensures a medium-low risk profile, based on our risk appetite framework defined by the board.
2. **Risk culture** that applies to all employees throughout the Group.
3. Clearly defined **three lines of defence model** that enable us to identify, manage, control, monitor and challenge all risks.
4. **Autonomous subsidiaries model with robust governance** based on a clear structure that separates the risk management and the risk control functions.

5. **Information and data management processes** that allow all risks to be identified, assessed, managed and reported at appropriate levels.

6. **Risks are managed by the units that generate them.**

These principles, combined with a series of interrelated tools and processes in the Group's strategic planning (risk appetite, risk identification and assessment, scenario analysis, risk reporting framework, annual planning and budget, etc.) provide a holistic control framework across the Group.

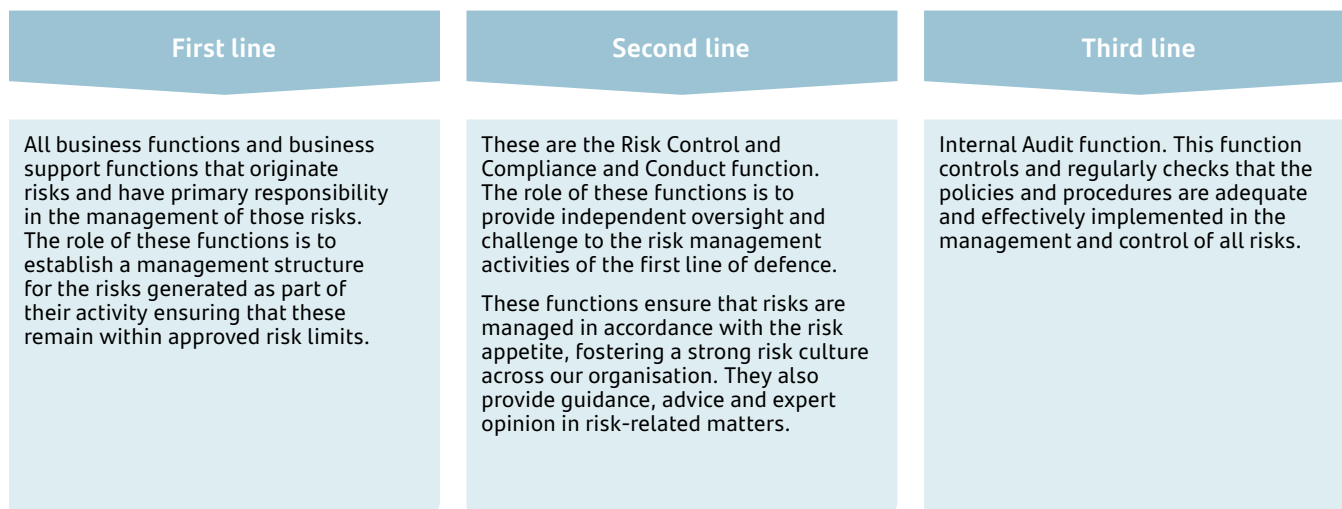
## 1.1 Risk governance

The Group has a strong governance framework, which pursues the effective control of the risk profile within the risk appetite defined by the board.

This governance framework is underpinned by the distribution of roles among the three lines of defence, a robust structure of committees dealing with a strong relationship between the Group and its subsidiaries. Overlaid with our Group wide risk culture Risk Pro/ I am Risk.

## Lines of defence

At Santander, we follow a three lines of defence control model:



The Risk Control, Compliance and Conduct, and Internal Audit functions are separated and independent and have direct access to the board of directors and/or its committees.

### Risk committees structure

Ultimately, the board of directors is responsible for risk management and control and, in particular, for approving and periodically reviewing the Group's risk culture and risk appetite framework.

Except for specific topics detailed in its bylaws, the board has the capacity to delegate its faculties to other committees. This is the case of the risk supervision, regulation and compliance committee and the Group's executive committee, which has specific risk related responsibilities.



For more information see the Corporate governance chapter, section 4.7 'Risk supervision, regulation and compliance committee activities in 2018'

The **Group Chief Risk Officer (Group CRO)** leads the risk function within the Group, advises and challenges the executive line and reports independently to the risk supervision, regulation and compliance committee and to the board.

Other bodies that form the highest level of risk governance, with authorities delegated by the board of directors, are the executive risk committee and the risk control committee, detailed as follows:

#### Executive risk committee (ERC)

**Purpose:** this committee is responsible for managing all risks, within the faculties delegated by the board. The committee makes

decisions on risks assumed at the highest level, ensuring that they are within the established risk appetite limits for the Group.

**Chair:** CEO.

**Composition:** nominated executive directors and other Group senior management. The Risk, Finance and Compliance and Conduct functions, among others, are represented. The Group CRO has a veto right on the committee's decisions.

#### Risk control committee (RCC):

**Purpose:** to control and oversee that risks are managed in accordance with the risk appetite approved by the board, providing a comprehensive overview of all risks. This includes identifying and monitoring both current and potential risks, and evaluating their potential impact on the Group's risk profile.

**Chair:** Group CRO.

**Composition:** senior management members from the Risk, Compliance and Conduct, Financial Accounting and Management Control functions are represented, among others. Senior members of the risk function (CROs) from the Group's units regularly take part in reporting their risk profiles.

Additionally, each risk factor has its own fora, committees and meetings to manage the risks under their control. Among others, they have the following responsibilities:

- Advise the CRO and the risk control committee that risks are managed in line with the Group's risk appetite.
- Carry out and regular monitoring of each risk factor.

- Oversee the measures adopted to comply with the expectations of the supervisors and internal and external auditors.

For certain matters, the Group may establish specific additional governance. For example, following the UK Government decision to leave the EU, the Group and Santander UK set up separate steering committees and working groups to: i) monitor the Brexit process; ii) develop contingency plans; and iii) escalate and take decisions to minimise potential impacts on our business and customers.

In the face of prolonged uncertainty, the Group and Santander UK began, in 2018, to execute the agreed contingency plans to ensure readiness for the withdrawal by the UK from the European Union.

### The Group's relationship with its subsidiaries regarding risk management

#### Alignment of units with the Group

In all the subsidiaries, the management and control model follows the frameworks established by the Group's board of directors. The local units adhere to them by their respective boards. The Group reviews and validates any local adaptations as needed. The Corporate centre participates in the relevant decision-making through their validation.

This creates a recognisable and common risk management and control model across the Group.

The 'Group-subsidiary governance model and good governance practices for subsidiaries' sets up regular interaction and functional reporting by each local CRO to the Group CRO, as well as the participation of the Group in the process of appointing, setting targets, evaluation and remuneration of local CRO's, in order to ensure risks are adequately controlled by the Group.

To strengthen the relationship between the Group and the units, various initiatives have been taken in order to develop the risk management model across the Group:

- Promote collaboration to accelerate share of best practices to help solve local weaknesses strengthen current processes and boost innovation.
- Talent identification within the risk teams, boosting international mobility (Global Risk Talent Program).
- Advanced Risk Management (ARM): definition and implementation of the risk initiatives, both Group and local, underpinning the transformation aspirations of the risk management and control model of each unit.

#### Subsidiary committee structures

The 'Group-subsidiary governance model and good governance practices for subsidiaries' recommends that each subsidiary should have risk committees and other executive committees, consistent with those already in place in the Group.

The subsidiary governance bodies are structured taking into consideration local requirements, both regulatory and legal, as well as their specific dimension and complexity, in a manner that is consistent with those of the parent company, as established in the internal governance framework.

As part of our role to review the aggregated oversight of all risks, the Group exercises a validation and challenge role with regard to the transactions and management policies of the subsidiaries, insofar as they affect the Group's risk profile.



For more detail regarding the subsidiaries committees' structure see chapter Corporate Governance, section 7 'Group structure and governance framework'.

#### Risk culture - Risk Pro

Santander has a strong risk culture known as Risk Pro implemented across the Group, which defines the way in which we understand and manage risks on a day-to-day basis. It is based on the principle that all employees are responsible for risk management.



Further information is available in the Responsible banking chapter, section 'Risk culture'.

## 1.2 Social and environmental risk

#### Social and environmental policies

Santander contributes to sustainable economic growth by promoting the protection and conservation of the environment, and the protection of human rights. This principle of environmental and social responsibility embedded across the Group and decision-making processes. It is for example, reflected in the environmental, social and reputational risk assessments that Santander carries out on its customers and transactions as part of its decision-making processes across the whole Group.

The Group has board approved, sector specific, environmental, social and reputational risk policies covering energy (including coal), mining and metals, soft commodities and defence that are reviewed annually to ensure they follow the best international practices and standards. The policies set out the activities where the Group will not provide financial products and/or services and those where Santander will conduct in-depth analysis to assess their environmental, social and reputational impacts.

Advances to our social and environmental policies is overseen by a working group chaired by the Group Chief Compliance Officer. The working group also assesses any issues with customers and transactions that fall within the scope of the policies and provides an opinion on all relevant matters to corresponding approval committees.

In addition to the above, and since 2009, the Group has applied the Equator Principles to all project finance transactions.



Equator Principles reporting by Santander is available on the Responsible banking chapter, in section 'Evaluation of environmental risk of financing activities'.

### Climate change and the Task Force on Climate-related Financial Disclosures

The Task Force on Climate-related Financial Disclosures (TCFD) of the Financial Stability Board (FSB) has published a series of recommendations for corporate governance, strategy, risk management, metrics and targets in relation to climate change. The implementation of these recommendations will significantly transform how financial institutions identify investment opportunities and manage the risks associated with the changes to international economic activities that are required to address the challenge of climate change.

As a result of the Paris Climate Agreement, governments and regulators across the EU and other countries, where the Group is present, are working on developing and implementing legal rules that will help meet the agreed targets and facilitate the transition to a lower emission economy. Santander is providing input into these consultations and will actively work to implement them in due course.

## 1.3 Management processes and tools

For risk management and control purposes, the Group has defined several key processes that rely on a series of tools, as follows:



Risk appetite



Stress Test



Risk Identification and Assessment (RIA)



Risk Reporting Framework (RRF)

### Risk appetite and structure of limits

In Santander we define risk appetite as the amount and type of risks that are considered prudent to assume for implementing our business strategy in the event of unexpected circumstances. Severe scenarios that could have a negative impact on the levels of capital, liquidity, profitability and/or the share price are taken into account.

The risk appetite is set by the board for the whole Group. Every main business unit sets its own risk appetite according to the adaptation of the Group methodology and its own circumstances. The boards of the subsidiaries are responsible for approving their respective risk appetite proposals once they have been reviewed and validated by the Group.

The Group shares a common risk appetite model. It sets out the requirements for processes, metrics, governance bodies, controls and standards for implementation across the Group, cascading down management policies and limits to lower levels.

#### a. Business model and fundamentals of the risk appetite

The risk appetite definition is consistent with our risk culture and business model. The main elements that define the business model and underpin the risk appetite are:

- Medium-low and predictable risk profile based on a diversified business model, focused on retail and commercial banking with internationally diversified activities and strong material market share, as well as a wholesale business model that is centred on customer relationships in the Group's main markets.
- Stable and recurrent earnings and shareholder remuneration policy, underpinned by sound capital and liquidity, and diversified sources of funding.

- Autonomous subsidiaries that are self-sufficient in terms of capital and liquidity, minimising the use of non-operational or shell companies, and ensuring that no subsidiary has a risk profile that could jeopardise the Group's solvency.
- An independent Risk function with active involvement of senior management to reinforce a strong risk culture and a sustainable return on capital.
- Global and holistic view of all risks, through extensive control and monitoring: All risks, all businesses and all countries.
- Focus on products that the Group knows sufficiently well and has the capacity to manage (systems, processes and resources).
- A conduct model that protects customers and shareholders.
- Remuneration policy that aligns the individual interests of employees and executives with the risk appetite, and is consistent with the evolution of the Group's long-term results.

### b. Corporate risk appetite principles

The following principles govern the Group's risk appetite in all its units:

- **Responsibility of the board and of senior management.**
- **Holistic risk view (Enterprise Wide Risk), risk profile backtesting and challenge.** The risk appetite must consider all significant risks and facilitate an aggregate view of the risk profile through the use of quantitative metrics and qualitative indicators.
- **Forward-looking view.** The risk appetite must consider the desirable risk profile for the short and medium term, taking into account both the most plausible circumstances and adverse/stress scenarios.
- **Embedding and alignment with strategic and business plans.** The risk appetite is an integral part of the strategic and business planning, and is embedded in the daily management through the transfer of the aggregated limits to those set at portfolio level, unit or business line, as well as through the key risk appetite processes.
- **Coherence across the various units and a common risk language throughout the Group.** The risk appetite of each unit of the Group must be coherent with that across the Group.
- **Periodic review, backtesting and adoption of best practices and regulatory requirements.** Monitoring and control mechanisms are established to ensure the risk profile is maintained, and the necessary corrective and mitigating actions are taken in the event of non-compliance.

### c. Limits structure, monitoring and control

The risk appetite is formulated annually and includes a series of metrics and limits to establish in quantitative and qualitative terms the maximum risk exposure that every unit and the Group as a whole is willing to assume.

Compliance with risk appetite limits is regularly monitored. Specialised control functions report the risk profile adequacy to the board and its committees, on quarterly basis.

Limit breaches and non-compliance with the risk appetite are reported to the relevant governance bodies. An analysis of the causes, an estimation of the duration of the breach and corrective actions proposals are also submitted.

Linkage between the risk appetite limits and those of the business units and portfolios is a key element for making the risk appetite an effective risk management tool. The management policies and structure of the limits used to manage the different types and categories of risk have a direct relation with the principles and limits defined in the risk appetite (described in greater detail in this chapter, sections [3.2 'Credit risk management'](#), [4.2 'Trading market risk management'](#) and [4.4 'Structural balance sheet risks management'](#)).

Each risk and business area is responsible for verifying that the risk appetite limits and controls used are properly embedded in the day-to-day management. The Risk Control and Supervision function validates the resulting assessment, ensuring that limits conform to the risk appetite.

### d. Risk appetite axes and key metrics

The risk appetite is expressed via limits on quantitative metrics and qualitative indicators that measure the exposure or risk profile by type of risk, portfolio and segment and business line, under both current and stressed conditions. These metrics and risk appetite limits are articulated in five axes that define the positioning that Santander wants to adopt or maintain in the deployment of its business model, which are described as follows:

- **Volatility of results**

To limit the potential negative volatility of the results in the strategic and business plans under stressed conditions.

This axis contains metrics which measure the behaviour and evolution of real or potential losses in the business.

The stress tests, measure the maximum fall in results under adverse conditions with a reasonable probability of occurrence and similar by risk type (thus allowing aggregation).

- **Solvency**

Addresses the maintenance of the Entity's equity, keeping capital above regulatory requirements and market expectations.

It determines the minimum level of capital the Entity requires in order to cope with potential losses under both normal and stressed conditions.

This approach included in the risk appetite model is supplementary to and consistent with the capital objective approved within the Group's capital planning process.

- **Liquidity**

The Group has developed a funding model based on autonomous subsidiaries that are responsible for maintaining their own liquidity needs.

On this basis, liquidity management is conducted by each subsidiary within a corporate framework that develops its basic principles (decentralisation, equilibrium in the medium and long term funding, high weight of customer deposits, diversification of wholesale sources, reduced exposure to short-term financing, sufficient liquidity reserve) and revolves around three main pillars (governance model, balance sheet analysis and measurement of liquidity risk).

Santander's liquidity risk appetite establishes demanding objectives of liquidity positions and horizons under systemic and idiosyncratic stress scenarios (local and global). In addition, a limit is set for the net stable funding ratio (NSFR), together with a limit on the minimum liquidity coverage position.

- **Concentration**

Santander seeks to maintain a diversified risk profile. This is achieved by virtue of Santander's business orientation to retail banking with a high degree of international diversification.

This axis includes, among others, the individual maximum exposure limits with customers, aggregated maximum exposure with major counterparties, and maximum exposure by activity sectors, in commercial real estate and in portfolios with a high risk profile. Customers with an internal rating lower than investment grade or equivalent, or which have excessive exposure of a certain degree, are also monitored.

- **Non-financial transversal risks**

This involves qualitative and quantitative metrics that help monitor exposure to non-financial risks. These include specific indicators for fraud, technological risk, security and cyberrisk, money laundering prevention, regulatory compliance, product governance and customer protection.

### Risk identification and assessment (RIA)

The Group carries out the identification and assessment of the different risks that it is exposed to, involving the different lines of defence, establishing management standards that not only meet regulatory requirements but also reflect best practices in the market, and reinforce our risk culture.

In 2018, the approach centred on three main areas: standards **control environment review**, **perimeter completeness** by integrating new units, together with the **risk performance indicators** review and their alignment with the risk appetite.

In addition, the RIA exercise analyses the evolution of risks and identifies areas of improvement:

- **Risk performance**, enabling the understanding of residual risk by risk type through a set of metrics and indicators calibrated using international standards.
- **Control environment assessment**, measuring the degree of implementation of the target operating model, as part of our advanced risk management.
- **Forward-looking analysis**, based on stress metrics and identification and/or assessment of the main threats to the strategic plan (**Top risks**), enabling specific action plans to be put in place to mitigate potential impacts and monitoring these plans.

Based on the periodic RIA exercise, the Group's risk profile as of December 2018 remains as solid medium-low.

### Scenario analysis

We analyse the impact triggered by different scenarios in the environment, in which the Group operates. These scenarios are expressed both in terms of macroeconomic variables, as well as other variables that may impact our risk profile.

Scenario analysis is a robust and useful tool for management at all levels. It enables the Group to assess its resilience in stressed environments or scenarios, and identifies measures to reduce exposure under these scenarios. The objective is to reinforce the stability of income, capital and liquidity.

The robustness and consistency of the scenario analysis exercises are based on the following pillars:

- Development and integration of models that estimate the future performance of metrics (for example, credit losses), based on both historic information (internal to the Group and external from the market), and simulation models.
- Inclusion of expert judgement and portfolio manager's know-how.

- Challenge and backtesting of model results to ensure they are adequate.
- Robust governance of the whole process, covering models, scenarios, assumptions and rationale for the results, and their impact on management.

The application of these pillars in the European Banking Authority (EBA) stress test, executed and reported bi-annually, has enabled Santander to satisfactorily meet the defined requirements - both quantitative and qualitative - and to contribute to the excellent results obtained by the Group.



For further information on the Stress test result, please refer to chapter Economic and financial review, in section 3.5 'EBA/ECB transparency exercise 2018'.

### Uses of scenario analysis

The EBA guidelines establish that scenario analysis should be integrated in the risk management framework and in the Group's management processes. This requires a forward looking view in risk and strategic management, capital and liquidity planning.

Scenario analysis is included in the Group's control and management framework, ensuring that any impact affecting the Group's solvency or liquidity can be rapidly identified and addressed. With this objective, a systematic review of exposure to the different types of risk is included, not only under the baseline scenario but also under various simulated adverse scenarios.

Santander has a map of uses in place to strengthen the alignment of scenario analysis for each risk type, along with the continuous improvement of such uses. The goal is to reinforce the integration among the different regulatory and management exercises.

Scenario analysis forms an integral part of several key processes of the Group:

- **Regulatory uses:** stress test scenarios using the guidelines set by the European regulator or by each local supervisor.
- Internal capital adequacy **assessment** (ICAAP) or liquidity **assessment** (ILAAP) in which, while the regulators can impose certain requirements, the Group develops its own methodology to assess its capital and liquidity levels under different stress scenarios to support planning and adequately managing the Group's capital and liquidity.
- **Risk appetite.** Contains stressed metrics on which maximum levels of losses (minimum liquidity levels) are established that the Group does not want to exceed. These exercises are related to those for capital and liquidity, although they have

different frequencies and present different granularity levels. For more detail see Risk appetite and structure of limits in section 1.3 'Management processes and tools' above mentioned and section 4.6. [Liquidity risk management](#) in this report.

- **Recurrent risk management** in different processes/exercises:
  - **Budgetary and strategic planning process**, in the development of commercial risk admission policies, in the global risk analysis for senior management or in the specific analysis regarding profile of activities or portfolios.
  - Identification of **Top risks** on the basis of a systematic process to identify and assess all the risks which the Group is exposed to. The Top risks are selected and a macroeconomic or idiosyncratic scenario is associated with each one, to assess their impact on the Group.
  - **Recovery plan** annually performed to establish the available tools the Group will have, to survive in the event of an extremely severe financial crisis. The plan sets out a series of financial and macroeconomic stress scenarios, with differing degrees of severity, that include idiosyncratic and/or systemic events.
  - IFRS9 from 1 January 2018, the processes, models and scenario analysis methodology are included in the new regulatory provision requirements.

For additional details regarding scenario analysis see sections 3.2 '[Credit risk management](#)', 4.2 '[Trading market risk management](#)' and 4.6 '[Liquidity risk management](#)'.

In 2018 Santander participated in the United Nations Environmental Program Financial Initiative (UNEP FI) pilot, along with 15 banks, to implement the TCFD requirements. The initiative's objective was to develop scenarios, models and metrics to enable a scenario-based, forward-looking assessment of climate-related risks and opportunities, as well as contributing to the working group.

The Group specifically focused on direct and indirect transition risks and their impact on its transportation sector wholesale portfolio, based on different scenarios provided within the UNEP FI pilot. The scenarios covered Santander exposures across all geographies, taking into consideration segmentation, sensitivities and model calibration that were selected based on our knowledge of clients.

The key finding from the pilot exercise was that the Santander wholesale portfolio clients are especially resilient to the stress test, including climate-related transition impacts, and are able to adapt to the technological change requirements with limited impact on their credit quality.

The UNEP FI project has brought notable progress to climate risk assessment, but there is still room for improvement in the metrics

calculation. Overall, the test highlighted that more granular scenarios would need to be developed to address more sector-specific drivers and more diverse geographical assumptions (e.g. Latin American countries). The model, as it currently stands, is a deterministic model reliant on expert judgement, so its methodology and calibration need to evolve to improve the results and make them comparable between participating banks.

### **Risk Reporting Framework (RRF)**

Our reporting model has strengthened by consolidating the overall view of all risks, based on complete, precise and recurring information that allows the Group's senior management to assess the risk profile and decide accordingly.

The risk reporting taxonomy contains three types of reports received by senior management on a monthly basis: the Group risk report, the risk reports of each unit, and the reports of each of the risk factors identified in the Group's General risk corporate framework.

This risk reporting taxonomy has the following features:

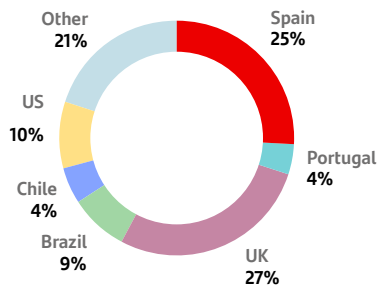
- It covers all significant risk areas. Reports maintain the due balance between data, analysis and qualitative comments, including forward-looking measures, risk appetite information, limits and emerging risks, and they are distributed to senior management.
- They are suitable for the Group's subsidiaries structure, combining a holistic view with a deeper analysis for each risk factor.
- They allow a uniform view, as each subsidiary may define its own reports based on local criteria, in addition to an aggregate view that enables for analysis of risks based on a common definition.

# 2. Risk map and risk profile

## Credit risk

[Section 3](#)

### Credit risk with customers<sup>A</sup> by country



**3.73%** ▼

Non-performing loan ratio  
-35 bp in 2018

→ Adequate sector and geographic diversification between mature and emerging markets.

→ Consolidation of the improvement trend in the Group's main credit indicators.

**1.00%** ▼

Cost of credit<sup>B</sup>  
-7 bp in 2018

A. Includes gross lending to customers, guarantees and documentary credits.

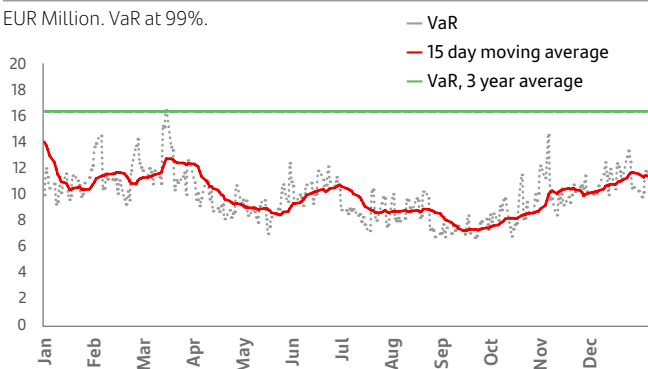
B. Cost of credit calculated as the percentage of loan-loss provisions twelve months of the average lending.

## Trading market risk, structural and liquidity risk

[Section 4](#)

### VaR 2018 evolution

EUR Million. VaR at 99%.



**158%** ▲

Comfortable short-term liquidity coverage ratio (LCR)  
+24 bp in 2018

→ Avg. VaR of the trading activity of SCIB remains at moderately low levels, as it is focused on customer services and has geographic diversification.

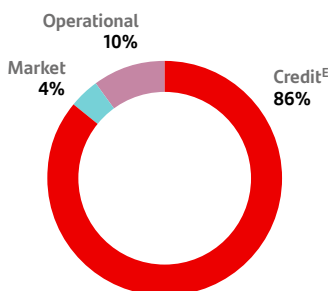
→ Comfortable liquidity position, based on our commercial strength and autonomous subsidiaries model, with a strong weighting of customer deposits and robust liquid asset buffers.

→ An appropriate balance sheet structure reduces the impact of interest rates changes on net interest income and equity.

## Capital risk

[Section 5](#)

### RWA<sup>C</sup> by risk type



**11.30%** ▲

CET fully Loaded<sup>D</sup>  
+46 bp in 2018

→ The main capital requirements correspond to credit risk, which is the core business of the Group, with a medium-low risk profile.

→ In the adverse scenario of the EBA stress test of November 2018, Santander is the bank with the least CET1 fully loaded destroyed among our European peers.

C. Risk Weighted Assets.

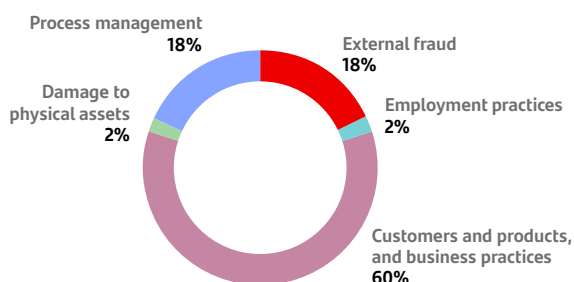
D. 2018 data calculated using the IFRS9 transitional arrangements.

E. Includes counterparty risk, securitisations and amounts below the thresholds for deduction.

## Operational risk

[Section 6](#)

### Net losses by operational risk categories



- Significant reduction in net losses compared to 2017, particularly in the Practices with Customers category.
- Improved risk analysis due to: incorporation of new risk appetite metrics, improvements in the process of determining critical controls and greater integration of operational risk in the Group's strategic exercises.
- Focus on: fraud risk mitigation, information security and cybersecurity, and supplier control.

## Compliance and conduct risk

[Section 7](#)

- Completion of the three-year strategic program, with the implementation of a series of initiatives.
- Digitalisation of the main processes of corporate operations, annual compliance program, product governance, Code of conduct in the securities market and operations with reputational risk validation.
- Promoting online collaboration with platforms and structured spaces for the exchange of information, money laundering and terrorism financing alert management optimisation.
- Deployment of the Regulatory Radar governance in the Group and units to support the monitoring of the new regulations.
- Implementation of a specific compliance program for GDPR and MiFID II in the Group's units.
- Consolidation of the supervision model regarding market abuse, reporting and escalation of events.

## Model risk

[Section 8](#)

- Supervisors and internal auditors focus on IRB and IMA regulatory models.
- A strategic project has been launched, model risk management 2.0 (MRM 2.0), to reinforce our model risk management.

The following sections detail the risk profile of the Group by risk factor. This risk profile might be affected by the macroeconomic, regulatory and competitive environment in which the Group performs its activities.



Further information can be found in the Economic and financial review chapter, section 1 'Economic, regulatory and competitive environment'.

## Strategic risk

[Section 9](#)

- The management model pursues a correct monitoring and control of strategic across the Group and its subsidiaries.
- Potential threats that may affect the strategic objectives are identified and assessed to take necessary mitigation actions.

The financial information is based on the aggregation of figures for the different geographical areas and business units within the Group. This information relates both to accounting data and those provided by the management information systems. In all cases, the same general principles are applied as those used in the Group.

The businesses included in each of our geographical segments and the accounting principles applied may differ from those used in the financial information prepared and disclosed by our subsidiaries which, by name or geographical description, may appear to correspond to the business areas contemplated in this report. Therefore, the results and trends shown here for our business areas may differ significantly from those of such subsidiaries.

The notes to the consolidated financial statements contain additional information regarding the Group's risks and other relevant information regarding provisions, litigation and other matters, including tax risks and litigation.

# 3. Credit risk

## 3.1 Introduction

Credit risk is the risk of financial loss arising from the default or credit quality deterioration of a customer or other third party, to which the Group has either directly provided credit or for which it has assumed a contractual obligation.

## 3.2 Credit risk management

The credit risk management process consists of identifying, analysing, controlling and deciding on the credit risk incurred by the Group's transactions. It considers a holistic view of the credit risk cycle including the transaction, customer and portfolio view. Both business and risk areas, together with the senior management participate in the management process.

The identification of credit risk is a key component for the active management and effective control of portfolios. The identification and classification of external and internal risks in each business allows corrective and mitigating measures to be adopted.

### Planning

Planning allows to set business targets and define specific action plans, within the risk appetite established by the Group. These targets are met by assigning the necessary means (models, resources, systems).

Strategic commercial plans (SCPs) are a basic management and control tool for the Group's credit portfolios. The SCPs are prepared jointly by the Commercial and Risk areas, and define the commercial strategies, risk policies and measures/infrastructures required to

meet the annual budget targets. These three factors are considered as a whole, ensuring a holistic view of the portfolio to be planned and allowing a map of all the Group's credit portfolios to be drawn.

SCP management integration provides an updated view on the credit portfolios quality, allows to measure credit risk, perform internal controls and periodic monitoring of planned strategies, anticipate deviations and identify significant changes in risk and its potential impact, as well as corrective actions.

The SCPs approval corresponds to the risk executive committee or equivalent body of each entity previous to its validation at Group level in the corporate risk executive committee. The periodic monitoring of SCPs is carried out by the same bodies that approve and validate them.

The process pursues the SCPs alignment with the capital objectives of the Group's units.

### Assessment of the risk and credit rating process

In order to assign a rating that reflects the credit quality of the customer, the Group uses valuation and parameter estimation models in each of the segments where it operates: SCIB (Santander Corporate & Investment Banking: sovereigns, financial institutions and large corporates), commercial banking, institutions, SMEs and individuals.

The decision models applied are based on credit rating drivers which are monitored and controlled to calibrate and precisely adjust the decisions and ratings they assign. Depending on the segment, drivers may be:

**1 Rating:** resulting from the application of mathematical algorithms incorporating a quantitative model based on balance sheet ratios or macroeconomic variables, and a qualitative module supplemented by the analyst's expert judgement. Used for the SCIB, commercial banking, institutions and SMEs (treated on an individual basis) segments.

**2 Scoring:** an automatic assessment system for credit applications. It automatically assigns an individual grade to the customer for subsequent decision-making.

Parameter estimation models are obtained through econometric statistical models, internally developed, based on historical loss and default of the portfolios for which they are developed and used to calculate the economic and regulatory capital, and the IFRS9 provision of each portfolio.

Periodic model monitoring and evaluation is carried out, assessing among others, the adequacy of its use, its predictive capacity, correct performance, and level of granularity. In the same way, the existence and compliance of the policies corresponding to each and every segment is verified (these policies enable the execution of business plans defined under the approved risk appetite).

The resulting ratings are regularly reviewed, incorporating the latest available financial and other information. The depth and frequency of the reviews are increased in the case of customers who require a more detailed monitoring or through automatic warnings in the systems.

#### Limits, pre-classifications and pre-approvals definition

The connection between the credit risk appetite of the Group and management of the credit portfolios is implemented through the SCPs, which define the portfolio and new originations limits to anticipate the portfolio risk profile. The cascading down of the Group's risk appetite framework credit risk metrics, strengthens the existing control over credit portfolios.

We have processes that determine the risk that the Group is able to assume with each customer. These limits are set jointly by the business and risk areas and have to be approved by the executive risk committee (or committees to which it has delegated such authority) and reflect the expected results of the business in terms of risk-return.

There are different limit models depending on the segment:

- **Large corporate groups:** we use a pre-classification model based on a system for measuring and monitoring economic capital. The result is the level of risk that the Group is willing to assume with a customer/group, in terms of Capital at risk, nominal CAP, and maximum periods according to the type of transaction (in the case of financial entities, limits are managed through Credit equivalent risk (CER). It includes the actual and expected risk with a customer based on its usual transactions, always within the limits defined in the risk appetite and established credit policies.
- **Corporates and institutions** that meet certain requirements (deep knowledge, rating, etc.): we use a more simplified pre-classification model through an internal limit that establishes a reference point in the level of risk to be assumed with the

customer. The criteria will include, among others, repayment capacity, debt in the system and the banking pool distribution.

In both cases, transactions over certain thresholds or with specific characteristics might require the approval of a senior analyst or committee.

- For **individual customers and SMEs** with low turnover, large volumes of credit transactions can be managed more easily with the use of automatic decision models for classifying the customer/ transaction binomial.

In specific situations where a series of requirements are met, pre-approved transactions are granted to customers or potential customers (campaigns).

#### Mitigation actions

As a general rule, from a risk admission point of view, the concession criteria are linked to the payment capacity of the borrower to comply with the total of the assumed financial obligations – this does not imply an impediment to requiring a higher level of real or personal guarantees.

The payment capacity will be evaluated based on the funds or net cash flows from the customer's businesses or usual sources of income, without depending on guarantors or assets given as collateral. Such guarantors or assets should always be considered, when evaluating the approval of the transaction, as a second and exceptional way of recovery in case the first has failed.

In general, a guarantee is defined as a reinforcement measure added to a credit transaction for the purpose of mitigating the loss due to a breach of the payment obligation.

Mitigation techniques implementation follow the minimum requirements established in the Guarantee management policy: legal certainty (possibility of legally requiring the settlement of guarantees at all times), the lack of substantial positive correlation between the counterparty and the value of the collateral, the correct documentation of all guarantees, the availability of documentation for the methodologies used for each mitigation technique and appropriate monitoring, traceability and regular control of the goods/assets used for the guarantee.

In Santander we apply several credit risk mitigation techniques on the basis, among other factors, of the type of customer and product. Some are inherent to specific transactions (e.g. real estate guarantees) while others apply to a series of transactions (e.g. derivatives netting and collateral). The different mitigation techniques can be grouped into the following categories:

- Personal guarantees
- Guarantees from credit derivatives
- Real guarantees

Effective guarantees are those real and personal guarantees for which its effectiveness as a credit risk mitigant is proved and whose valuation complies with the established policies and procedures. The analysis of the effectiveness of the guarantees must take into account, among others, the necessary time for the execution and ability to enforce the guarantees.

## Scenario analysis

As described in Scenario analysis in section 1.3 'Management processes and tools', credit risk scenario analysis enables senior management to better understand the portfolio evolution in the face of market conditions and changes in the environment. It is a key tool for assessing the sufficiency of capital provisions for stress scenarios.

Scenario analysis is applied to all of the Group's significant portfolios, usually over a 3-year horizon. The process involves the following main stages:

- **Definition of benchmark scenarios**, either central or most plausible scenarios (baseline), as well as less likely and more adverse economic scenarios (stress scenarios). A global stress scenario is a world crisis situation that impacts each of the countries in which the Group operates. In addition, a local stress scenario impacts in an isolated way some of the main units with a greater degree of stress than the global stress scenario.

These scenarios are defined by the Group's Research department in coordination with each unit, using figures published by leading international institutions as a benchmark.

All scenarios are backed by a rationale and are verified and reviewed by all areas involved in the simulation process.

- **Determination of risk parameters value** (probability of default, loss given default, etc.) for the scenarios defined. These parameters are established using internally developed **statistical-econometric models**, based on default and historical losses, in relation to historical data for macroeconomic variables taking into consideration a complete economic cycle.

The forecasting models follow the same development, validation and governance cycles as other internal models of the Group. They are subject to regular backtesting and recalibration to ensure they correctly capture the relationship between macroeconomic variables and the risk parameters.

- **Adaptation of the projection methodology to IFRS9**, with an impact on the estimation of the **expected loss** in each of the IFRS9 stages, associated with each of the scenarios put forward, as well as with other **important credit risk metrics** deriving from the parameters obtained (non-performing loans, provisions, allowances, etc.).
- **Analysis and rationale for the credit risk profile evolution** at portfolio, segment, unit and Group levels, in different scenarios and compared to previous years.
- **Integration of management indicators** to supplement the analysis of the impact caused by macroeconomic factors on risk metrics.
- Likewise, the process is completed with a set of **controls and backtesting** that ensure the adequacy of metrics and calculations.

The entire process takes place within a corporate governance framework, and is adapted to the growing importance of this framework as well as market best practices, assisting the Group's senior management in gathering knowledge for decision-making.

## Monitoring

Monitoring business performance on a regular basis, and comparing performance against agreed plans is a key risk management activity.

All customers must be monitored on an ongoing and holistic manner that enables the earliest possible detection of any incidents that may arise impacting the customer's credit rating. Monitoring is carried out through an ongoing review of all customers, assigning a monitoring classification, establishing pre-defined actions associated to each classification and executing specific measures (pre-defined or ad-hoc) to correct any deviations that could have a negative impact for the Group.

In this monitoring, the consideration of forecasts and transactions characteristics throughout its life, is assured. It also takes into consideration any variations that may have occurred in the classification and its adequacy in the moment of the review.

Monitoring is carried out by local and global Risk teams, supplemented by Internal Audit. It is based on customer segmentation:

- In the SCIB segment, monitoring, in the first instance, is a direct function of both the commercial manager and the risk analyst, who maintain the direct relationship with the customer and manage the portfolio. This function allows that an up-to-date view of the customers' credit quality is always available and allows anticipating situations of concern and taking the necessary actions.
- In the commercial banking, institutions and SMEs with an analyst assigned, the function consists in identifying and tracking customers whose situations require closer monitoring, reviewing ratings and continuously analysing indicators.
- In the individual customers, businesses and SMEs with low turnover segments monitoring is carried out through automatic alerts for the main indicators, in order to detect shifts in the performance of the loan portfolio with respect to the forecasts in strategic plans.

During 2018, the Group's Customer watch list policy was replaced with a new Santander customer assessment note monitoring system (SCAN) that will be implemented in the Group's units during 2019.

The Group's SCAN system aims to establish the level of monitoring, policies and specific actions for all customers with individualised treatment, based on their credit quality and their particular circumstances. Each customer is assigned a level of monitoring, and specific risk management actions, in a dynamic manner, with a specific manager and an established periodicity.

In addition to customers' credit quality monitoring, Santander establishes the control procedures needed to analyse portfolios and their performance, as well as possible deviations regarding planning or approved alert levels.

The function establishes as main axes, the control by countries, business areas, management models, products, among others, facilitating early detection of specific attention points, as well as preparing action plans to correct any deteriorations.

Portfolio analysis permanently and systematically controls the evolution of credit risk with regard to budgets, limits and benchmark standards, assessing the impacts of future situations, both exogenous and resulting from strategic decisions, to establish measures to bring the risk portfolio profile and volumes within the parameters set by the Group and in line with its risk appetite.

### Recovery and collections management

Recovery activity is a significant element in the Group's risk management. This function is carried out by the Recoveries area, which defines a global strategy and an enterprise-wide focus for recovery management.

The Group has a corporate recovery management model that sets the guidelines and general lines of action to be applied in the different countries, taking always into account the local particularities that the recovery activity requires, such as economic environment, business model or a mixture of both.

Recovery has been aligned with the socio-economic reality of the Group's countries and different risk management mechanisms are used with adequate prudential criteria considering unpaid debt conditions.

The Recoveries area directly manage customers, where sustained value creation is based on effective and efficient collection management. The new digital channels are becoming increasingly important in recovery management, developing new forms of customer relations.

The diverse features of Santander's customers make segmentation necessary in order to manage recoveries adequately. Mass management of large groups of customers with similar profiles and products is conducted through processes with a high technological and digital component, while personalised management focuses on customers who, because of their profile, require a specific manager and more customised management.

Recovery management is divided into four phases: in arrears, non-performing loans recoveries, write-offs recoveries and management of foreclosed assets.

The management scope for the recovery function includes non-productive assets (NPAs), corresponding to the forborne portfolios, NPLs, write-off loans and foreclosed assets, where the Group may use mechanisms to rapidly reduce these assets, such as portfolios

or foreclosed assets sales. Therefore, the Group is constantly seeking alternative solutions to juridical processes for collecting debt.

In the write-off loans category, debt instruments are included, whether due or not, for which, after an individualised analysis, their recovery is considered remote due to a notorious and unrecoverable impairment of the solvency of the transaction or the holder. Classification in this category involves full or partial cancellation of the gross carrying amount of the loan and its derecognition, which does not mean that the Group interrupts negotiations and legal proceedings to recover its amount.

The Group employs specific policies for recovery management that include the principles of the different recovery strategies, while always ensuring the required rating and provisions are maintained and these policies have been updated with IFRS9 implementation, where the most significant change relates to the classification of transactions and the provisions calculation.

In countries with a high exposure to real estate risk, the Group has efficient sales management instruments that enable to maximise the recovery and reduce balance sheet stock.

### Forborne portfolio

The Group has an internal Forbearance policy which acts as a reference for the different local transpositions of all its subsidiaries and shares the principles established by the regulation and the applicable supervisory expectations. This policy includes the requirements arising from the implementation of IFRS9.

This policy defines forbearance as the modification of the payment conditions of a transaction to allow a customer who is experiencing financial difficulties (current or foreseeable), to fulfil their payment obligations. If the modification was not made, it would be reasonably certain that the customer would not be able to meet their financial obligations. The modification could be made to the original transaction or through a new transaction replacing the previous one.

In addition, this policy also sets down rigorous criteria for the evaluation, classification and monitoring of such transactions, ensuring the strictest possible care and diligence in their granting and monitoring. Therefore, the forborne transaction must be focused on recovery of the amounts due and the payment obligations must be adapted to the customer's actual situation and, in addition losses must be recognised as soon as possible if any amounts are deemed irrecoverable.

Forbearances may never be used to delay the immediate recognition of losses or to hinder the appropriate recognition of risk of default.

Further, the policy defines the classification criteria for the forborne transactions in order to ensure that the risks are suitably recognised, bearing in mind that they must remain classified as non-performing or in watch-list for a prudential period of time (aligned with Regulation EU 680/2014) to attain reasonable certainty that repayment capacity can be recovered.

The forbore portfolio stood at EUR 41,234 million at the end of December. In terms of credit quality, 49% is classified as non-performing loans, with average coverage of 53% (26% of the total portfolio).

### Key figures of forbore portfolio

EUR million

	2018	2017	2016
Performing	20,877	27,661	29,771
Non-performing	20,357	20,044	18,689
<b>Total Forborne</b>	<b>41,234</b>	<b>47,705</b>	<b>48,460</b>
<b>% Coverage<sup>A</sup></b>	<b>26%</b>	<b>24%</b>	<b>23%</b>

A. Total loan-loss allowances/total forbore portfolio.

Regarding its evolution, the Group's forbore portfolio decreased by 13.6% in 2018, in line with the trend of previous years.

## 3.3 Key metrics

### Changes in perimeter

#### Banco Popular

On 7 June 2017, the Group acquired Banco Popular (Popular) and its results and balance sheet were disclosed in the Banco Popular unit.

In this chapter, Popular results and balance sheets, both from 2017 and 2018, are allocated to the different geographical areas of the Group (unless stated otherwise), mainly Spain, Portugal and Spain real estate activity.

#### Deutsche Bank Polska

In Poland, a country with one of the highest growth rates in Europe, we have concluded the acquisition of Deutsche Bank Polska retail portfolio (of approximately EUR 4,500 million), thus reinforcing our position as one of the main banks in the country.

### 2018 general performance

Risk is diversified among the main regions where the Group operates: Continental Europe (45%), United Kingdom (27%), Latin America (18%) and the United States (10%), with an adequate balance between mature and emerging markets.

The evolution up to December 2018, credit risk with customers increased by 4% vs. 2017, considering the same perimeter, mainly due to the United States, United Kingdom, and Mexico. Growth in local currency was generalised across all units with the exception of Spain and Portugal.

These levels of lending, together with lower non-performing loans (NPLs) of EUR 35,692 million (-5.1% vs. 2017) reduced the Group's NPL ratio to 3.73% (-35 bp against 2017).

In order to cover potential losses arising from these NPLs, in accordance with the new provision calculation in accordance with IFRS9, the Group recorded allowances for loan loss of EUR 8,873 million (-2.6% vs. December 2017), after deducting post write-off recoveries. This decrease is materialised in a reduction of the cost of credit to 1.00 % (7 bp less than the previous year).

Total loan-loss allowances were EUR 24,061 million, bringing the Group's coverage ratio to 67%, taking into consideration that 62% of the Group net customer loans are secured. It is important to bear in mind that the coverage ratio is affected downwards by the weight of mortgage portfolios (particularly in the UK and Spain), as lower provisions are required due to the existing collateral, which mitigates potential losses.

The tables below show the main metrics performance related to credit risk derived from our activity with customers:

### Main credit risk performance metrics from our activity with customers

Dec. 2018 data

	Credit risk with customers <sup>A</sup> (EUR million)			Non-performing loans (EUR million)			NPL ratio (%)		
	2018	2017	2016	2018	2017	2016	2018	2017	2016
<b>Continental Europe</b>	<b>9,454</b>	<b>424,248</b>	<b>331,706</b>	<b>2,537</b>	<b>24,674</b>	<b>19,638</b>	<b>5.25</b>	<b>5.82</b>	<b>5.92</b>
Spain	39,479	251,433	172,974	14,833	15,880	9,361	6.19	6.32	5.41
Santander Consumer Finance	97,922	92,589	88,061	2,244	2,319	2,357	2.29	2.50	2.68
Portugal	8,340	39,394	30,540	2,279	2,959	2,691	5.94	7.51	8.81
Poland	30,783	24,391	21,902	1,317	1,114	1,187	4.28	4.57	5.42
<b>UK</b>	<b>62,196</b>	<b>247,625</b>	<b>255,049</b>	<b>2,755</b>	<b>3,295</b>	<b>3,585</b>	<b>1.05</b>	<b>1.33</b>	<b>1.41</b>
<b>Latin America</b>	<b>1,898</b>	<b>167,516</b>	<b>173,150</b>	<b>7,461</b>	<b>7,464</b>	<b>8,333</b>	<b>4.34</b>	<b>4.46</b>	<b>4.81</b>
Brazil	84,212	83,076	89,572	4,418	4,391	5,286	5.25	5.29	5.90
Mexico	33,764	28,939	29,682	822	779	819	2.43	2.69	2.76
Chile	41,268	40,406	40,864	1,925	2,004	2,064	4.66	4.96	5.05
Argentina	5,631	8,085	7,318	179	202	109	3.17	2.50	1.49
<b>US</b>	<b>92,152</b>	<b>77,190</b>	<b>91,709</b>	<b>2,688</b>	<b>2,156</b>	<b>2,088</b>	<b>2.92</b>	<b>2.79</b>	<b>2.28</b>
SBNA	51,049	44,237	54,040	450	536	717	0.88	1.21	1.33
SC USA	26,424	24,079	28,590	2,043	1,410	1,097	7.73	5.86	3.84
<b>Total Group</b>	<b>58,153</b>	<b>920,968</b>	<b>855,510</b>	<b>5,692</b>	<b>37,596</b>	<b>33,643</b>	<b>3.73</b>	<b>4.08</b>	<b>3.93</b>

	Coverage ratio (%)			Net ASR <sup>B</sup> provisions (EUR million)			Cost of credit (%/risk) <sup>C</sup>		
	2018	2017	2016	2018	2017	2016	2018	2017	2016
<b>Continental Europe</b>	<b>52.2</b>	<b>54.4</b>	<b>60.0</b>	<b>,399</b>	<b>1,109</b>	<b>1,342</b>	<b>.36</b>	<b>0.31</b>	<b>0.44</b>
Spain	45.0	46.8	48.3	728	603	585	.33	0.30	0.37
Santander Consumer Finance	106.4	101.4	109.1	360	266	387	.38	0.30	0.47
Portugal	50.5	62.1	63.7	32	12	54	.09	0.04	0.18
Poland	67.1	68.2	61.0	161	137	145	.65	0.62	0.70
<b>UK</b>	<b>33.0</b>	<b>32.0</b>	<b>32.9</b>	<b>173</b>	<b>205</b>	<b>58</b>	<b>.07</b>	<b>0.08</b>	<b>0.02</b>
<b>Latin America</b>	<b>97.3</b>	<b>85.0</b>	<b>87.3</b>	<b>,567</b>	<b>4,972</b>	<b>4,911</b>	<b>.95</b>	<b>3.15</b>	<b>3.37</b>
Brazil	106.9	92.6	93.1	,963	3,395	3,377	.06	4.36	4.89
Mexico	119.7	97.5	103.8	830	905	832	2.75	3.08	2.86
Chile	60.6	58.2	59.1	473	462	514	1.19	1.21	1.43
Argentina	135.0	100.1	142.3	231	159	107	.45	1.85	1.72
<b>US</b>	<b>142.8</b>	<b>170.2</b>	<b>214.4</b>	<b>,618</b>	<b>2,780</b>	<b>3,208</b>	<b>.27</b>	<b>3.42</b>	<b>3.68</b>
SBNA	122.1	102.2	99.6	108	116	120	.24	0.25	0.23
SC USA	154.6	212.9	328.0	2,501	2,590	2,992	.01	9.84	10.72
<b>Total Group</b>	<b>67.4</b>	<b>65.2</b>	<b>73.8</b>	<b>,873</b>	<b>9,111</b>	<b>9,518</b>	<b>.00</b>	<b>1.07</b>	<b>1.18</b>

A. Includes gross loans and advances to customers, guarantees and documentary credits.

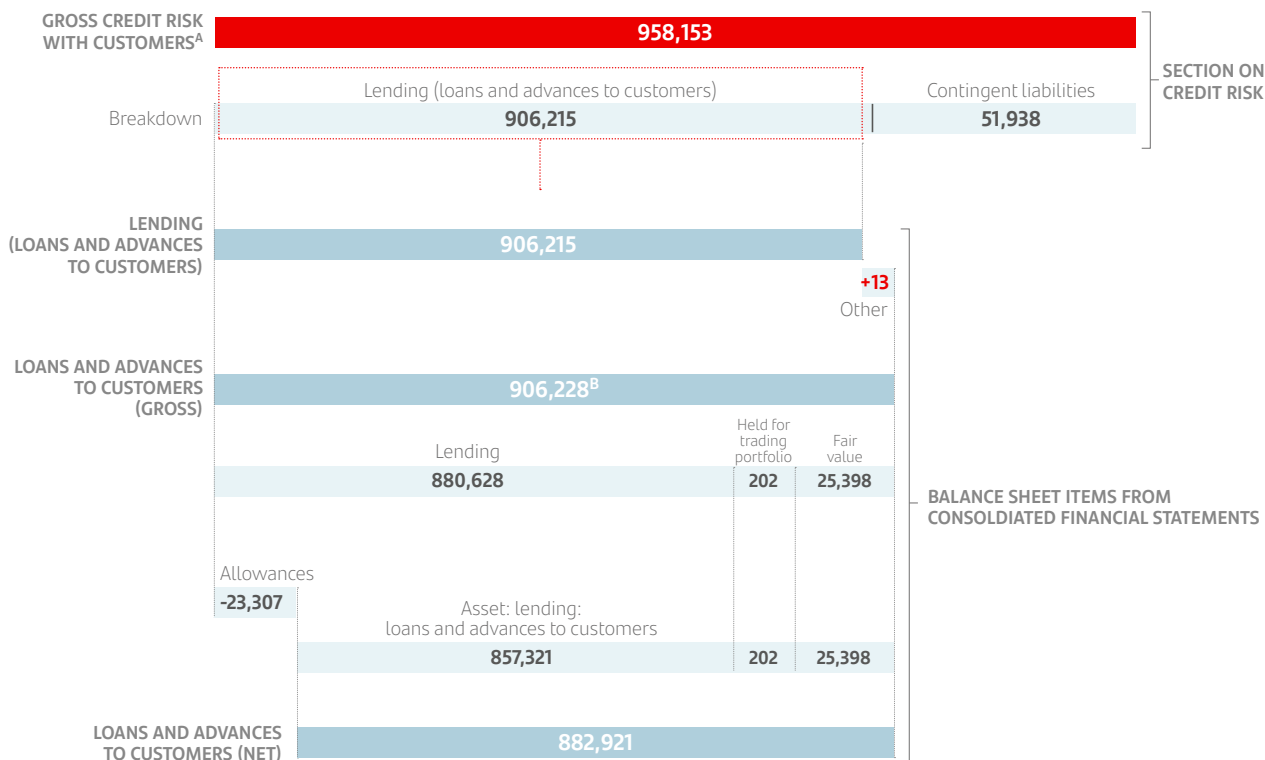
B. Recovered write-off assets (EUR 1,558 million).

C. Cost of credit = loan-loss provisions twelve months/average lending.

### Key figures reconciliation

The 2018 consolidated financial statements details the customer loans portfolio, both gross and net of funds. Credit risk also includes off-balance sheet risk. The following table shows the relation between the concepts that comprise these figures:

EUR million



A. Includes gross loans and advances to customers, guarantees and documentary credits.

B. Before loan-loss allowances.

### Geographical distribution and segmentation

The Group's risk function is organised on the basis of three types of customers:

- **Individuals:** includes all individuals, except those with a business activity. This segment is, in turn, divided into sub-segments by income levels, which enables risk management by customer type.

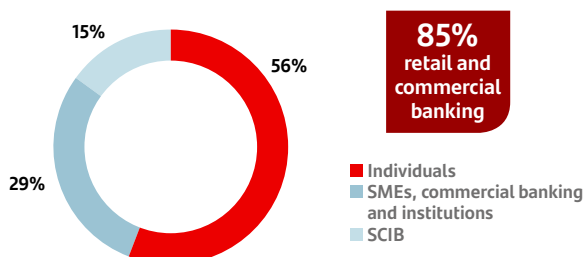
Mortgages to individuals represent approximately 36% of the Group net customer loans. These mortgages are focused in Spain and the UK, and are mainly residential mortgages with a low risk profile, low non-performing ratios and an appropriate coverage ratio. This low risk profile produces low related losses.

- **SMEs, commercial banking and institutions:** includes companies and individuals with business activity. It also includes public sector activities in general and private sector non-profit entities.

- **Santander Corporate & Investment Banking (SCIB):** consists of corporate customers, financial institutions and sovereigns, comprising a closed list that is revised annually. This list is determined based on a full analysis of the company (business type, level of geographic diversification, product types, volume of revenues it represents for the Group, etc.).

The following chart shows the distribution of credit risk on the basis of its management model (includes gross loans and advances to customers, guarantees and documentary credits):

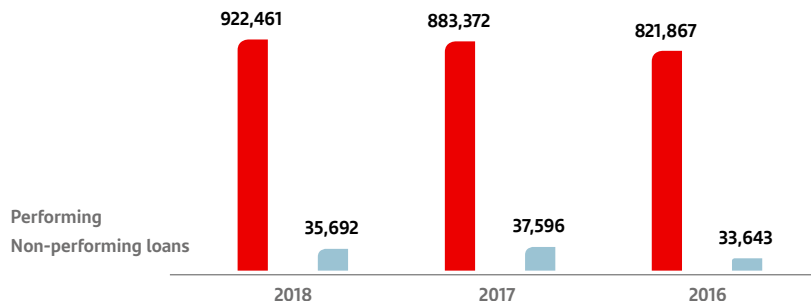
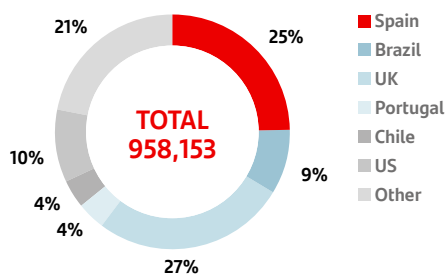
### Credit risk distribution



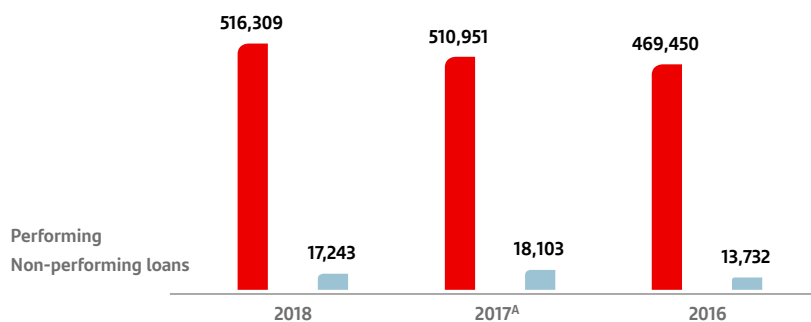
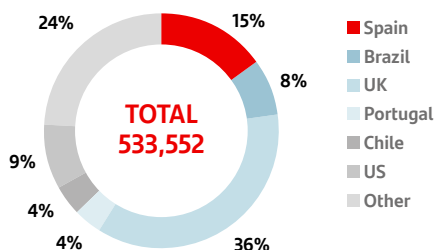
Taking into consideration the aforementioned segmentation, the geographical distribution and situation of the portfolios is shown in the following charts:

EUR million

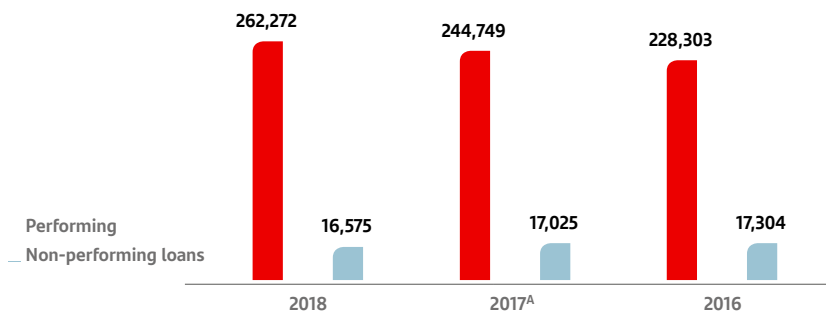
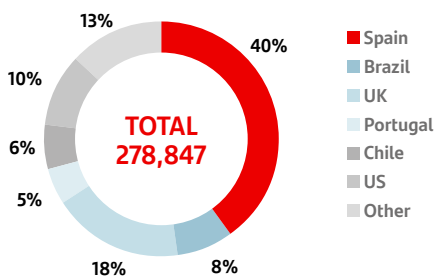
**Total**



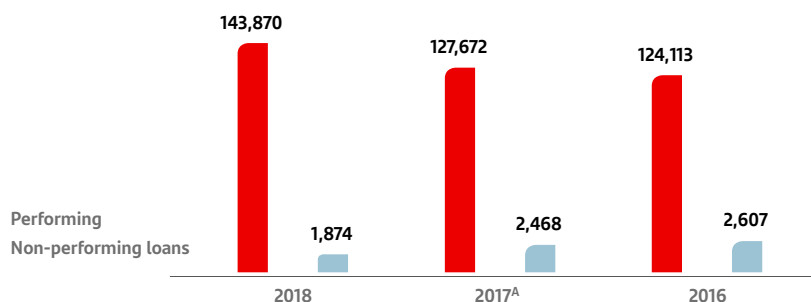
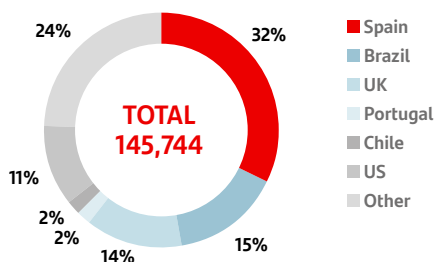
**Individuals**



**SMEs, Commercial Banking and Institutions**



**SCIB**



A. Proxies applied for 2017 data.

The key figures by geographical area are commented below:

#### • Continental Europe

- In **Spain**<sup>1</sup>, the NPL ratio dropped to 6.19% (-13 bp compared to 2017), due mainly to the better performance of the portfolio, the normalisation of several restructured positions and portfolio sales.
- In **Portugal**, recoveries and distressed portfolio sales allowed for the reduction of the non-performing loans, placing the NPL ratio at 5.94% (-157 bp vs. 2017).
- In **Poland**, the downward trend of the NPL ratio continued, placing it at 4.28% (-29 bp vs. 2017), thanks to a proactive management of the non-performing portfolio through portfolio sales, as well as the incorporation of the new retail portfolio from Deutsche Bank.
- In **Santander Consumer** the NPL ratio was 2.29% (-21 bp in the year), due to good overall performance of the portfolios in general, across all its geographies.

- **United Kingdom**<sup>2</sup> reduced its NPL ratio, standing at 1.05% (-28 bp in the year) due to the good performance of all segments in general, as well as the single names management in the Corporates portfolio. The coverage ratio remained stable at 33%, thanks to the significance proportion of secured loans with real guarantees.

#### • Latin America:

- **Brazil**<sup>3</sup>, thanks to the robustness of its risk management model, as well as the proactive policies applied in the retail portfolios, the NPL ratio decreased to 5.25% (-4 bp compared to the end of 2017). The coverage ratio was 107% (+14 pp in the year), due to the implementation of IFRS9.
- **Chile** reduced its NPL ratio to 4.66% (-30 bp in the year) thanks to the good performance in non-performing loans, mainly in individuals, together with a significant growth in exposure that benefited from the country's favourable macroeconomic situation reflected in the country's main indicators.
- In **Mexico** the NPL ratio fell to 2.43% (-26 bp in the year), mainly due to the normalisation of the Individuals segment performance.
- In **Argentina** the NPL ratio increased up to 3.17% (+67 bp in the year) due to the difficult economic situation of the country, which is affecting especially the Individuals segment. An action plan is already in place begin to show positive results. The coverage ratio improves to 135% due to provisions increases made in certain economic groups as a preventive measure against the country's macroeconomic deterioration.

- In the **United States**<sup>4</sup> the NPL ratio stood at 2.92% (+13% in the year) with the coverage ratio remaining at high levels, at 143%.
- At **Santander Bank N.A.** the NPL ratio was 0.88% (-33 bp in the year), due to the proactive management of certain exposures, the favourable evolution of the macroeconomic environment, is reflected in the credit risk profile improvement of the corporates portfolio and the good performance of the individual portfolio.
- In **SC USA** the NPL ratio was 7.73%, mainly due to the maturity of those loans that were forborne in 2017 which included the support to customers affected by hurricane season.

#### Amounts past due (performing loans)

Amounts past due by three months or less represented 0.34% of total credit risk with customers. The following table shows the structure at 31 December 2018, classified on the basis of the first maturity:

#### Amounts past due. Maturity detail

EUR million

	Less than 1 month	1 to 2 months	2 to 3 months
Loans and advances to credit institutions	14	1	-
Loans and advances to customers	2,023	629	617
Public administrations	5	-	-
Other private sector	2,018	629	617
Debt instruments	-	-	-
<b>TOTAL</b>	<b>2,037</b>	<b>630</b>	<b>617</b>

#### Impairment of financial assets

The main change in determining the financial assets hedge due to their impairment is that the new accounting standard, IFRS9, introduces the concept of expected loss compared to the previous model of incurred loss.

The IFRS9 impairment model applies to financial assets valued at amortised cost, debt instruments valued at fair value with changes reported in other comprehensive income, lease receivables, and commitments and guarantees given not valued at fair value.

The portfolio of financial instruments subject to IFRS9 is divided into three categories, or stages, depending on the status of each instrument in relation to its level of credit risk.

- Stage 1: financial instruments for which no significant increase in risk is identified since its initial recognition. In this case, the impairment provision reflects expected credit losses arising from defaults over the following twelve months from the reporting date.
- Stage 2: if there has been a significant increase in risk since the date of initial recognition but the impairment event has not

1. Does not include real estate activity. Further information is available in section 3.4 'Detail of main geographies' - Spain.

2. More information available in section 3.4 'Detail of main geographies' - United Kingdom.

3. More information available in section 3.4 'Detail of main geographies' - Brazil.

4. More information available in section 3.4 'Detail of main geographies' - United States.

materialised, the financial instrument is classified as Stage 2. In this case, the impairment provision reflects the expected losses from defaults over the residual life of the financial instrument

- Stage 3: a financial instrument is catalogued in this stage when it shows effective signs of impairment as a result of one or more events that have already occurred resulting in a loss. In this case, the amount of the impairment provision reflects the expected losses for credit risk over the expected residual life of the financial instrument.

The following table shows the credit risk exposure by each of these stages exposure by geography:

### Exposure by stage and by geography

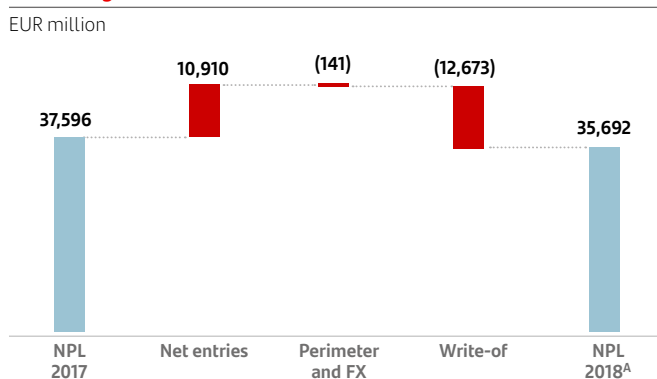
EUR million	Stage 1	Stage 2	Stage 3	Total <sup>A</sup>
<b>Continental Europe</b>	<b>373,675</b>	<b>20,877</b>	<b>22,529</b>	<b>417,082</b>
Spain	199,457	13,128	14,833	227,419
SCF	90,878	4,715	2,241	97,833
Portugal	34,086	1,974	2,279	38,340
Poland	28,187	1,060	1,312	30,559
<b>UK</b>	<b>243,419</b>	<b>12,958</b>	<b>2,755</b>	<b>259,132</b>
<b>Latin America</b>	<b>154,387</b>	<b>9,523</b>	<b>7,461</b>	<b>171,370</b>
Brazil	74,184	5,472	4,418	84,074
Mexico	31,371	1,184	822	33,378
Chile	37,085	2,259	1,925	41,268
Argentina	5,072	381	179	5,631
<b>US</b>	<b>73,719</b>	<b>9,927</b>	<b>2,684</b>	<b>86,330</b>
SBNA	47,394	3,021	450	50,866
SC USA	17,903	6,470	2,043	26,417
<b>Total Group</b>	<b>845,200</b>	<b>53,285</b>	<b>35,670</b>	<b>934,155</b>

A. Excluding EUR 23,998 million from balance not subject to impairment accounting.

In addition, the amount due to the impairment provision reflects the expected credit risk losses over the expected residual life in those financial instruments Purchased or Originated Credit Impaired (POCI).

The evolution of the financial instruments with effective signs of impairment (stage 3) are shown below:

### Non-performing loans evolution according to constituent item

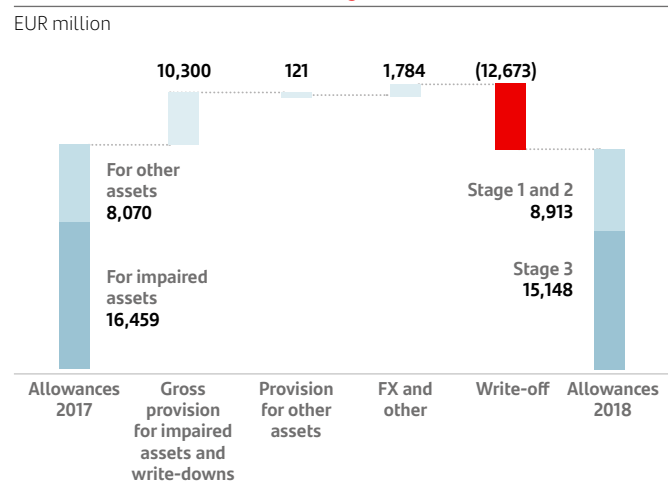


A. Includes EUR 22 million of NPL not subject to impairment accounting.

### 2016 - 2018 NPL evolution

	2016	2017	2018
<b>NPL (start of period)</b>	<b>37,094</b>	<b>33,643</b>	<b>37,596</b>
Stage 3	-	-	37,571
NPL not subject to impairment accounting	-	-	25
Net entries	7,362	8,269	10,910
Perimeter	734	10,032	177
FX and others	1,211	(826)	(318)
Write-off	(12,758)	(13,522)	(12,673)
<b>NPL (end of period)</b>	<b>33,643</b>	<b>37,596</b>	<b>35,692</b>
Stage 3	-	-	35,670
NPL not subject to impairment accounting	-	-	22

### Allowances evolution according to constituent item



### 2016 - 2018 allowances evolution

	2016	2017	2018
<b>Allowances (start of period)</b>	<b>27,121</b>	<b>24,835</b>	<b>24,529</b>
For impaired assets	17,706	15,466	16,459
For other assets	9,414	9,369	8,070
Gross provision for impaired assets and write-downs	11,045	11,607	10,300
Provision for other assets	52	(881)	121
FX and other	(625)	2,490	1,784
Write-off	(12,758)	(13,522)	(12,673)
<b>Allowances (end of period)</b>	<b>24,835</b>	<b>24,529</b>	<b>24,061</b>
Stage 1 and 2	-	-	8,913
Stage 3	-	-	15,148

The methodology required for the quantification of expected loss due to credit events will be based on an unbiased and weighted consideration of the occurrence of up to five possible future scenarios that could impact the collection of contractual cash flows, taking into account the time-value of money, all available information relevant to past events, and current conditions and projections of macroeconomic factors deemed relevant to the estimation of this amount (e.g. GDP, house pricing, unemployment rate, etc.).

In estimating the parameters used for impairment provisions calculation (EAD, PD, LGD and discount rate), the Group leverages its experience in developing internal models for calculating parameters for regulatory and internal management purposes. The Group is aware of the differences between such models and regulatory requirements for provisions. As a result, it has focused on adapting the development of its IFRS9 impairment provisions models to such requirements.

- **Determination of significant increase in risk:** for the purpose of determining whether a financial instrument has increased its credit risk since initial recognition, proceeding with its classification into stage 2, the Group considers the following criteria:

- Quantitative criteria: changes in the risk of a default occurring through the expected life of the financial instrument are analysed and quantified with respect to its credit level in its initial recognition.

For the purpose of determining if such changes are considered as significant, with the consequent classification into stage 2, each unit has defined the quantitative thresholds to consider in each of its portfolios taking into account corporate guidelines and ensuring a consistent interpretation across all geographies.

- Qualitative criteria: in addition to the quantitative criteria mentioned above, the Group considers several indicators that are aligned with those used in ordinary credit risk management (e.g. over 30 days past due, forbearances, etc.). Each unit has defined these qualitative criteria for each of its portfolios, according to its particularities and policies that are currently in force.

The use of these qualitative criteria is complemented with the application of expert judgement.

- **Default definition:** the definition considered for impairment provisioning purposes is consistent with that used in the development of advanced models for regulatory capital requirements calculations. The Group is currently working to adapt the definition of default under new standard (EBA Guidelines on the application of the definition of default under Article 178 of the CRR), according to the scheduled plan.

- **Use of present, past and future information:** estimation of expected losses requires a high component of expert judgement and it must be supported by past, present and future information. Therefore, these expected loss estimates take into consideration multiple macroeconomic scenarios for which the probability is measured considering past events, current situation and future trends and macroeconomic indicators, such as GDP or unemployment rate.

The Group already uses forward looking information in internal management and regulatory processes, incorporating several scenarios. In this sense, the Group has leveraged its experience in the management of such information, maintaining consistency with the information used in the other processes.

- **Expected life of the financial instrument:** with the purpose of its estimation all the contractual terms have been taken into account (e.g. prepayments, duration, purchase options, etc.), being the contractual period (including extension options) the maximum period considered to measure the expected credit losses. In the case of financial instruments with an uncertain maturity period and a component of undrawn commitment (e.g. credit cards), expected life is estimated considering the period for which the entity is exposed to credit risk and the effectiveness of management practices mitigates such exposure.

- **Impairment recognition:** the main change with respect to the current standard related to assets measured at fair value with changes recognised through other comprehensive income. The portion of the changes in fair value due to expected credit losses will be recorded at the current profit and loss account while the rest will be recorded in other comprehensive income.

## 3.4 Detail of main geographies

### United Kingdom

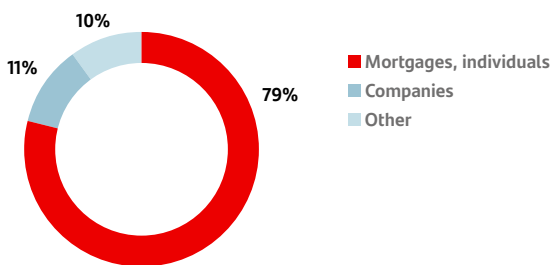
#### Portfolio overview

Credit risk with customers in the UK amounted to EUR 262,196 million as of December 2018, which means an increase, of 6% compared to year-end 2017 (increase of 7% in local currency), and representing 27% of the Group's total loans portfolio.

The NPL ratio fell to 1.05% at the end of December (-28 bp compared to year-end 2017), thanks to the good macroeconomic environment and the application of prudent policies, within the risk appetite framework. Therefore, the amount of non-performing loans decreased by 16%, following the trend observed in previous years, thanks to the good performance of the portfolios and the management of single names in the Companies segment.

Santander UK portfolio is divided into the following segments:

Portfolio segmentation



Due to its relevance, not only for Santander UK, but also for the entire credit risk exposure of the Group, it is noteworthy the portfolio of mortgage loans to individuals, detailed below.

Mortgage portfolio

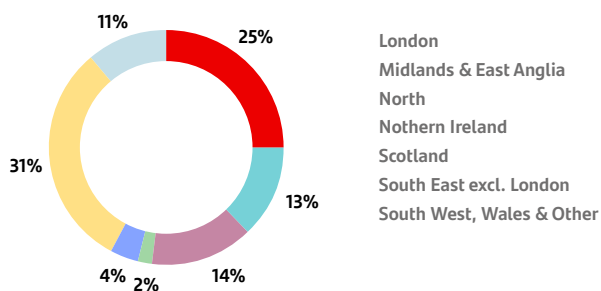
This portfolio at the end of December 2018 amounted to EUR 176,581 million (2.1% growth in the year). It consists of residential mortgages granted to new and existing customers, and all are first mortgages. There are no transactions that entail second or successive liens on mortgaged properties.

The real estate market has shown strong resilience with over 1.3% price growth in the year and a stable number of transactions.

Geographically, credit exposures are predominantly concentrated in the south east area of the UK and, particularly, in the metropolitan area of London.

Geographical concentration

Dec. 18 data



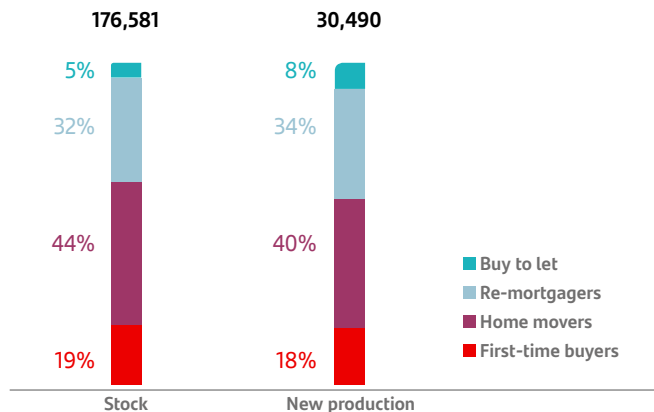
All properties are valued independently before each new transaction is approved, in accordance with the Group's risk management principles.

The value of the property used as collateral for mortgages that have already been granted is updated quarterly by an independent agency, using an automatic valuation system in accordance with market practices and applicable legislation.

The distribution of the portfolio by type of borrower is shown in the chart below:

Mortgage portfolio loan type

EUR million



- A. First time buyer: customers who purchase a home for the first time.
- B. Home mover: customers who change houses, with or without changing the bank granting the loan.
- C. Remortgage: customers who switch the mortgage from another financial entity.
- D. Buy to let: houses bought for renting out.

Santander UK offers a wide range of mortgage products that are aligned with its policies and risk limits. The characteristics of some of them are described below:

- **Interest only loans (32%)<sup>5</sup>:** the customer pays the interest every month and repays the capital at maturity. An appropriate repayment vehicle such as a pension plan, mutual fund, etc. is required. This is a common product in the UK market for which Santander UK applies restrictive policies in order to mitigate inherent risks. For example: a maximum loan to value (LTV) of 50%, more stringent approval criteria and assessment of payment capacity, simulating the repayment of capital and interest instead of just interest.
- **Flexible loans (8%):** the contract for this type of loan enables the customer to modify their monthly payments or make additional drawdowns of funds up to a previously pre-established limit, under various conditions.
- **Buy to let (5%):** buy to let mortgages (purchase of a property to rent out) account for a small percentage of the total portfolio, with approval subject to strict risk policies. In December 2017, these represented approximately 8% of total underwriting and 4% of the remaining portfolio.

The good performance of the mortgage portfolio is reflected in the NPL ratio, which remained moderate at 1.21% at the end of December (+8 bp regarding the previous year). Thanks to the application of prudent admission policies an affordability rate of

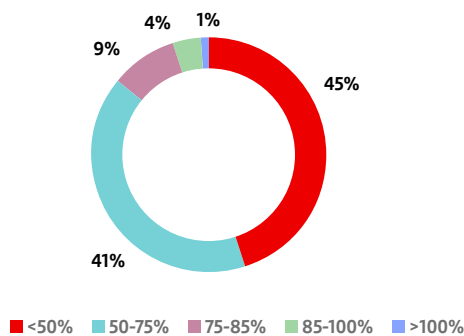
5. Percentage calculated for loans with total or some interest only component.

the new production is maintained at 3.24 compared to 3.16 the previous year, with a reduced volume of foreclosed properties, which in December 2018 amounted to EUR 25.2 million, 0.02% of total mortgage exposure.

These policies have also allowed the simple average LTV of the portfolio to stand at 42% and the average weighted LTV at 39%. The proportion of the portfolio with LTV between 85% and 100% is at low levels, around 4%.

The following charts show the LTV structure for the stock of residential mortgages as of December 2018:

### Loan to Value<sup>A</sup>



A. Loan to value: relation between the amount of the loan and the appraised value of the property. Based on indices.

The credit risk policies currently used explicitly forbid loans regarded as high risk (subprime mortgages) and establish strict requirements for credit quality, both for transactions and for customers. For example, since 2009 mortgages with a loan-to-value of more than 100% have not been allowed.

## Spain

### Portfolio overview

Total credit risk (including guarantees and documentary credits) at Santander Spain (excluding the Real estate unit, which is discussed subsequently in more detail) amounted to EUR 239,479 million (25% of the Group's total), with an adequate level of diversification by both product and customer segment.

In a context of lower economic and credit growth, new loans continue to increase, especially in SMEs and Corporates. The total credit risk decreased by 4.8% in annual terms, mainly due to the lower financing to public administrations, wholesale banking and an amortisation rate even higher than the growth of new production in individuals. Within the commercial banking segment, SMEs consolidate the growth trend initiated in previous years.

### Credit risk by segment<sup>A</sup>

Dec. 2018 data

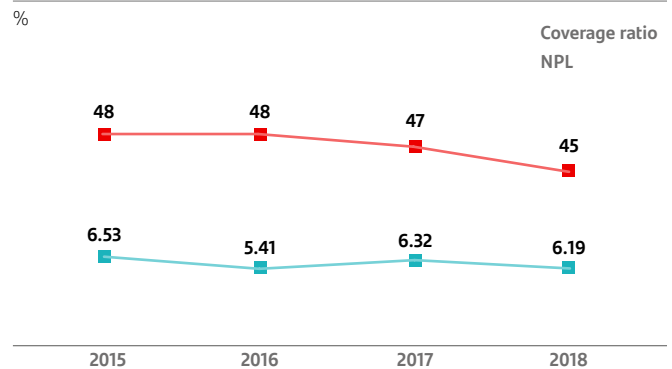
	2018	2017	2016	Var 18/17
<b>Total credit risk<sup>A</sup></b>	<b>239,479</b>	<b>251,433</b>	<b>172,974</b>	<b>(4.8%)</b>
Household mortgages	60,908	62,039	46,213	(2%)
Other credit for individuals	25,170	27,372	16,614	(8%)
Business Portfolio	137,296	143,668	96,082	(4%)
Public Administrations	16,105	18,353	14,065	(12%)

A. In 2017 and 2018 B.Popular is integrated.

B. Including guarantees and documentary credits.

The NPL ratio for the total portfolio was 6.19%, 13 bp less than in 2017. The decrease in lending (which increased the NPL ratio by 31 bp) was offset by the better NPL figure (which reduced the ratio by 44 bp). This improvement was mainly due to a better performance of the credit portfolio, the cure of several restructured positions and portfolio sales.

### NPL and coverage ratio



The more relevant portfolios are described in the following subsections.

### Residential mortgages

Residential mortgages in Santander Spain amounted to EUR 61,453 million, representing 26% of total credit risk. 99% of which have a mortgage guarantee.

Residential mortgages<sup>A</sup>

EUR million

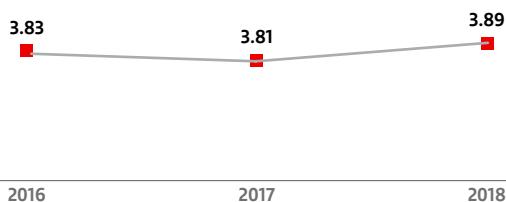
	2018	2017	2016
<b>Gross Amount</b>	<b>61,453</b>	<b>62,571</b>	<b>46,858</b>
Without mortgage guarantee	545	532	645
With mortgage guarantee	60,908	62,039	46,213
<b>of which non-performing loans</b>	<b>2,425</b>	<b>2,511</b>	<b>1,796</b>
Without mortgage guarantee	54	147	27
With mortgage guarantee	2,371	2,364	1,769

A. Excluding SC Spain mortgage portfolio (EUR 1,837 million in 2018 with doubtful debt of EUR 68 million).

The NPL ratio of mortgages granted to households to acquire a home was 3.89%, remaining at levels similar to previous years below 3.9%.

NPL ratio, residential mortgages

%

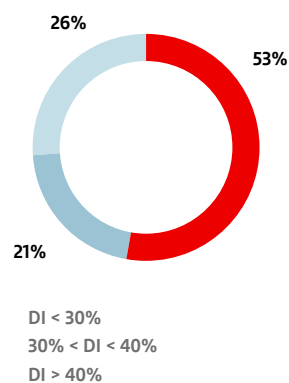


The portfolio of mortgages granted to acquire homes in Spain have characteristics that maintain its medium-low risk profile which limits the expectations of a potential additional deterioration:

- Principal is repaid on all mortgages from the start.
- Early repayment is common so the average life of the transaction is well below that of the contract.
- High quality of collateral concentrated almost exclusively in financing the first home.
- Average affordability rate stood at 28%.
- 83% of the portfolio has a LTV below 80%, calculated as total risk/latest available house appraisal.
- All customers applying for a residential mortgage are subject to a rigorous assessment of credit risk and affordability. In evaluating the payment capacity (affordability) of a potential customer, the credit analyst must determine if the income of the customer is sufficient to meet the payment of the loan instalments taking into consideration other income that the customer may receive. In addition, the analyst must assess if the customer's income will be stable over the term of the loan.

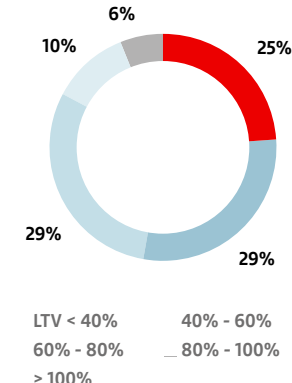
Debt to income<sup>A</sup>

Average 28.2%



Loan to value<sup>B</sup>

%



A. Debt to income: relation between the annual instalments and the customer's net income.

B. Loan to value: percentage indicating the total risk/latest available house appraisal.

Business portfolio

Credit risk assumed directly with SMEs and corporates (EUR 137,296 million) represent the main lending segment in Santander Spain (57% of the total).

Most of the portfolio corresponds to customers who have been assigned an analyst to monitor them continuously throughout the risk cycle.

The portfolio is highly diversified, with no significant concentrations by activity sector.

The NPL ratio for this portfolio stood at 6.36% in 2018, 49 bp lower than in 2017, due to better performance, normalisation of several restructured positions and portfolio sales.

### Real estate activity

The Group manages the real estate activity in Spain in a separate unit, which includes the loans from clients with activity mainly in real estate development, and who have a specialised management model, holdings in real estate companies and foreclosed assets.

In recent years the Group's strategy has been geared towards reducing these assets, which at the end of 2018 stood at a total of 9,282 EUR billion, representing 2% of assets in Spain and less than 0.6% of Group assets. Assets decreased by 13% during 2018, with the following evolution in credit exposures and foreclosed assets (run-off):

- Net credits amount to approximately EUR 900 million, with a 29% reduction during 2018 and with a coverage ratio of 41%.
- Net real estate assets (foreclosed and rental assets) were EUR 2,617 billion, with a 9% reduction vs. 2017, and a coverage ratio of 59%.

Credit and foreclosed gross exposure followed the trend begun in previous years and presents a decrease of 80% between 2008 and 2018. Additionally, the Group reached an agreement to sell properties for EUR 1,535 million. This transaction is expected to be finalised by the first quarter of 2019.

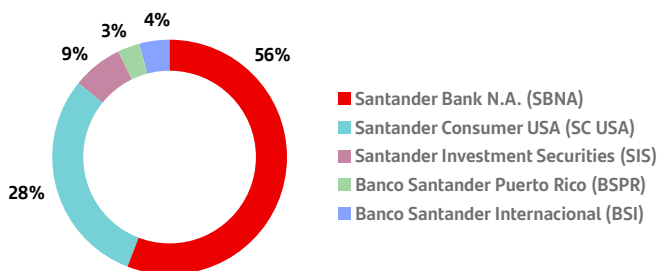
### Real estate portfolio evolution

EUR million. Dec. 2018 data

	2018	2017
Gross Value	9.282	10.620
Allowances	4.638	5.318
Net value	4.644	5.302
Foreclosed	2.617	2.879
Rental assets	1.154	1.199
Real estate loans	873	1.224

### United States

Credit risk at Santander US increased to EUR 92,152<sup>6</sup> million at the end of December (representing 10% of the Group's total), is made up of the following business units:



In 2018, Santander US credit lending continued to grow (+19%), after the reduction of non-core portfolios. The most significant increases are registered in the consumer portfolio (auto) of SBNA and SC USA, as well as in the wholesale banking business of SBNA and SIS.

NPL ratio and cost of credit remain at moderate levels, 2.92% (+13 bp in the year) and 3.27% (-15 bp in the year), respectively. The performance details of Santander US main units are set out below.

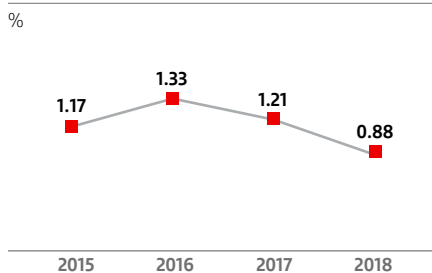
#### Santander Bank N.A.

Santander Bank N.A. business is focused on retail and commercial banking (83%), of which 35% is with individuals and approximately 65% with corporates. One of the main strategic goals is to continue to enhance the wholesale banking business (17%).

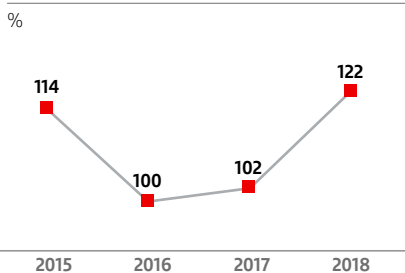
Lending has increased by 15% over 2018, being wholesale banking and consumer (auto) the segments with higher growth. The sale of non-core assets continues and the proportion of secured lending remains above 60%.

The NPL ratio continues to decline, standing at 0.88% (-33 bp in the year) in December. This reduction is explained by a proactive management of certain exposures and the favourable macro development showed in the improvement of customer's credit risk profile in corporates and individuals portfolios. The cost of credit remains at stable levels of 0.24% despite the increase in some segment's coverage ratios.

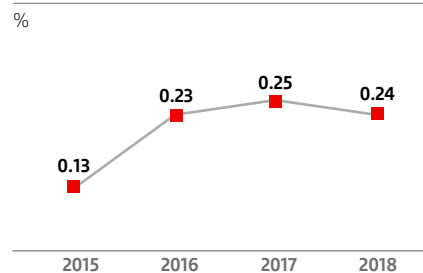
#### Non-Performing Loans Ratio (SBNA)



#### Coverage Ratio (SBNA)



#### Cost of credit (SBNA)



6. Includes EUR 9.5 million of SH USA investment.

**Santander Consumer USA**

The risk indicators for SC USA are higher than those of the other United States units and the Group, due to the nature of its business, which focuses on auto financing through loans and leasing (97%), seeking the optimisation of the returns associated to the risk assumed. SC USA's lending also includes a smaller personal lending portfolio (3%).

In 2018, new loan and leasing production showed growth of more than 20% and 60% regarding year-end 2017, mainly supported by the commercial relationship with the Fiat Chrysler Automobiles (FCA) group, the "Chrysler Agreement", which dates back to 2013, maintaining the quality standards for approval.

Under the Chrysler Agreement, FCA has the option to acquire, for fair market value, an equity participation in the business offering and providing financial services contemplated by the Chrysler Agreement

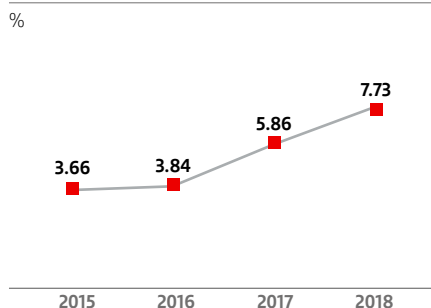
In June 2018, SC USA announced that it was in exploratory discussions with FCA regarding the future of FCA's U.S. finance operations after FCA had announced its intention to establish a captive U.S. auto finance unit and indicated that acquiring SC's FCA-related business was one option it would consider. These

exploratory discussions cover a range of options on how to optimize the existing contract and other longer-term arrangements. While a significant change in the business relationship could affect SC USA's and SH USA's operations adversely, FCA has not delivered a notice to exercise its equity option and SC USA and FCA continue to operate under the existing arrangements.

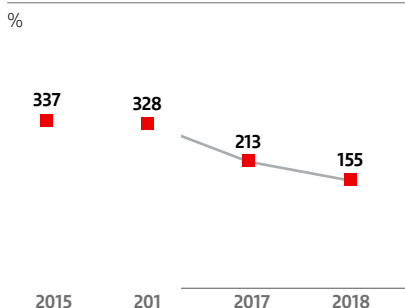
The NPL rate, however, increased to 7.73%, mainly due to the maturity of those loans forborne in 2017, which included the support to customers affected by hurricane season. The cost of credit, at the end of December stood at 10.01% (+17 bp in the year), due to the average investment lower growth as a result of the vintages amortisation from high production exercises (2015), partially mitigated by the increase in recoveries efficiency and the positive evolution of the used car price. The coverage ratio remains at high levels, 155%.

The leasing portfolio - business carried out exclusively under the FCA agreement and focused on customers with high quality credit profiles- grew by 41% in the year, to EUR 13,309 million, providing stable and recurring earnings. The management and mitigation of the residual value<sup>7</sup> remains a priority, at the end of December the mark-to-market of this vehicles stood in line with the balance sheet value.

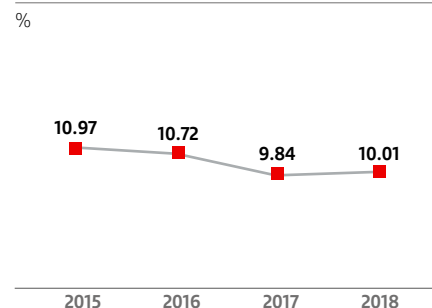
**Non-performing loans ratio (SC USA)**



**Coverage ratio SC USA)**



**Cost of credit (SC USA)**



7. Leasing residual value: difference between the estimated residual vehicle value at the contract signature and the real vehicle value at the end of the contract.

## Brazil

Improvement in the macro indicators with respect to the previous year, with a GDP growth owing to the increase in private consumption and firm's investment, driven in a great measure by the reduction in interest rates (SELIC), with minimum historical levels, and the boost from exports arising from the depreciation of the Brazilian real. Additionally, expectations for the next years are optimistic, and macro indicators are expected to continue improving, with a gradual normalisation of interest rates.

Credit risk in Brazil amounts to EUR 84,212 million, representing an increase of 1.4% vs. 2017 and largely due to the depreciation of the Brazilian currency, excluding the exchange rate effect, recorded growth is 13%. Santander Brazil therefore accounts for 9% of the Group's lending.

Santander Brazil is adequately diversified and has an increasingly marked retail profile, with more than 60% of loans extended to individuals, consumer financing and SMEs.

This increase was more pronounced in retail segments with a more conservative risk profile, within prudential framework of risk growth assumption, but at the same time boosting customer relationship and loyalty, as well as business attracted through digital channels, where an important increase has been recorded during the last year.

In the individuals' loan segment, market share has increased in profitable products. It is noteworthy the growth in payroll discount loans through the *Olé Consignado* brand, in addition to credit cards and the mortgage loan portfolio. At the same time, the *Financiera* unit has reported a stronger position than its competitors, reaching 25% of market share.

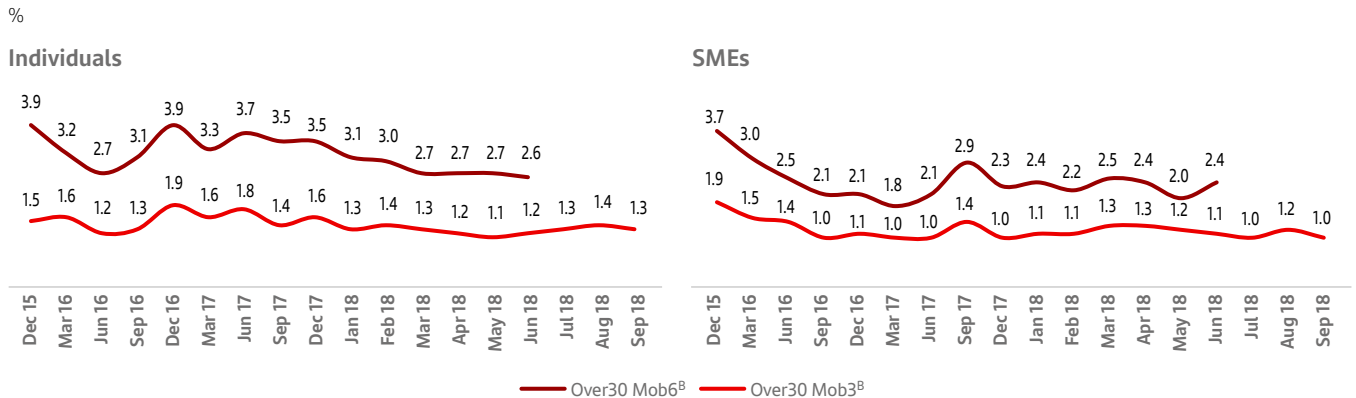
In the SME segment it is noteworthy the increase of *Adquirência*, and to a lower extent, rural loans, which have a low risk profile.

Lastly, the Corporate and SCIB portfolios, both with considerable exposures in US dollars, led more conservative growth, due to the impact of the Brazilian real depreciation against the US dollar.

The leading indicators for the credit risk profile of new loans (vintages) are continuously tracked. These are shown below, confirming the Group's resilience and prudence in risk management operates. The vintages show transactions over 30 days in arrears at three and six months respectively from their origination date, in order to anticipate any possible portfolio deterioration. This enables the Group to define corrective actions if any deviations from expected results are detected.

As it can be observed in the following chart, Over30 ratio vintages have been kept at historically low levels, in spite of the strong portfolio growth, thanks to proactive risk management as well as the appropriate measures taken to improve performance.

### Vintages. Over 30<sup>A</sup> ratio evolution at 3 and 6 months from each vintage



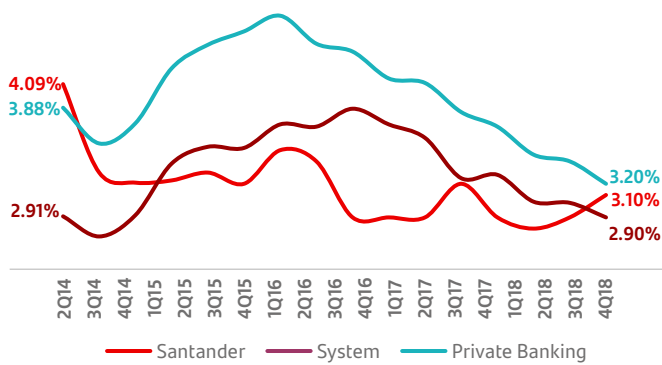
A. Ratio calculated as the total value of loans more than 30 days in arrears in the payment over the total vintage amount.

B. Months on Book.

The NPL ratio stood at 5.25% as of December 2018 (-4 bp compared to the year-end of 2017). This good performance was due to the preventive risk management of the portfolio, the normalisation of the corporates and SCIB portfolios, and due to a solid growth in profitable segments.

Santander Brazil, thanks to a solid culture and advanced risk management, continues improving its credit metrics. Its impairment rate on the lending portfolio, known locally as 'Over 90 ratio', stood at 3.1% in December 2018 (-0.1 pp vs. year-end 2017), below the average for private Brazilian banks.

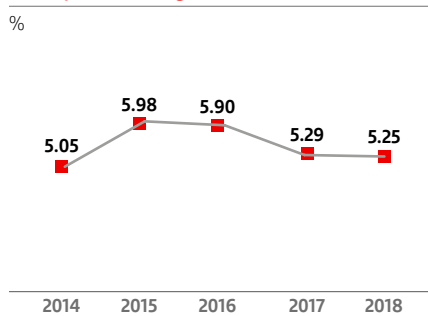
Over 90 ratio total



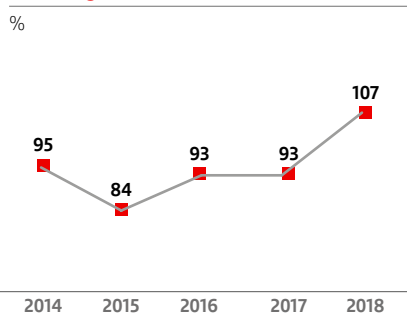
In general terms, and taking into account the evolution of recent years, the downward trend in the cost of credit continues, which stands at 4.06% at the end of December (-30 bp compared to the end of 2017), thanks to the proactive risk management, the improvements applied in the rating models in the SME portfolio, and the good overall performance in all portfolios.

The coverage ratio stands at 107% (+14 pp vs. end of 2017), due to the implementation of IFRS9, which is comfortable level.

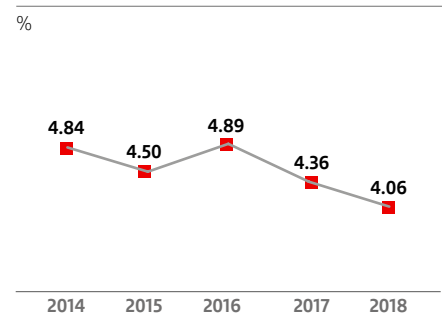
Non-performing loans ratio



Coverage ratio



Cost of credit



### 3.5 Other credit risk aspects

#### Credit risk by activity in the financial markets

This section covers credit risk generated in treasury activities with customers, mainly with credit institutions. Transactions are undertaken through money market financial products with different financial institutions and through counterparty risk products which serve the Group's customer's needs.

According to regulation (EU) 575/2013, counterparty credit risk is the risk that a client in a transaction could default before the definitive settlement of the cash flows of the transaction. It includes the following types of transactions: derivative instruments, transactions with repurchase commitment, stock and commodities lending, transactions with deferred settlement and financing of guarantees.

There are two methodologies for measuring this exposure: (i) mark-to-market (MtM) methodology (replacement value of derivatives) plus potential future exposure (add-on) and (ii) the calculation of exposure using Montecarlo simulation for some countries and products. The capital at risk or unexpected loss is also calculated, i.e. the loss which, once the expected loss has been subtracted, constitutes the economic capital, net of guarantees and recoveries.

After markets close, exposures are re-calculated by adjusting all transactions to their new time frame, adjusting the potential future exposure and applying mitigation measures (netting, collateral, etc.), so that the exposures can be controlled directly against the limits approved by senior management. Risk control is performed through an integrated system and in real time, enabling the exposure limit available with any counterparty, product and maturity and in any of Santander's subsidiaries to be known at any time.

#### Exposures in counterparty risk: over the counter (OTC) transactions and organised markets (OM)

As of December 2018, total exposure on the basis of management criteria in terms of positive market value after applying netting agreements and collateral for counterparty risk activities was EUR 14,699 million (net exposure of EUR 33,500 million).

#### Counterparty risk: exposure in terms of market value and credit risk equivalent, including mitigation effect<sup>A</sup>

EUR million	2018	2017	2016
Market value, netting effect <sup>B</sup>	29,626	31,162	34,998
Collateral received	14,927	16,293	18,164
Market value with netting effect and collateral <sup>C</sup>	14,699	14,869	16,834
Netting effect <sup>D</sup>	33,500	32,876	44,554

A. Figures under internal risk management criteria. Listed derivatives have a market value of zero. No collateral is received for these types of transactions.

B. Market value used to include the effects of mitigation agreements so as to calculate exposure for counterparty risk.

C. Considering the mitigation of netting agreements and having deducted the collateral received.

D. CRE (credit risk equivalent): net value of replacement plus the maximum potential value, minus collateral received.

In the following table the distribution is shown, both in nominal and market value terms, of the Group's different products that generate counterparty credit risk. This risk, is mainly concentrated in interest and exchange rate hedging instruments:

Counterparty risk: Distribution by nominal risk and gross market value<sup>A</sup>

EUR million

	2018			2017			2016		
	Nominal	Market value		Nominal	Market value		Nominal	Market value	
		Positive	Negative		Positive	Negative		Positive	Negative
CDS protection bought <sup>B</sup>	13,498	7	(187)	18,134	36	(95)	23,323	83	(383)
CDS protection sold	8,966	123	(5)	12,097	266	-	19,032	339	(33)
<b>Total credit derivatives</b>	<b>22,464</b>	<b>130</b>	<b>(192)</b>	<b>30,231</b>	<b>302</b>	<b>(95)</b>	<b>42,355</b>	<b>422</b>	<b>(416)</b>
Equity forwards	1,080	256	(43)	733	4	-	133	48	-
Equity options	15,695	467	(443)	10,572	770	(2,841)	15,154	448	(426)
Spot equities	240	-	-	-	-	-	234	-	-
Equity swaps	13,937	1,329	(227)	25,264	859	(554)	15,388	631	(461)
Equities - ETF	32,090	899	(1,127)	26,088	-	-	36,512	-	-
<b>Total equity derivatives</b>	<b>63,042</b>	<b>2,951</b>	<b>(1,840)</b>	<b>62,657</b>	<b>1,633</b>	<b>(3,395)</b>	<b>67,421</b>	<b>1,127</b>	<b>(888)</b>
Fixed income forwards	6,766	110	(45)	8,660	89	(13)	6,357	37	(83)
Fixed income options	-	-	-	-	-	-	483	5	(2)
Spot fixed income	3,161	11	(14)	-	-	-	5,159	5	(2)
Fixed income - ETF	-	-	-	-	-	-	349	-	-
<b>Total fixed income derivatives</b>	<b>9,927</b>	<b>121</b>	<b>(59)</b>	<b>8,660</b>	<b>89</b>	<b>(13)</b>	<b>12,348</b>	<b>48</b>	<b>(88)</b>
Spot and term exchange rates	167,729	2,854	(2,461)	128,914	2,604	(3,870)	150,095	3,250	(6,588)
Exchange rate options	46,288	296	(707)	37,140	256	(343)	31,362	479	(624)
Other exchange rate derivatives	719	9	(12)	963	23	(17)	606	7	(27)
Exchange rate swaps	562,719	18,584	(16,918)	488,671	18,264	(15,892)	510,405	25,753	(24,175)
Exchange rate - organised markets	4,186	-	-	1,404	-	-	824	-	-
<b>Total exchange rate derivatives</b>	<b>781,641</b>	<b>21,743</b>	<b>(20,098)</b>	<b>657,092</b>	<b>21,147</b>	<b>(20,122)</b>	<b>693,292</b>	<b>29,489</b>	<b>(31,413)</b>
Asset swaps	8,607	1,196	(1,475)	22,736	1,194	(817)	22,948	1,178	(758)
Call money swaps	878,103	4,563	(4,477)	376,596	2,544	(2,301)	223,005	2,006	(1,581)
Interest rate structures	81,336	4,785	(5,708)	4,180	977	(594)	7,406	2,321	(593)
Forward rate agreements - FRAs	308,111	29	(28)	190,476	23	(39)	370,433	41	(106)
IRS	3,507,802	73,597	(73,237)	3,219,369	71,346	(75,391)	3,182,305	92,268	(92,873)
Other interest rate derivatives	143,029	1,906	(1,484)	185,925	2,816	(2,113)	210,061	3,762	(2,985)
Interest rate - ETF	73,418	3	(2)	127,288	-	-	117,080	-	-
<b>Total interest rate derivatives</b>	<b>5,000,406</b>	<b>86,079</b>	<b>(86,411)</b>	<b>4,126,570</b>	<b>78,900</b>	<b>(81,255)</b>	<b>4,133,238</b>	<b>101,576</b>	<b>(98,896)</b>
Commodities	-	-	-	221	-	-	539	108	(5)
Commodities - ETF	2	-	-	124	-	-	47	-	-
<b>Total commodity derivatives</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>345</b>	<b>-</b>	<b>-</b>	<b>586</b>	<b>108</b>	<b>(5)</b>
<b>Total OTC derivatives</b>	<b>5,767,787</b>	<b>110,123</b>	<b>(107,471)</b>	<b>4,730,651</b>	<b>102,071</b>	<b>(104,880)</b>	<b>4,794,429</b>	<b>132,770</b>	<b>(131,706)</b>
<b>Total derivatives organised markets<sup>C</sup></b>	<b>109,695</b>	<b>902</b>	<b>(1,129)</b>	<b>154,904</b>	<b>-</b>	<b>-</b>	<b>154,812</b>	<b>-</b>	<b>-</b>
<b>Repos</b>	<b>149,006</b>	<b>2,352</b>	<b>(2,466)</b>	<b>165,082</b>	<b>2,322</b>	<b>(2,363)</b>	<b>122,035</b>	<b>2,374</b>	<b>(2,435)</b>
<b>Securities lending</b>	<b>43,675</b>	<b>12,425</b>	<b>(22,272)</b>	<b>54,923</b>	<b>15,469</b>	<b>(16,580)</b>	<b>33,547</b>	<b>9,449</b>	<b>(4,124)</b>
<b>Total counterparty risk</b>	<b>6,070,163</b>	<b>125,802</b>	<b>(133,338)</b>	<b>5,105,560</b>	<b>119,862</b>	<b>(123,823)</b>	<b>5,104,823</b>	<b>144,593</b>	<b>(138,265)</b>

A. Figures under internal risk management criteria.

B. Credit derivatives acquired including hedging of loans.

C. Refers to transactions involving listed derivatives (proprietary portfolio). Listed derivatives have a market value of zero. No collateral is received for these types of transactions.

The Group's derivatives transactions focus on terms of less than five years, repos and securities loans maturing in less than one year, as the following chart shows:

### Counterparty risk: Distribution of nominal by maturity<sup>A</sup>

EUR millio. Dec. 2018 data

	Up to 1 year	Up to 5 years	Up to 10 years	More than 10 years	Total
Credit derivatives <sup>B</sup>	35%	61%	3%	1%	22,464
Equity derivatives	46%	46%	8%	0%	63,042
Fixed income derivatives	88%	11%	1%	0%	9,927
Exchange rate derivatives	54%	28%	13%	5%	781,641
Interest rate derivatives	31%	42%	19%	9%	5,000,407
Commodity derivatives	100%	0%	0%	0%	2
<b>Total OTC derivatives</b>	<b>34%</b>	<b>40%</b>	<b>18%</b>	<b>8%</b>	<b>5,767,787</b>
<b>Total derivatives organised markets<sup>C</sup></b>	<b>53%</b>	<b>43%</b>	<b>4%</b>	<b>0%</b>	<b>109,695</b>
<b>Repos</b>	<b>92%</b>	<b>8%</b>	<b>0%</b>	<b>0%</b>	<b>149,006</b>
<b>Securities lending</b>	<b>99%</b>	<b>1%</b>	<b>0%</b>	<b>0%</b>	<b>43,675</b>
<b>Total counterparty risk</b>	<b>36%</b>	<b>39%</b>	<b>17%</b>	<b>8%</b>	<b>6,070,163</b>

A. Figures under internal risk management criteria.

B. Credit derivatives acquired including hedging of loans.

C. Refers to transactions involving listed derivatives (proprietary portfolio). Listed derivatives have a market value of zero. No collateral is received for these types of transactions.

From the customer perspective, counterparty credit risk exposure is concentrated in those clients with high credit quality (90.2% counterparty risk with a rating equal or higher than A), and mainly with financial institutions (25%) and clearing houses (69%).

### Distribution of counterparty risk by customer rating (in nominal terms)<sup>A</sup>

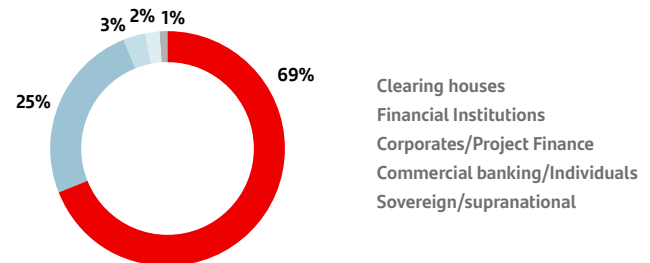
Dec. 2018 data

Rating	%
AAA	0.80%
AA	11.15%
A	78.20%
BBB	7.78%
BB	2.03%
B	0.03%
Other	0.01%

A. Ratings based on internally defined equivalences between internal ratings and credit agency ratings.

### Counterparty risk by customer segment

Dec. 2018 data



Transactions with clearing houses and financial institutions are carried out under netting and collateral agreements, and constant efforts are made to ensure that all other transactions are covered under this type of agreement. Generally, the collateral agreements that the Group signs are bilateral with few exceptions, mainly with multilateral institutions and securitisation funds, in which the agreements are unilateral in favour of the customer.

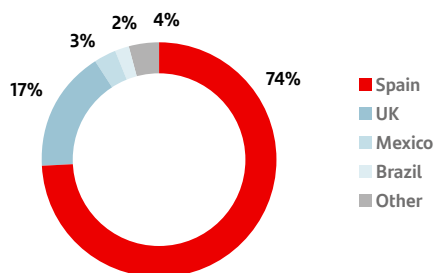
Collateral is used for of reducing counterparty risk. These are a series of instruments with a certain economic value and high liquidity that are deposited/transferred by a counterparty in favour of another in order to guarantee/reduce the credit risk of the counterparty that could result from portfolios of derivatives with cross-risk between them. The transactions subject to the collateral agreement are regularly valued (normally daily) applying the parameters defined in the contract so that a collateral amount is obtained (usually cash or securities), which is to be paid to or received from the counterparty.

The collateral received by the Group under the different types of collateral agreements (CSA, OSLA, ISMA, GMRA, etc.) amounted to EUR 14,927 million (of which EUR 11,588 million related to collateral received by derivatives), mostly cash (78.7%), the rest of the collateral types are subject to strict policies of quality regarding the issuer type and its rating, debt seniority and haircuts applied.

In geographical terms, the collateral received is distributed as shown in the following chart:

### Collateral received. Geographical distribution

Dec. 2018 data



As a consequence of the risk associated with the credit exposure that is taken on with each counterparty, the Group includes a valuation adjustment for over the counter (OTC) derivatives due to the risk associated with credit exposure assumed with each counterparty, i.e. a Credit Valuation Adjustment (CVA), and a valuation adjustment due to the risk relating to the Group itself assumed by counterparties on OTC derivatives, i.e. Debt Valuation Adjustment (DVA).

As of December 2018, there were CVAs of EUR 350.8 million (+8.8% compared to December 2017) and DVAs of EUR 261.4 million (+19% compared with 2017).

The definition and methodology for calculating the CVA and DVA are set out in '[Credit Valuation Adjustment \(CVA\) and Debt Valuation Adjustment \(DVA\)](#)' in this chapter.

### Counterparty risk, organised markets and clearing houses

The Group's policies seek to anticipate, wherever possible, the implementation of measures resulting from new regulations regarding transactions with OTC derivatives, repos and securities lending, whether settled through clearing houses or traded bilaterally. In recent years, there has been a gradual standardisation of OTC transactions in order to conduct clearing and settlement of all new trading transactions through clearing houses, as required by the recent regulation and to foster internal use of electronic execution systems.

Furthermore, the Group actively manages transactions not settled through clearing houses and seeks to optimise their volume, given the spread and capital requirements under new regulations.

With regards to organised markets, regulatory credit exposure has been calculated for such transactions since 2014 and the entry into force of the new CRD IV (Capital Requirements Directive) and CRR, transposing the Basel III principles for calculating capital, even though counterparty risk management does not consider credit risk on such transactions.

The following tables show the weighting of trades settled through clearing houses as a portion of total counterparty risk at December 2018:

### Distribution of counterparty risk by settlement channel and product type<sup>A</sup>

Nominal in EUR million

	Bilateral		CCP <sup>B</sup>		Organised markets <sup>C</sup>		Total
	Nominal	%	Nominal	%	Nominal	%	
Credit derivatives	18,233	81.2%	4,231	18.8%	-	-	22,464
Equity derivatives	30,813	48.9%	139	0.2%	32,090	50.9%	63,042
Fixed income derivatives	9,927	100.0%	-	-	-	-	9,927
Exchange rate derivatives	744,713	95.3%	32,742	4.2%	4,186	-	781,641
Interest rate derivatives	974,732	19.5%	3,952,257	79.0%	73,418	1.5%	5,000,406
Commodity derivatives	-	-	-	-	2	100.0%	2
Repos	107,514	72.2%	41,492	27.8%	-	-	149,006
Securities lending	43,675	100.0%	-	-	-	-	43,675
<b>General total</b>	<b>1,929,607</b>		<b>4,030,861</b>		<b>109,695</b>		<b>6,070,163</b>

A. Figures under internal risk management criteria.

B. Central counterparties (CCP).

C. Refers to transactions involving listed derivatives (proprietary portfolio). Listed derivatives have a market value of zero. No collateral is received for these types of transactions.

## Distribution of risk settled by CCP and organised markets, by product<sup>A</sup>

Nominal in EUR million

	2018	2017	2016
Credit derivatives	4,231	2,524	3,916
Equity derivatives	32,229	26,088	36,568
Fixed income derivatives	-	-	349
Exchange rate derivatives	36,928	1,592	1,419
Interest rate derivatives	4,025,674	2,950,796	2,732,103
Commodity derivatives	2	124	47
Repos	41,492	64,086	29,763
Securities lending	-	-	4
<b>General total</b>	<b>4,140,556</b>	<b>3,045,210</b>	<b>2,804,170</b>

A. Figures under internal risk management criteria.

### Off-balance sheet credit risk

The off-balance sheet risk corresponding to funding and guarantee commitments with wholesale customers was EUR 96,007 million, with the following distribution by products:

### Off balance sheet exposure

EUR million. Dec. 2018 data

Product	Maturity				Total
	< 1 year	1-3 years	3-5 years	>5 years	
Funding <sup>A</sup>	12,639	20,849	28,715	4,222	66,425
Technical guarantees	7,680	2,384	1,742	4,838	16,644
Financial and commercial guarantees	6,084	3,033	1,606	1,178	11,901
Trade finance <sup>B</sup>	861	139	31	6	1,037
<b>General total</b>	<b>27,264</b>	<b>26,405</b>	<b>32,094</b>	<b>10,244</b>	<b>96,007</b>

A. Mainly including committed bilateral and syndicated credit lines.

B. Including primarily stand-by letters of credit.

### Credit derivatives activity

The Group uses credit derivatives to cover loans, our customer's business in financial markets and within its trading activities. The volume of this activity is small compared to the total assets of the Group and, moreover, is subject to a solid environment of internal controls and operational risk minimisation.

### Concentration risk

Concentration risk control is a vital part of management. The Group continuously monitors the degree of concentration of its credit risk portfolios using various criteria: geographical areas and countries, economic sectors and groups of customers.

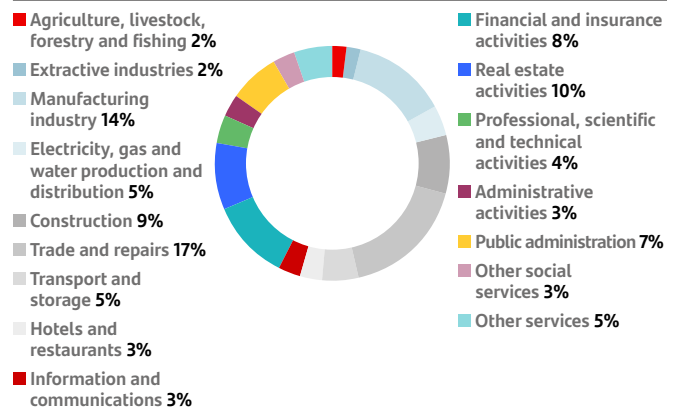
The board, via the risk appetite framework, determines the maximum levels of concentration, as detailed in Risk appetite and structure of limits in section 1.3 'Management processes and tools'.

In line with these maximum levels and limits, the executive risk committee establishes the risk policies and reviews the appropriate exposure levels for the adequate management of the degree of concentration in Santander's credit risk portfolios.

As indicated in the key metrics section of this chapter, in geographical terms, credit risk with customers is diversified in the main markets where the Group operates (United Kingdom 27%, Spain 25%, United States 10%, Brazil 9%, etc.).

In terms of diversification by sector, approximately 56% of the Group's credit risk corresponds to individual customers, who, due to their inherent nature, are highly diverse. In addition, the lending portfolio is well distributed, with no significant concentrations in specific sectors. The following chart shows the distribution at the end of the year:

### Diversification by economic sector<sup>A</sup>



A. Excluding individuals and reverse repos.

The Group is subject to the regulation on large risks contained in the CRR, according to which the exposure contracted by an entity with a customer or group of customers linked among themselves will be considered a large exposure when its value is equal or greater than 10% of eligible capital. In addition, in order to limit large exposures, no entity can assume exposures exceeding 25% of its eligible capital with a single customer or group of linked customers, after taking into account the credit risk reduction effect contained in the regulation.

Having applied the risk mitigation techniques, no groups triggered these thresholds at the end of December.

Regulatory credit exposure with the 20 largest groups within the scope of large risks represented 4.47% of the outstanding credit risk with customers (lending to customers plus off-balance sheet risks) as of December 2018.

The Group's Risk division works closely with the Financial division to actively manage credit portfolios. Its activities include reducing the concentration of exposures through various techniques, such as using credit derivatives and securitisations to optimise the risk-return relationship for the whole portfolio.

### Country risk

Country risk is a component of credit risk in all cross-border credit transactions arising from circumstances other than the usual business risks. The main elements involved are sovereign risk, transfer risk and other risks that affect international financial activity (wars, natural disasters, balance of payments crises, etc.).

The Group takes into account these three elements of country risk in the calculation of provisions, through its loss forecasting models and considering the additional risk arising from cross-border transactions.

As of 31 December 2018, the provisionable exposure due to country risk was EUR 285 million (EUR 184 million in 2017). At year-end 2018, total provisions stood at EUR 25 million, compared to EUR 37 million at the end of the previous period.

The variation of the exposure is mainly due to new investments for institutional support, having calibrated the coverages under the new national and international regulation.

The principles of country risk management continued to follow criteria of maximum prudence; country risk is assumed very selectively in transactions that are clearly profitable for the Group, and which enhance the global relationship with our customers.

### Sovereign risk including vis-à-vis the rest of public administrations

As a general criteria in the Group, sovereign risk is that contracted in transactions with a central bank (including the regulatory cash reserve requirement), issuer risk with the Treasury (public debt portfolio) and that arise from transactions with public institutions with the following features: their funds only come from the state's budgeted income and the activities are of a non-commercial nature.

These criteria, historically used by the Group, differ in some respects from that applied by the European Banking Authority (EBA) for its regular stress exercises. The main differences are that the EBA's criterion does not include deposits with central banks, exposures with insurance companies, indirect exposures via guarantees and other instruments. On the other hand, the EBA does include public administrations in general (including regional and local bodies), not only the central state sector.

According to the management Group criteria, local sovereign exposure in currencies other than the official currency of the country of issuance is not very significant (EUR 8,901 million, 3.5% of total sovereign risk), and exposure to non-local sovereign issuers involving cross-border<sup>8</sup> risk is even less significant (EUR 3,906 million, 1.5% of total sovereign risk).

Sovereign exposure in Latin America is mostly in local currency, and is recognised in the local accounts and concentrated in short-term maturities with lower interest rate risk and higher liquidity.

In general, over the past few years, total exposure to sovereign risk has remained at adequate levels to support the regulatory and strategic reasons driving this portfolio.

The investment strategy for sovereign risk also takes into account the credit quality of each country when setting the maximum exposure limits. The following table shows percentage exposure by rating levels<sup>9</sup>:

	2018	2017	2016
AAA	11%	13%	16%
AA	20%	19%	17%
A	31%	29%	29%
BBB	13%	14%	8%
Lower than BBB	25%	25%	30%

8. Countries that are not considered as "low risk" by Bank of Spain.

9. Internal ratings are applied.

During 2018 a new regulatory report was implemented, Sovereign COREP, for which its perimeter is based on the regulatory classification of counterparties. Exposure at year-end 2018 is shown in the table below (EUR million):

2018					
Portfolio					
	Financial assets held for trading and Financial assets designated as FV with changes in results	Financial assets at fair value through other comprehensive income	Financial assets at amortised cost	Non-trading financial assets mandatorily at fair value through profit or loss	Total net direct exposure
Spain	1,143	27,078	21,419	-	49,640
Portugal	(43)	4,794	4,002	-	8,753
Italy	(204)	-	465	-	261
Greece	-	-	-	-	-
Ireland	-	-	-	-	-
Rest Eurozone	503	953	1,322	-	2,778
UK	1,013	1,190	8,666	-	10,869
Poland	2,015	9,203	11	-	11,229
Rest of Europe	-	84	245	-	329
US	426	6,138	2,113	5	8,682
Brazil	1,839	20,540	3,782	893	27,054
Mexico	3,320	4,279	2,816	-	10,415
Chile	160	1,596	20	-	1,776
Rest of America	103	340	450	-	893
Rest of the world	-	5,688	534	-	6,222
<b>Total</b>	<b>10,275</b>	<b>81,883</b>	<b>45,845</b>	<b>898</b>	<b>138,901</b>

# 4. Trading market risk, structural and liquidity risk

## 4.1 Introduction

The **perimeter** of activities subject to market risk involves transactions where patrimonial risk is assumed as a consequence of variations in market factors. Thus they include trading risks and also structural risks, which are also affected by market shifts.

This risk arises from changes in **risk factors** - interest rates, inflation rates, exchange rates, stock prices, credit spreads, commodity prices and the volatility of each of these elements - as well as from the liquidity risk of the various products and markets in which the Group operates, and balance sheet liquidity risk.

- **Interest rate risk** is the possibility that changes in interest rates could adversely affect the value of a financial instrument, a portfolio or the Group as a whole. It affects loans, deposits, debt securities, most assets and liabilities in the trading books and derivatives, among others.
- **Inflation rate risk** is the possibility that changes in inflation rates could adversely affect the value of a financial instrument, a portfolio or the Group as a whole. It affects instruments such as loans, debt securities and derivatives, where the return is linked to inflation or to a change in the actual rate.
- **Exchange rate risk** is the sensitivity of the value of a position in a currency other than the base currency to a movement in exchange rates. Hence, a long or open position in a foreign currency will produce a loss if that currency depreciates against the base currency. Among the exposures affected by this risk are the Group's investments in subsidiaries in non-euro currencies, as well as any foreign currency transactions.
- **Equity risk** is the sensitivity of the value of positions in equities to adverse movements in market prices or expectations of future dividends. Among other instruments, this affects positions in shares, stock market indices, convertible bonds and derivatives using shares as the underlying asset (put, call, equity swaps, etc.).
- **Credit spread risk** is the risk or sensitivity of the value of positions in fixed income securities or in credit derivatives to movements in credit spread curves or in recovery rates associated with issuers and specific types of debt. The spread is the difference between financial instruments listed with a margin over other benchmark instruments, mainly the interest rate risk of Government bonds and interbank interest rates.
- **Commodities price risk** is the risk derived from the effect of potential changes in commodities prices. The Group's exposure to this risk is not significant and is concentrated in derivative transactions on commodities with customers.
- **Volatility risk** is the risk or sensitivity of the value of a portfolio to changes in the volatility of risk factors: interest rates, exchange rates, shares, credit spreads and commodities. This risk is incurred by all financial instruments where volatility is a variable in the valuation model. The most significant case is the financial options portfolio.

All these market risks can be partly or fully mitigated by using options, futures, forwards and swaps.

In addition, **other types of market risk** require more complex hedging. For example:

- **Correlation risk.** Sensitivity of the portfolio to changes in the relationship between risk factors (correlation), either of the same type (for example, two exchange rates) or different types (for example, an interest rate and the price of a commodity).
- **Market liquidity risk.** Risk when a Group entity or the Group as a whole cannot reverse or close a position in time without having an impact on the market price or the cost of the transaction. Market liquidity risk can be caused by a reduction in the number of market makers or institutional investors, the execution of a large volume of transactions, or market instability. It increases as a result of the concentration of certain products and currencies.
- **Prepayment or cancellation risk.** When the contractual relationship in certain transactions explicitly or implicitly allows the possibility of early cancellation without negotiation before maturity, there is a risk that the cash flows may have to be reinvested at a potentially lower interest rate. This mainly affects mortgage loans and mortgage securities.
- **Underwriting risk.** This occurs as a result of an entity's involvement in underwriting a placement of securities or another type of debt, assuming the risk of partially owning the issue or the loan due to non-placement of all of it among potential buyers.

In addition to the above market risks, balance sheet liquidity risk must also be considered. Unlike market liquidity risk, **balance sheet liquidity risk** is defined as the possibility of not meeting payment obligations on time, or doing so at excessive cost. Among the losses caused by this risk are losses due to forced sales of assets or margin impacts due to the mismatch between expected cash inflows and outflows.

On the other hand, **pension and actuarial risks** also depend on shifts in market factors, which are described in more detail, in this chapter.

The Group has projects under way for compliance with obligations related to the Basel Committee's Fundamental Review of the Trading Book, and for compliance with EBA guidelines on balance sheet interest rate risk. The objective of these projects is to have the best tools for control and management of market risks available to both managers and control units, all within a governance framework that is appropriate for the models used and the reporting of risk metrics. These projects allow meeting the requirements related to regulatory demands in these risk factors.

## 4.2 Trading market risk management

### System for controlling limits

Setting trading market risk limits is a dynamic process, determined by the Group's predefined risk appetite levels (as described in Risk appetite and structure of limits in section [1.3 'Management processes and tools'](#)). This process is part of an annual limits plan defined by the Group's senior management, involving every Group's entity.

The market risk limits are established based on different metrics and are intended to cover all activities subject to market risk from many perspectives, applying a conservative approach. The main ones are:

- Value at Risk (VaR) and Stressed VaR limits.
- Limits of equivalent and/or nominal positions.
- Interest rate sensitivity limits.
- Vega limits.
- Delivery risk limits for short positions in securities (fixed income and securities).
- Limits to constrain the volume of effective losses, and protect results generated during the period:
  - Loss trigger.
  - Stop loss.
- Credit limits:
  - Total exposure limit.
  - Jump to default by issuer limit.
  - Others.
- Limits for origination transactions.

These general limits are complemented by other sub-limits to establish a sufficiently granular limits framework for the effective control of the market risk factors to which the Group is exposed in its trading activities. Positions are monitored on a daily basis globally and for each unit at desk level, as well as with an exhaustive control of changes to portfolios and trading desks, so as to identify any incidents that might need immediate correction, and thus comply with the Volcker Rule.

Three categories of limits are established based on the scope of approval and control: global approval and control limits, global approval limits with local control, and local approval and local control limits. The limits are requested by the business executive

of each country/entity, considering the particular nature of the business in order to achieve the established budget targets, seeking consistency between the limits and the risk/return ratio. The limits are approved by the corresponding risk bodies.

Business units must comply with the approved limits at all times. In the event of a limit being exceeded, the local business executives have to explain, in writing and on the same day, the reasons for the excess and the action plan to correct the situation, which in general might consist of reducing the position until it reaches the defined limits or setting out the strategy that justifies an increase in the limits.

If the business unit fails to respond to the breach within three days, the global business executives will be asked to set out the actions to be taken in order to make the adjustment to the existing limits. If this situation lasts for ten days as of the first excess, senior risk management will be informed so that a decision can be taken: the risk takers could be required to reduce the levels of risk assumed.

## Methodologies

### a) Value at Risk (VaR)

The standard methodology Santander applies to trading activities is Value at Risk (VaR), which measures the maximum expected loss with a certain confidence level and time frame. The standard for historic simulation is a confidence level of 99% and a time frame of one day. Statistical adjustments are applied enabling the most recent developments affecting the levels of risk assumed to be incorporated efficiently and on a timely manner. A time frame of two years or at least 520 days from the reference date of the VaR calculation is used. Two figures are calculated every day: one applying an exponential decay factor that allocates less weight to the observations furthest away in time and another with the same weight for all observations. The higher of the two is reported as the VaR.

Simultaneously the Value at Earnings (VaE) is calculated, which measures the maximum potential gain with a certain level of confidence and time frame, applying the same methodology as for VaR.

VaR by historic simulation has many advantages as a risk metric (it sums up in a single number the market risk of a portfolio, it is based on market movements that really occurred without the need to make assumptions of functions forms or correlations between market factors, etc.), but it also has its limitations.

Some limitations are intrinsic to the VaR metrics, regardless of the methodology used in their calculation, including:

- The VaR calculation is calibrated at a certain level of confidence, which does not indicate the levels of possible losses beyond it.
- There are some products in the portfolio with a liquidity horizon greater than that specified in the VaR model.

- VaR is a static analysis of the portfolio risk, and the situation could change significantly during the following day, although the likelihood of this occurring is very low.

Using the historic simulation methodology also has its limitations:

- High sensitivity to the historic window used.
- Inability to capture plausible events that would have significant impact, if these do not occur in the historic window used.
- The existence of valuation parameters with no market input (such as correlations, dividend and recovery rate).
- Slow adjustment to new volatilities and correlations, if the most recent data receives the same weight as the oldest data.

Some of these limitations are overcome by using Stressed VaR and expected shortfall, calculating VaR with exponential decay and applying conservative valuation adjustments. Furthermore, as previously stated, the Group regularly conducts analysis and backtesting of the VaR calculation model accuracy.

### b) Stressed VaR (sVaR) and expected shortfall (ES)

In addition to standard VaR, Stressed VaR is calculated daily for the main portfolios. The calculation methodology is the same as for VaR, with the two following exceptions:

- The historical observation period for the factors: when calculating stressed VaR a window of 260 observations is used, rather than 520 for VaR. However, this is not the most recent data: rather, the data used is from a continuous period of stress for the portfolio in question. This is determined for each major portfolio by analysing the history of a subset of market risk factors selected based on expert judgement and the most significant positions in the books.
- Unlike VaR, stressed VaR is obtained using the percentile with uniform weighting, not the higher of the percentiles with exponential and uniform weightings.

Moreover, the expected shortfall is also calculated by estimating the expected value of the potential loss when this is higher than the level set by VaR. Unlike VaR, ES has the advantages of capturing the risk of large losses with low probability (tail risk) and being a sub-additive metric<sup>10</sup>. The Basel Committee considers that ES with a 97.5% confidence interval delivers a similar level of risk to VaR at a 99% confidence interval. ES is calculated by applying uniform weights to all observations.

10. According to the financial literature, subadditivity is a desirable property for a coherent risk metric. This property establishes that  $f(a+b)$  is less than or equal to  $f(a)+f(b)$ . Intuitively, it assumes that the more instruments and risk factors there are in a portfolio, the lower the risks, because of the benefits of diversification. Whilst VaR only offers this property for some distributions, ES always does so.

### c) Scenario analysis

The Group uses other metrics in addition to VaR, providing it greater control over the risks it faces in the markets where it is active. These measures include scenario analysis, which consists in defining alternative behaviours for various financial variables and obtaining the impact on results of applying these to activities. These scenarios may replicate events that occurred in the past (such as a crisis) or determine plausible alternatives that are unrelated to past events.

The potential impact on earnings of applying different stress scenarios is regularly calculated and analysed, particularly for trading portfolios, considering the same risk factor assumptions. Three scenarios are defined, as a minimum: plausible, severe and extreme. Taken together with VaR, these reveal a much more complete spectrum of the risk profile.

A number of trigger thresholds have also been established for global scenarios, based on their historical results and the capital associated with the portfolio in question. When these triggers are activated, the portfolio managers are notified so they can take appropriate action. The results of the global stress exercises, and any breaches of the trigger thresholds, are reviewed regularly, and reported to senior management, when this is considered appropriate.

### d) Analysis of positions, sensitivities and results

Positions are used to quantify the net volume of the market securities for the transactions in the portfolio, grouped by main risk factor, considering the delta value of any futures or options. All risk positions can be expressed in the base currency of the local unit and the currency used for standardising information. Changes in positions are monitored on a daily basis to detect any incidents, so they can be corrected immediately.

Measurements of market risk sensitivity estimate the variation (sensitivity) of the market value of an instrument or portfolio to any change in a risk factor. The sensitivity of the value of an instrument to changes in market factors can be obtained using analytical approximations through partial derivatives or through a complete revaluation of the portfolio.

Furthermore, the daily formulation of the income statement by the Risk area is an excellent indicator of existing risks, as it allows to identify the impact of changes in financial variables on portfolios.

### e) Derivatives activities and credit management

Also noteworthy is the control of derivative activities and credit management which, because of its atypical nature, is conducted daily with specific measures. First, the sensitivities to price movements of the underlying asset (delta and gamma), volatility (vega) and time (theta) are controlled. Second, measures such as the sensitivity to the spread, jump-to-default, concentrations of positions by level of rating, etc., are reviewed systematically.

With regard to the credit risk inherent to trading portfolios, and in line with the recommendations of the Basel Committee and prevailing regulations, a further metric is also calculated: the incremental risk charge (IRC). This seeks to cover the risks of

non-compliance and ratings migration that are not adequately captured in VaR, through changes in the corresponding credit spreads. This metric is essentially applied to fixed-income bonds, both public and private, derivatives on bonds (forwards, options, etc.) and credit derivatives (credit default swaps, asset backed securities, etc.). IRC is calculated using direct measurements of loss distribution tails at an appropriate percentile (99.9%), over a one year horizon. The *Montecarlo* methodology is used, applying one million simulations.

### f) Credit Valuation Adjustment (CVA) and Debt Valuation Adjustment (DVA)

The Group incorporates CVA and DVA when calculating the results of trading portfolios. The CVA is a valuation adjustment of over-the-counter (OTC) derivatives, as a result of the risk associated with the credit exposure assumed by each counterparty.

It is calculated by taking into account the potential exposures with each counterparty in each future maturity. The CVA for a particular counterparty is the sum of the CVA for all maturities. For its calculation, the following inputs are considered:

- Expected exposure: including, for each operation the current market value (MTM) as well as the potential future risk (add-on) to each maturity. Mitigating factors such as collateral and netting agreements are taken into account, as well as a time decay factor for derivatives with partial interim payments.
- Loss given default: the percentage of final loss assumed in case of default/non-payment of the counterparty.
- Probability of default: for cases in which there is no market information (spread curve traded through CDS, etc.), general proxies generated on the basis of same sector companies with listed CDSs for the same sector and the counterparty's external rating.
- Discount factor curve.

The **Debt Valuation Adjustment (DVA)** is a valuation adjustment similar to the CVA, but in this case as a result of the Group's risk that counterparties assume in OTC derivatives.

## 4.3 Key metrics (trading market risk)

Risk levels in trading activity have stayed at historically low levels in 2018, in a complex environment marked by uncertainty arising from low interest rates and Brexit in Europe, and geopolitical risks in Latin America units (elections in the main geographies during the year). The exposure levels in trading portfolios are lower compared to previous years in all risk factors.

Risks of trading activities arise mainly from activities with customers in non-complex instruments, concentrated in hedging of interest rate and exchange rate risks. Contribution to overall risk of proprietary positions in trading portfolios is substantially lower than in previous years.

Trading market risk, structural and liquidity risk

In 2018, a low level of consumption has been seen of limits established for trading activities, which are set in a manner that is consistent with the risk appetite defined in the Group for this type of activity. Lower risk levels are also evident even under stressed scenarios, as seen in the loss results in the stress tests regularly carried out to assess any risks not reflected in the usual metrics to control and monitor trading risks.

**VaR analysis**

During the year, the Group maintained its strategy of concentrating its trading activity on customer business, minimising, where possible, the exposure to directional risk in net terms and maintaining geographic and risk factor diversification. This is reflected in the Value at Risk (VaR) of the SCIB trading book, which, despite the volatility in the markets, particularly in interest rates and exchange rates, decreased slightly from its average path over the last three years, ending December at EUR 11.3 million<sup>11</sup>.

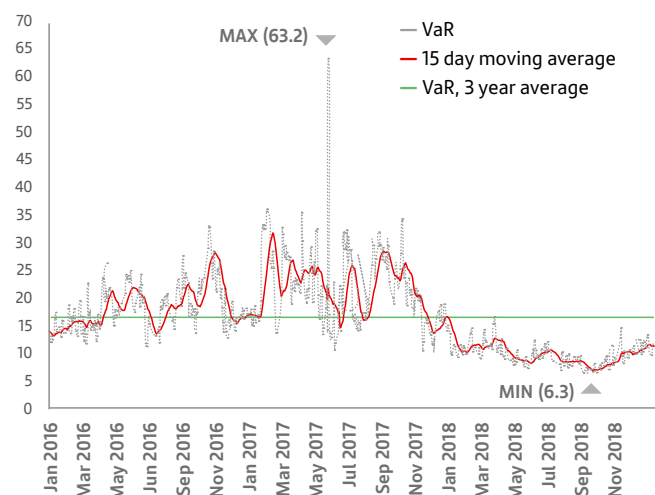
VaR during 2018 fluctuated between EUR 16.6 million and EUR 6.4 million. The most significant changes were related to variations in exchange and interest rate exposures and also market volatility.

The average VaR in 2018 was EUR 9.7 million, slightly lower than in the two previous years (EUR 21.5 million in 2017 and EUR 18.3 million in 2016).

The following histogram shows the distribution of risk in VaR terms from 2016 to 2018. The accumulation of days with levels of between EUR 12 million and EUR 32 million (95%) is shown. Values higher than EUR 32 million (3%) largely occur in periods affected by temporary spikes in volatility, mainly in the Brazilian real against the US dollar and also in Brazilian interest rates.

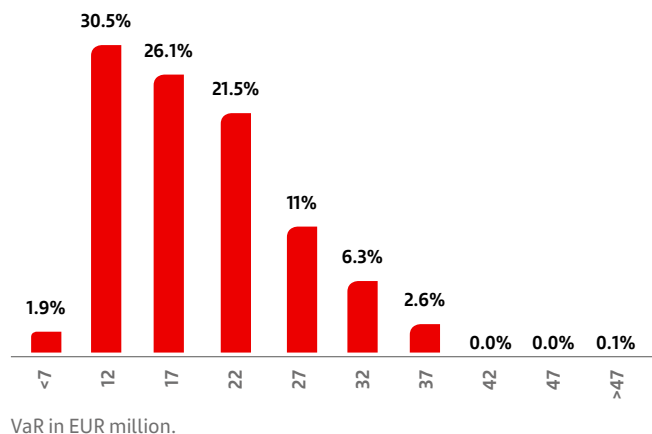
**VaR 2016-2018**

EUR million. VaR at 99% over a one day horizon.



**VaR histogram**

VaR at 99% over a one day horizon. Number of days (%) in each range from 2016 to 2018



11. Value at Risk. The definition and calculation methodology for VaR is set out in section 4.2 'Trading market risk management'. In addition to the trading activity of SCIB, there are other positions catalogued for accounting purposes. The total VaR of trading of this accounting perimeter was EUR 11.1 million.

## Risk per factor

The following table displays the average and latest VaR values at 99% by risk factor over the last three years, the lowest and highest values in 2018 and the expected shortfall at 97.5% at the close of December 2018:

### VaR statistics and Expected Shortfall by risk factor <sup>12,13</sup>

EUR million, VaR at 99% and ES at 97.5% with one day time horizon

	2018					2017		2016		
	VaR (99%)				ES (97.5%)	VaR		VaR		
	Min	Average	Max	Latest	Latest	Average	Latest	Average	Latest	
Total trading	<b>Total</b>	<b>6.4</b>	<b>9.7</b>	<b>16.6</b>	<b>11.3</b>	<b>12.4</b>	<b>21.5</b>	<b>10.2</b>	<b>18.3</b>	<b>17.9</b>
	Diversification effect	(3.3)	(9.3)	(18.7)	(11.5)	(10.0)	(8.0)	(7.6)	(10.3)	(9.6)
	Interest rate	5.9	9.4	15.5	9.7	9.5	16.2	7.9	15.5	17.9
	Equities	0.8	2.4	6.3	2.8	3.0	3.0	1.9	1.9	1.4
	Exchange rate	1.6	3.9	11.4	6.2	5.7	6.6	3.3	6.9	4.8
	Credit spread	1.0	3.4	13.0	4.1	4.2	3.6	4.6	4.2	3.3
	Commodities	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.1	0.1
Europe	<b>Total</b>	<b>3.3</b>	<b>5.7</b>	<b>11.5</b>	<b>6.3</b>	<b>6.4</b>	<b>7.0</b>	<b>6.4</b>	<b>9.0</b>	<b>9.4</b>
	Diversification effect	(3.2)	(6.3)	(11.0)	(7.8)	(7.3)	(6.1)	(6.0)	(9.1)	(7.6)
	Interest rate	3.2	4.9	8.7	5.7	5.5	6.1	5.7	8.2	9.1
	Equities	0.4	1.1	2.1	1.2	1.0	1.1	0.5	1.6	1.5
	Exchange rate	0.4	1.7	6.5	2.1	2.1	2.1	1.4	4.1	3.0
	Credit spread	2.2	4.3	12.6	5.1	5.0	3.7	4.7	4.1	3.4
	Commodities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Latin America	<b>Total</b>	<b>5.0</b>	<b>8.7</b>	<b>20.9</b>	<b>12.0</b>	<b>11.1</b>	<b>20.1</b>	<b>8.4</b>	<b>13.7</b>	<b>13.5</b>
	Diversification effect	(0.7)	(5.0)	(12.2)	(4.7)	(5.5)	(3.7)	(4.1)	(3.6)	(2.7)
	Interest rate	4.9	7.7	12.8	8.0	7.9	15.1	7.5	11.4	13.0
	Equities	0.5	2.3	5.6	2.7	3.0	3.3	1.9	1.4	0.8
	Exchange rate	1.3	3.4	12.1	5.3	5.0	5.5	3.1	4.5	2.4
US and Asia	<b>Total</b>	<b>0.5</b>	<b>1.6</b>	<b>3.2</b>	<b>1.8</b>	<b>1.8</b>	<b>2.1</b>	<b>1.2</b>	<b>1.3</b>	<b>2.7</b>
	Diversification effect	0.1	(0.5)	(1.6)	(0.3)	(0.2)	(0.6)	(0.4)	(0.5)	(0.6)
	Interest rate	0.6	1.5	3.1	1.8	1.7	2.0	1.2	1.3	2.7
	Equities	0.0	0.1	0.8	0.0	0.0	0.2	0.0	0.1	0.0
	Exchange rate	0.1	0.5	1.7	0.3	0.3	0.5	0.4	0.4	0.5
Global activities	<b>Total</b>	<b>0.2</b>	<b>1.0</b>	<b>1.8</b>	<b>0.5</b>	<b>0.5</b>	<b>0.4</b>	<b>0.2</b>	<b>0.6</b>	<b>0.5</b>
	Diversification effect	(0.0)	(0.3)	(0.5)	(0.1)	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)
	Interest rate	0.0	0.3	0.6	0.1	0.1	0.1	0.0	0.1	0.1
	Equities	0.2	0.9	1.8	0.5	0.5	0.4	0.2	0.5	0.5
	Exchange rate	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0

12. The VaR of global activities includes transactions that are not assigned to any particular country.

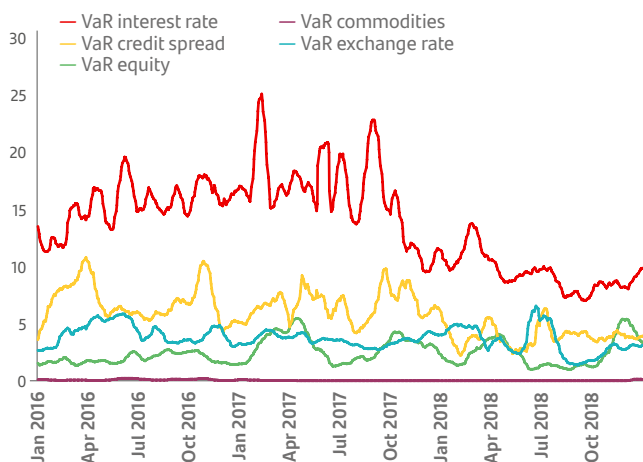
13. In Latin America, the United States and Asia, VaR levels are not shown separately for credit spreads and commodities, because of their limited or zero materiality.

At the end of December, VaR increased slightly by EUR 1.1 million compared to year-end 2017, decreasing average VaR by EUR 11.8 million. By risk factor, average VaR decreased in all factors, although the reduction of the credit spread was smaller. By geographical area, it declined in all areas except in that of Global Activities, where it slightly increased, although it remained at a low level.

The evolution of VaR by risk factor has, in general, been stable over the last few years, decreasing somewhat in 2018, in line with the above figures. The temporary rises in VaR for various factors are due more to temporary increases in the volatility of market prices than to significant changes in positions.

### Historical VaR by risk factor

EUR million. VaR at 99% with one day time horizon (15-day moving average)



### Gauging and backtesting measures

Actual losses can differ from those forecast by VaR for various reasons related to the limitations of this metric. This is set out in detail in Methodologies in section 4.2 'Trading market risk management'. The Group regularly analyses and contrasts the accuracy of the VaR calculation model in order to confirm its reliability.

The most important test consists of backtesting exercises, analysed at the local and global levels and in all cases with the same methodology. Backtesting consists of comparing forecast VaR measurements, with a certain level of confidence and time frame, with actual losses obtained in the same time frame. This enables anomalies in the VaR model of the portfolio in question to be detected (for example, shortcomings in the parameterisation of the valuation models of certain instruments, not very adequate proxies, etc.).

The Group calculates and evaluates three types of backtesting:

- 'Clean' backtesting: the daily VaR is compared with the results obtained without taking into account the intraday results or changes in the portfolio's positions. This method compares the effectiveness of the individual models used to assess and measure the risks of positions.
- Backtesting on complete results: daily VaR is compared with the day's net results, including the results of intraday transactions and those generated by fees and commissions.
- Backtesting on complete results without mark-ups or fees: the daily VaR is compared to the day's net results from intraday transactions but excluding those generated by mark-ups and fees. This method aims to give an idea of the intraday risk assumed by Group treasuries.

For the first case and for the total portfolio, there were three exceptions of Value at Earnings (VaE) at 99% in 2018 (day on which daily profit was higher than VaE) on 21 and 30 August and 8 October, caused by strong shifts in the exchange rates of emerging economies. The definition and calculation methodology for VaE is set out in section 4.2 'Trading market risk management' in this chapter.

There were also three exceptions to VaR at 99% (day on which the daily loss was higher than the VaR) on the 29 May, due to the rise in market volatility caused by political instability in Europe, and on 15 and 29 October due to the strong variations in the exchange rates and interest rates in Brazil and Mexico motivated by the general elections volatility.

The number of exceptions which occurred is consistent with the assumptions specified in the VaR calculation model.

## Backtesting of trading portfolios: daily results vs. VaR for previous day



### Derivatives risk management

Derivatives activity is mainly focused on commercialisation of investment products and on hedging risks for our customers. Management is focused on ensuring that the net risk opened is the lowest possible.

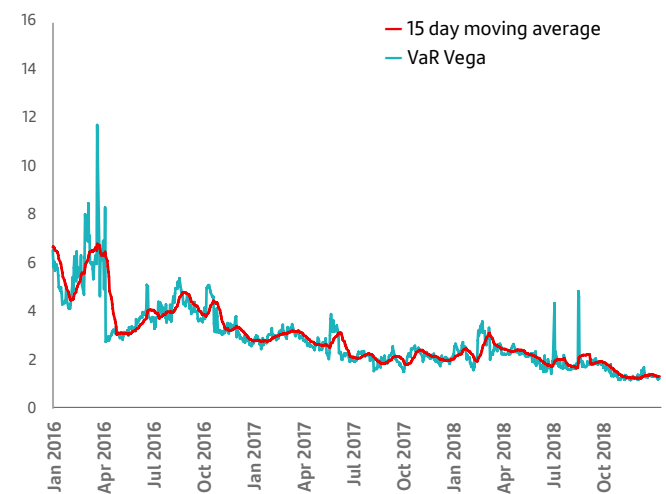
These transactions include options on equities, fixed income and exchange rates. The units where this activity mainly takes place are: Spain, Brazil, the UK and Mexico.

The following chart shows the VaR Vega<sup>14</sup> performance of structured derivatives business over the last three years. It fluctuated at around an average of EUR 3 million. In general, the periods with higher VaR levels are related to episodes of significant rises in volatility in the markets.

During 2016, a number of different events pushed up market volatility (Brexit, general elections in Spain and the United States, political-economic situation in Brazil, constitutional referendum in Italy). In 2017 and 2018 these events have been less volatile, other than in a few isolated instances, which has meant lowered risk and lower VaR Vega.

### Change in risk over time (VaR) of structured derivatives

EUR million. VaR Vega at a 99% over a one day horizon



14. Vega, a Greek term, means here the sensitivity of the value of a portfolio to changes in the price of market volatility.

Regarding the VaR by risk factor, on average, the exposure was concentrated, in this order: equities, exchange rates and interest rates. This is shown in the table below:

### Financial derivatives. Risk (VaR) by risk factor

EUR million. VaR at a 99% over a one day horizon

	2018				2017		2016	
	Minimum	Average	Maximum	Latest	Average	Latest	Average	Latest
<b>Total VaR Vega</b>	<b>1.0</b>	<b>1.8</b>	<b>4.7</b>	<b>1.1</b>	<b>2.3</b>	<b>2.5</b>	<b>4.0</b>	<b>2.5</b>
Diversification effect	(0.7)	(1.4)	(2.8)	(1.4)	(1.5)	(0.6)	(2.4)	(2.3)
VaR interest rate	0.6	0.9	4.9	0.9	1.3	0.7	3.6	2.6
VaR equities	0.6	1.2	2.7	1.0	1.5	1.4	1.7	1.3
VaR exchange rate	0.5	1.1	2.3	0.6	0.9	1.0	1.1	0.9
VaR commodities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

The average risk in 2018 (EUR 1.8 million) is lower than in 2017 and 2016, for the reasons explained above.

**The Group continues to have a very limited exposure to instruments or complex structured assets**, a management culture for which prudence in risk management is one of its hallmarks in risk management. In both cases, the exposure has reduced comparing with the previous year, for which the Group has:

- Hedge funds: the total exposure is not significant (EUR 28 million at close of December 2018) and is all indirect, acting as counterparty in derivatives transactions. The risk with this type of counterparty is analysed case by case, establishing percentages of collateralisation on the basis of the features and assets of each fund.
- Monolines: exposure to bond insurance companies as of December 2018 was EUR 24 million, all of it indirect, by virtue of the guarantee provided by this type of entity for various financing or traditional securitisation transactions. The exposure in this case is to double default, as the primary underlying assets are of high credit quality.

The Group's policy for approving new transactions related to these products remains very prudent and conservative. It is subject to strict supervision by the Group's senior management. Before approving a new transaction, product or underlying asset, the Risk division verifies:

- The existence of an appropriate valuation model to monitor the value of each exposure: mark-to-market, mark-to-model or mark-to-liquidity.

- The availability in the market of observable data (inputs) needed to apply this valuation model.

And provided these two conditions are always met:

- The availability of adequate systems, duly adapted to calculate and monitor every day the results, positions and risks of new transactions.
- The degree of liquidity of the product or underlying asset, in order to make possible their coverage when deemed appropriate.

### Scenario analysis

Various stress scenarios were calculated and analysed regularly in 2018 (at least monthly) at the local and global levels for all the trading portfolios and using the same risk factor assumptions.

#### Maximum volatility scenario (worst case)

This scenario is given particular attention as it combines historic movements of risk factors with an ad-hoc analysis in order to reject very unlikely combinations of variations (for example, sharp falls in stock markets together with a decline in volatility). A historic volatility equivalent to six standard deviations is applied. The scenario is defined by taking for each risk factor the movement which represents the largest potential loss in the portfolio, rejecting the most unlikely combinations in economic-financial terms.

At the end of December, that scenario implied, for the global portfolio, interest rate rises in Latin American markets and falls in core markets, stock market falls, depreciation of all currencies against the euro, and increased credit spreads and volatility.

The results for this scenario as of the end of December 2018 are shown in the following table:

## Stress scenario: maximum volatility (worst case)

EUR million. Dec. 2018 data

	Interest rate	Equities	Exchange rate	Credit spread	Commodities	Total
<b>Total trading</b>	<b>(18.9)</b>	<b>(13.1)</b>	<b>(29.4)</b>	<b>(12.9)</b>	<b>-</b>	<b>(74.3)</b>
Europe	(7.9)	(3.8)	(9.2)	(11.1)	-	(32.0)
Latin America	(2.1)	(9.3)	(15.8)	(0.1)	-	(27.3)
US	(8.5)	-	(3.8)	-	-	(12.3)
Global activities	(0.2)	-	(0.2)	(1.7)	-	(2.1)
Asia	(0.2)	-	(0.4)	-	-	(0.6)

The stress test shows that the economic loss suffered by the Group in its trading portfolios, in terms of the mark-to-market (MtM) result, would be EUR 74.3 million, if the stress movements defined in the scenario materialised in the market. This loss would be concentrated in Europe (in the following order: credit spread, exchange rate, interest rate and equities) and in Latin America (in the following order: exchange rate, equities, interest rate and credit spread).

### Other global stress scenarios

'Abrupt crisis': an ad-hoc scenario with sharp market movements. Rise in interest rate curves, sharp falls in stock markets, strong appreciation of the dollar against other currencies, rise in volatility and in credit spreads.

'Subprime crisis': historic scenario of the US mortgage crisis. The objective of the analysis was to capture the impact on results of the reduction in liquidity in the markets. Two time horizons were used (one day and 10 days), and in both cases there were falls in stock markets and in interest rates in core markets and rises in emerging markets, and appreciation of the US dollar against other currencies.

'Plausible Forward Looking Scenario': a hypothetical plausible scenario defined at local level in market risk units, based on the portfolio positions and their expert judgement regarding short-

term changes in market variables which can have a negative impact on such positions.

'EBA adverse scenario': the scenario proposed by the EBA in April 2014 as part of the EBA 2014 EU-Wide Stress Test and updated in January 2016. It was initially conceived as an adverse scenario proposed by European banks thinking in terms of a 2014-2016 time horizon and subsequently updated to the 2016-2018 time horizon. It reflects the systemic threats which are considered to be the most serious threats to the stability of the banking sector in the European Union.

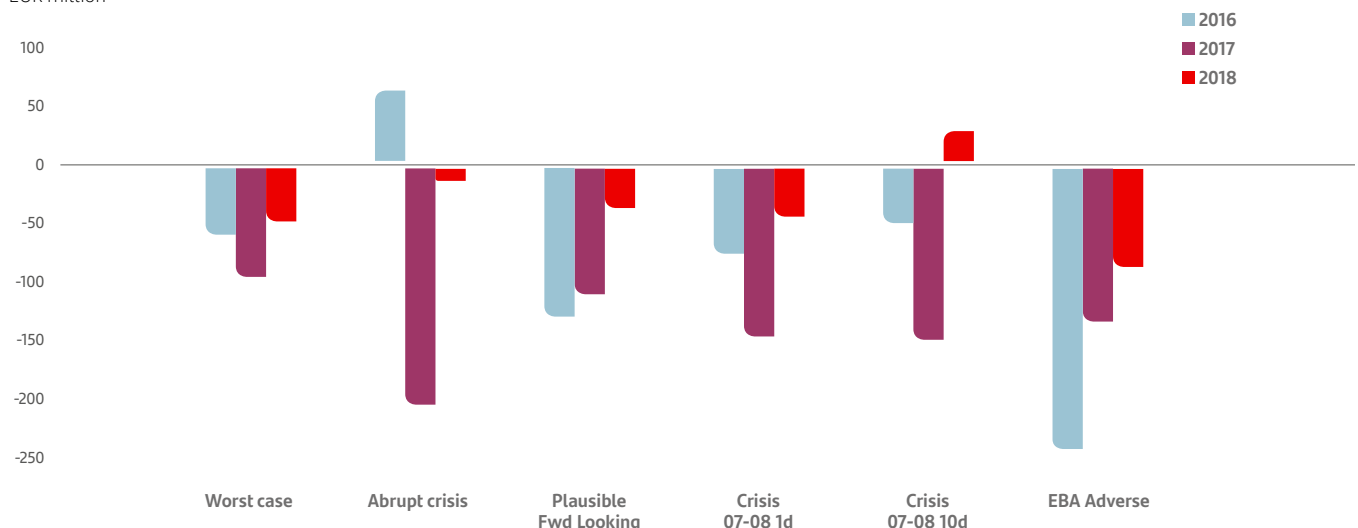
Analysis of reverse stress tests, which are based on establishing a predefined result (unfeasibility of a business model or possible insolvency) and subsequently the risk factor scenarios and movements which could cause that situation are identified.

On a monthly basis, a stress test assessment report is performed containing explanations of the main results variations for the different scenarios and units. An early warning mechanism has also been established so that when the loss for a scenario is high in historic terms and/or in terms of the capital consumed by the portfolio in question, the relevant business executive is informed.

The results of these monthly global scenarios for the last three years are shown in the following table:

## Stress test results. Comparison of 2016-2018 scenarios (annual averages)

EUR million



Also, other stress scenarios are carried out on a quarterly basis, such as the reverse stress test, scenarios of illiquidity and concentration with regard to Additional valuation adjustments (AVAs), and IRC.

### Linkage with balance sheet items

Below are the balance sheet items in the Group's consolidated position that are subject to market risk, distinguishing the positions whose main risk metric is the VaR from those where monitoring is carried out with other metrics.

### Relation of risk metrics with balances in Group's consolidated position

EUR million. Dec. 2018 data

Assets subject to market risk	Balance sheet amount	Main market risk metrics		Main risk factors for 'Other' balance
		VaR	Other	
Cash, cash balances at central banks and other deposits on demand	113,663		113,663	Interest rate
Financial assets held for trading	92,879	92,140	739	Interest rate; credit spread
Non-trading financial assets mandatorily at fair value through profit or loss	10,730	9,327	1,403	Interest rate; equities
Financial assets designated at fair value through profit or loss	57,460	56,584	876	Interest rate
Financial assets at fair value through other comprehensive income	121,091		121,091	Interest rate; credit spread
Financial assets measured at amortised cost	946,099		946,099	Interest rate
Hedging derivatives	8,607	8,586	21	Interest rate; exchange rates
Changes in the fair value of hedged items in portfolio hedges of interest risk	1,088		1,088	Interest rate
Other assets	107,654			
<b>Total assets</b>	<b>1,459,271</b>			
<b>Liabilities subject to market risk</b>				
Financial liabilities held for trading	70,343	70,054	289	Interest rate; credit spread
Financial liabilities designated at fair value through profit or loss	68,058	67,909	149	Interest rate
Financial liabilities at amortised cost	1,171,630		1,171,630	Interest rate; credit spread
Hedging derivatives	6,363	6,357	6	Interest rate; exchange rates
Changes in the fair value hedged items in portfolio hedges of interest rate risk	303		303	Interest rate
Other liabilities	35,213			
<b>Total liabilities</b>	<b>1,351,910</b>			
<b>Total equity</b>	<b>107,361</b>			

## 4.4 Structural balance sheet risks management

### System for controlling limits

As already stated for the market risk in trading, under the annual limits plan framework, limits are set for balance sheet structural risks, responding to the Group's risk appetite level.

The main limits are:

- Balance sheet structural interest rate risk:

- Limit on the sensitivity of net interest income in 1 year.

- Limit on the sensitivity of equity value.

- Structural exchange rate risk:

- Net position in each currency (for results hedging positions).

In the event one of these limits or their sub limits is exceeded, the risk management executives must explain the reasons and facilitate the actions to correct it.

## Methodologies

### a) Structural interest rate risk

The Group analyses the sensitivity of its net interest income and equity value to changes in interest rates. This sensitivity arises from differences in maturity dates and interest rate repricing gaps in the various balance sheet items.

Taking into consideration the balance-sheet interest rate position and the market situation and outlook, the necessary financial actions are adopted to align this position with that desired by the Group. These measures can range from opening positions on markets to the definition of the interest rate features of commercialised products.

The metrics used by the Group to control interest rate risk in these activities are the repricing gap, the sensitivity of net interest margin and market value of equity to changes in interest rates, the duration of capital and value at risk (VaR) for economic capital calculation purposes.

### b) Interest rate gap on assets and liabilities

This is the basic concept for identifying the Group's interest rate risk profile and it measures the difference between the volume of sensitive assets and liabilities on and off balance sheet that re-price (i.e. that mature or are subject to rate revisions) at certain times (called, buckets). This provides an immediate approximation of the sensitivity of the entity's balance sheet and its net interest income and equity value to changes in interest rates.

### c) Net interest income (NII) sensitivity

This is a key measure of the profitability of balance sheet management. It is calculated as the difference which arises in the net interest income during a certain period of time due to a parallel movement in interest rates. The standard period for measuring net interest income sensitivity is one year.

### d) Economic value of equity (EVE) sensitivity

This measures the interest rate risk implicit in equity value (which for the purposes of interest rate risk is defined as the difference between the net current value of assets and the net current value of liabilities outstanding), based on the impact that a change in interest rates would have on those current values.

### e) Treatment of liabilities without defined maturity

In the corporate model, the total volume of the balances of accounts without maturity is divided between stable and unstable balances which are obtained from a model that is based on the relationship between balances and their own moving averages.

From this simplified model, the monthly cash flows are obtained and used to calculate NII and EVE sensitivities.

This model requires a variety of inputs:

- Parameters inherent in the product.
- Performance parameters of the client (in this case analysis of historic data is combined with the expert business view).
- Market data.
- Historic data of the portfolio.

### f) Pre-payment treatment for certain assets

The pre-payment issue mainly affects fixed-rate mortgages in units where the relevant interest rate curves for the balance sheet are at low levels. This risk is modelled in these units, and this can also be applied, with some modifications, to assets without defined maturity (credit card businesses and similar).

The usual techniques used to value options cannot be applied directly because of the complexity of the factors that determine borrower pre-payments. As a result, the models for assessing options must be combined with empirical statistical models that seek to capture pre-payment performance. Some of the factors conditioning this performance are:

- **Interest rate:** the differential between fixed rates on the mortgage and the market rate at which it could be refinanced, net of cancellation and opening costs.
- **Seasoning:** reflects the existing trend of lower prepayments at the beginning of the transaction's life-cycle, which then increase and stabilises as time goes by.
- **Seasonality:** redemptions or early cancellations tend to take place at specific dates.
- **Burnout:** decreasing trend in the speed of pre-payment as the instrument's maturity approaches, which includes:
  - a) Age: defines low rates of pre-payment.
  - b) Cash pooling: defines those loans that have already overcome various waves of interest rate falls as more stable. In other words, when a loan portfolio has passed one or more cycles of downward rates and thus high levels of pre-payment, the 'surviving' loans have a significantly lower pre-payment probability.
  - c) Other: geographic mobility, demographic, social and available income factors, etc.

The series of econometric relationships that seek to capture the impact of all these factors is the probability of pre-payment of a loan or pool of loans and is denominated the pre-payment model.

### g) Value at Risk (VaR)

For balance sheet activity and investment portfolios, this is defined as the 99% percentile of the distribution function of losses in equity value, calculated based on the current market value of positions and returns over the last two years, at a particular level of statistical confidence over a certain time horizon. As with trading portfolios, a time frame of two years or at least 520 days from the reference date of the VaR calculation is used.

The Group is working on implementing the guidelines published by the EBA on management of interest rate risk in the banking book (Irrbb), published in July 2018 and applicable in 2019.

#### h) Structural foreign exchange rate risk/hedging of results

These activities are monitored via position measurements, VaR and results, on a monthly basis.

#### i) Structural equity risk

These activities are monitored via position measurements, VaR and results, on a monthly basis.

## 4.5 Key metrics (structural balance sheet risks)

The market risk profile inherent in the Group's balance sheet, in relation to its asset volumes and shareholders' funds, as well as the budgeted net interest income margin, remained moderate in 2018, in line with previous years.

The interest rate risk originated by commercial banking in each unit is transferred to its management – through an internal risk transfer system – to the local Financial division, which is responsible for the subsidiary's structural risk management generated by interest rate fluctuations. The Group's usual practice is to measure interest rate risk by using statistical models, relying on mitigation strategies of structural risk using interest rate instruments, such as fixed income bond portfolios and derivative instruments to maintain the risk profile at levels that are appropriate to the risk appetite approved by senior management.

### Structural interest rate risk

#### Europe and United States

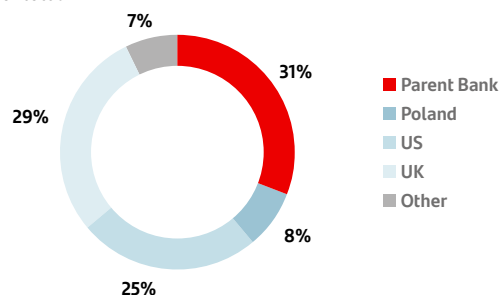
The main balance sheets, the Parent, the UK and the US, in mature markets and in a low interest rate setting, usually show positive sensitivities to interest rates in economic value of equity and net interest income.

Exposure levels in all countries are moderate in relation to the annual budget and capital levels.

At the end of December 2018, risk on net interest income over one year, measured as sensitivity to parallel changes in the worst case scenario of  $\pm 100$  basis points, was concentrated in the euro, at EUR 269 million, the pound sterling, at EUR 203 million, the US dollar, with EUR 130 million, and the Polish zloty, at EUR 53 million.

### Net interest income sensitivity

% of total

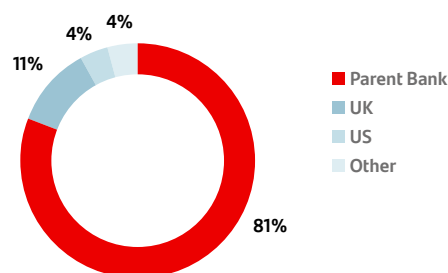


Other: Portugal and SCF.

At the same date, the most significant risk in economic value of equity, measured as its sensitivity to parallel changes in the worst case scenario of  $\pm 100$  basis points, was concentrated in the euro interest rate curve, at EUR 5,043 million, the pound sterling, with EUR 605 million, the Polish zloty, at EUR 62 million and the US dollar, at EUR 19 million.

### Economic value of equity sensitivity

% of total



Other: Poland, Portugal and SCF.

### Latin America

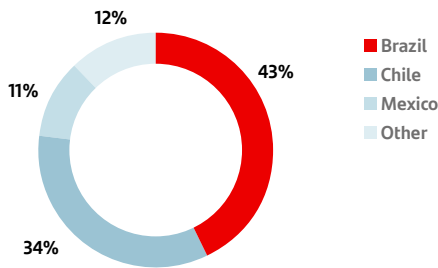
Latin American balance sheets are usually positioned for interest rate cuts for both economic value and net interest income, except for net interest income in Mexico, where liquidity excess is invested in the short term in the local currency.

In 2018, exposure levels in all countries were moderate in relation to the annual budget and capital levels.

At the end of December, risk on net interest income over one year, measured as sensitivity to parallel changes in the worst case scenario of  $\pm 100$  basis points, was concentrated in three countries: Brazil (EUR 45 million), Chile (EUR 35 million) and Mexico (EUR 12 million), as shown in the chart below:

## Net interest income sensitivity

% of total

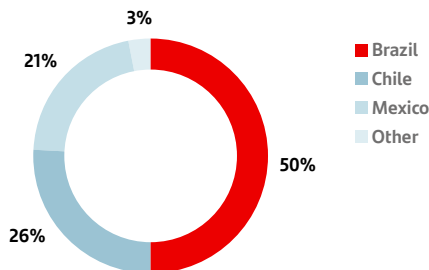


Other: Argentina, Peru and Uruguay.

Risk to the economic value of equity over one year, measured as sensitivity to parallel  $\pm 100$  basis point movements in the worst case scenario, was also concentrated in Brazil (EUR 419 million), Chile (EUR 219 million) and Mexico (EUR 172 million).

## Economic value of equity sensitivity

% of total



Other: Argentina, Peru and Uruguay.

## Balance sheet structural interest rate VaR

In addition to sensitivities to interest rate movements (in which, assessments of  $\pm 100$  bp movements are complemented by assessments of  $\pm 25$  bp,  $\pm 50$  bp and  $\pm 75$  bp movements to give a fuller understanding of risk in countries with very low rates), the Group also uses other methods to monitor structural balance sheet risk from interest rates movements: these include scenario analysis and VaR calculations, applying a similar methodology to that used for trading portfolios.

The table below shows the average, minimum, maximum and year-end values of structural interest rate risk VaR over the last three years:

## Balance sheet structural interest rate risk (VaR)<sup>A</sup>

EUR million. VaR at a 99% over a one day horizon

	2018			
	Minimum	Average	Maximum	Latest
<b>Structural interest rate VaR<sup>A</sup></b>	<b>301.3</b>	<b>337.1</b>	<b>482.5</b>	<b>319.5</b>
Diversification effect	(49.5)	(113.2)	(182.5)	(71.5)
Europe and US	282.2	340.2	535.2	319.1
Latin America	68.5	110.1	129.7	72.0

	2017			
	Minimum	Average	Maximum	Latest
<b>Structural interest rate VaR<sup>A</sup></b>	<b>280.9</b>	<b>373.9</b>	<b>459.6</b>	<b>459.6</b>
Diversification effect	(198.6)	(230.3)	(256.5)	(169.1)
Europe and US	362.6	433.6	517.8	511.8
Latin America	116.9	170.6	198.4	116.9

	2016			
	Minimum	Average	Maximum	Latest
<b>Structural interest rate VaR<sup>A</sup></b>	<b>242.5</b>	<b>340.6</b>	<b>405.8</b>	<b>327.2</b>
Diversification effect	(129.2)	(271.0)	(294.3)	(288.6)
Europe and US	157.7	376.8	449.3	365.0
Latin America	214.0	234.9	250.8	250.8

A. Includes credit spread VaR on ALCO portfolios

Structural interest rate risk, measured in terms of VaR at one-day and at 99%, averaged EUR 337.1 million in 2018. It is important to note the high level of diversification between the balance sheets of Europe and United States and those of Latin America.

## Structural foreign exchange rate risk/hedging of results

Structural exchange rate risk arises from Group transactions in foreign currencies, mainly related to permanent financial investments, results and the hedging of both.

This management is dynamic and seeks to limit the impact on the core capital ratio from foreign exchange rates movements. In 2018, hedging levels of the core capital ratio for foreign exchange rate risk were maintained near 100%.

At the end of 2018, the largest exposures of permanent investments (with their potential impact on equity) were, in the following order, in Brazilian reais, US dollars, UK pounds sterling, Chilean pesos, Mexican pesos and Polish zlotys. The Group hedges some of these positions of a permanent nature with foreign exchange-rate derivatives.

In addition, the financial area is responsible for managing foreign exchange rate risk for the Group's expected results and dividends in units where the base currency is not the euro.

### Structural equity risk

The Group maintains equity positions in its banking book in addition to those of the trading portfolio. These positions are maintained as equity instruments or as equity stakes, depending on the percentage or control.

The equity portfolio available for the banking book at the end of December 2018 was diversified in securities in various countries, mainly Spain, China, Morocco, Netherlands and Poland. Most of the portfolio is invested in financial activities and insurance sectors.

Among other sectors, to a lesser extent, are for example real estate activities or public administrations.

Structural equity positions are exposed to market risk. VaR is calculated for these positions using market price data series or proxies. As of the end of December 2018, the VaR at 99% with a one day time frame was EUR 180.1 million (EUR 261.6 and EUR 323 million at the end of 2017 and 2016, respectively).

### Structural VaR

A standardised metric such as VaR can be used for monitoring total market risk for the banking book, excluding the trading activity of SCIB (the VaR evolution for this activity is described in section 4.3 'Key metrics (trading market risk)', distinguishing between fixed income (considering both interest rates and credit spreads on ALCO portfolios), exchange rates and equities.

In general, structural VaR is not high in terms of the Group's volume of assets or equity.

### Structural VaR

EUR million. VaR at a 99% over a one day horizon

	2018				2017		2016	
	Minimum	Average	Maximum	Latest	Average	Latest	Average	Latest
<b>Structural VaR</b>	<b>485.0</b>	<b>568.5</b>	<b>799.4</b>	<b>556.8</b>	<b>878.0</b>	<b>815.7</b>	<b>869.3</b>	<b>922.1</b>
Diversification effect	(319.7)	(325.0)	(355.4)	(267.7)	(337.3)	(376.8)	(323.4)	(316.6)
VaR Interest Rate <sup>A</sup>	301.3	337.1	482.5	319.5	373.9	459.6	340.6	327.2
VaR Exchange Rate	323.3	338.9	386.2	324.9	546.9	471.2	603.4	588.5
VaR Equities	180.1	217.6	286.1	180.1	294.5	261.6	248.7	323.0

A. Includes credit spread VaR on ALCO portfolios.

## 4.6 Liquidity risk management

### Methodologies

The Group measures liquidity risk using a range of tools and metrics that account for the risk factors identified within this risk.

### Liquidity buffer

The buffer is a portion of the total liquidity available to an entity to deal with potential withdrawals of funds (liquidity outflows) that may arise as a result of periods of stress. Specifically, a buffer consists of a set of unencumbered liquid resources that are available for immediate use and capable of generating liquidity promptly, without incurring any loss or excessive discount. The Group uses the liquidity buffer as a tool that forms part of the calculation of most liquidity metrics and is also a metric in its own, with specified limits for each entity.

### Liquidity coverage ratio (LCR)

LCR has a regulatory definition. It is intended to reinforce the short-term resistance of banks' liquidity risk profile by ensuring that they have available sufficient high-quality liquid assets to withstand a stress scenario (idiosyncratic stress or market stress) of considerable severity for thirty calendar days.

### Wholesale liquidity metric

This metric takes the form of a liquidity horizon assuming non-renewable wholesale financing outflows; it measures the number of days the entity would survive using its liquid assets to cover that loss of liquidity. The Group uses this figure as an internal short-term liquidity metric which also reduces the risk of dependence on wholesale funding.

### Net stable funding ratio (NSFR)

NSFR is one of the metrics used by the Group to measure long-term liquidity risk. It is a regulatory metric defined as the coefficient of the available amount of stable funding and the required amount of stable funding. This metric requires banks to maintain a stable funding profile in relation to the composition of their assets and off-balance sheet activities.

### Structural funding ratio

The structural funding ratio measures the volume of structural funding sources used by the entity in relation to all assets regarded as structural. This internal metric is used by each Group unit to measure long-term liquidity risk. It is intended to limit recourse to short-term wholesale funding and encourage the use of medium- and long-term instruments to fund requirements arising from the Group's core business.

### Asset encumbrance metrics

The Group uses at least two types of metric to measure asset encumbrance risk: (i) the asset encumbrance ratio, which calculates the proportion of total encumbered assets, which are unavailable for obtaining funds, to the entity's total assets; and (ii) the structural asset encumbrance ratio, which measures the proportion of assets encumbered by reason of structural funding transactions (mainly long-term collateralised issues and funding from central banks).

### Other liquidity indicators

Aside from traditional liquidity risk measurement tools for short-term risk and long-term or funding risk, the Group has constructed a range of additional liquidity indicators that supplement the conventional toolset and measure other liquidity risk factors not otherwise covered. Most of these indicators are concentration metrics, such as concentration on the five largest counterparties from a liabilities point of view, or concentration of financing by time to maturity.

### Liquidity scenario analysis

The Group uses four standard scenarios as liquidity stress tests:

- (i) an idiosyncratic scenario featuring events that adversely affect the Group alone;
- (ii) a local market scenario, which considers events having serious adverse effects on the financial system or real economy of the Group's base country;
- (iii) a global market scenario, which considers events having serious adverse effects on the global financial system; and
- (iv) a combined scenario, coupling idiosyncratic events with severe (local and global) market events arising simultaneously and interactively.

The Group uses the outcomes of the stress scenarios in combination with other tools to determine risk appetite and support business decision-making.

### Liquidity early warning indicators (EWIs)

The system of liquidity EWIs comprises quantitative and qualitative indicators that enable us to foresee liquidity stress situations and potential weaknesses in the Group entities' funding and liquidity structure. EWIs are both external (environmental), relating to market financial variables, or internal, relating to the Group's own actions.

## 4.7 Key metrics (liquidity risk)

The Group has a strong liquidity and financing position based on a decentralised liquidity model, where each of the Group's units is autonomous in managing its liquidity and maintains large buffers of highly liquid assets.

As a rule, short-term liquidity metrics, LCR remains stable, with regulatory ratios above the threshold (the minimum required in 2018 is 100%).

The Group has an effective management of its liquidity buffers to face the challenge of maintaining a proper liquidity profile (regulatory limits) while protecting the profitability of our balance sheet. Furthermore, most of Santander's units maintain sound balance sheet structures, with a stable financing structure based on a broad customer deposit base, which covers structural needs, with low dependence on short-term funding and liquidity metrics well above regulatory requirements, both locally and at Group level, and within the limits defined on the risk appetite framework.

Hence, for long-term liquidity, the regulatory metric NSFR remains above 100% for the Group's core units and for the consolidated ratio.

As to structural assets encumbrance risk, i.e. the risk of facing an excess of assets bearing charges or encumbrances in connection with financing transactions and other market operations, the Group-level risk is in line with our European peers, where the main sources of encumbrance are collateralised debt issuances (securitisations and covered bonds) and collateralised funding facilities provided by central banks.

The soundness of Santander units' balance sheets is also demonstrated under stress scenarios constructed in accordance with uniform corporate criteria across the Group. All units would survive the worst case scenario for at least 45 days, meeting liquidity requirements with their liquid asset buffers alone.



For more detail regarding liquidity metrics, see the Economic and financial review chapter, section 3.4 'Liquidity and funding management'.

## 4.8 Pension and actuarial risk management

### Pension risk

In managing the risk associated with the defined benefit employee pension funds, the Group assumes the financial, market, credit and liquidity risks incurred in connection with the fund's assets and investments and the actuarial risks arising from the fund's liabilities, i.e. the pension obligations to its employees.

The aim pursued by the Group in pensions risk control and management is primarily to identify, measure, follow up, control, mitigate and report this risk. The Group's priority is to therefore identify and mitigate all clusters of pension's risk.

This is why the methodology used by the Group estimates every year the combined losses in assets and liabilities under a defined stress scenario from changes in interest rates, inflation, stocks markets and real estate prices, as well as credit and operational risk.

### Actuarial risk

Actuarial risk arises due to biometric changes in the life expectancy of those with life insurance, from the unexpected increase in the compensation envisaged in non-life insurance and, in any case, from unexpected changes in the performance of insurance takers in the exercise of the options envisaged in the contracts.

A distinction is made between the following actuarial risks:

**Risk of life liability:** risk of loss in the value of life assurance liabilities caused by fluctuations in risk factors that affect these liabilities:

- Mortality/longevity risk: risk of loss due to changes in the value of liabilities as a result of changes in the estimate of the probability of death/survival of insureds.
- Morbidity risk: risk of loss due to changes in the value of liabilities as a result of changes in the estimate of the probability of disability/incapacity of insureds.
- Redemption/fall risk: risk of loss due to changes in the value of liabilities as a result of the early termination of the contract or changes in the policyholders' exercise of rights with regard to redemption, extraordinary contributions and/or paid up options.
- Expense risk: risk of loss due to changes in the value of liabilities arising from adverse variances in expected expenses.
- Catastrophe risk: losses caused by the occurrence of catastrophic events that increase the entity's life liabilities.

**Risk of non-life liability:** risk of loss from the change in the value of the non-life insurance liability caused by fluctuations in risk factors that affect these liabilities:

- Premium risk: loss derived from the insufficiency of premiums to cover the disasters that might occur.
- Reserve risk: loss derived from the insufficiency of reserves for disasters, already incurred but not settled, including costs for management of these disasters.
- Catastrophe risk: losses caused by catastrophic events that increase the Group's non-life liability.

# 5. Capital risk

## 5.1 Introduction

The Group defines capital risk as the risk of lacking sufficient capital, in quantitative or qualitative terms, to fulfil its business objectives, regulatory requirements, or market expectations.

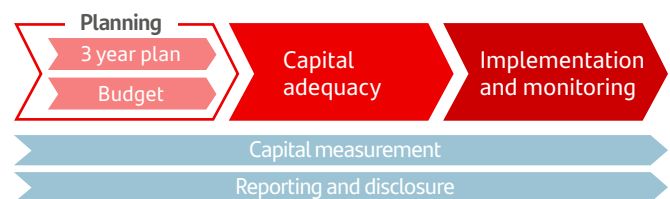
## 5.2 Capital risk management

The capital risk function, as second line of defence carries out the control and supervision of the capital activities developed by the first line of defence, which independently challenges mainly through the following processes:

- Supervision of capital planning and adequacy exercises through a review of all their components (balance sheet, profit and loss account, risk-weighted assets and available capital).
- Ongoing supervision of measurement of the Group's regulatory capital by identifying the key metrics for the calculation, setting tolerance levels for identified metrics and reviewing their consumption and the consistency of the calculations, including single transactions with a capital impact.

The function is designed to carry out full and regular monitoring of capital risk by verifying that capital is sufficient and adequately covered in accordance with the Group's risk profile.

Capital risk control is part of the general corporate risk framework, which brings together a range of processes, such as capital planning and adequacy and the subsequent budget execution and monitoring, alongside the ongoing measurement of capital and the reporting and disclosure of capital data, as described below:



### Supervision of capital planning and adequacy exercises

The review by the risk function of capital planning and adequacy exercises ensure that capital is consistent with the established risk appetite and risk profile. It has the following fundamental objectives:

- Ensure that all relevant risks to which the Group is subject, in the course of its activity, are monitored.
- Review the methodologies and assumptions used in these planning processes are appropriate.
- Verify that results are reasonable and consistent with the business strategy, the macroeconomic environment and the variables of the system.
- Assess the consistency between different tests, especially those which use base and stressed scenarios.

This function is implemented in phases, according to the following scheme:



### Definition of scope

The process of supervision of capital planning and adequacy begins with the preparation of the materiality proposal, which will identify the local units whose importance is representative for the Group in terms of risk-weighted assets.

In addition, other units, businesses or portfolios may be included, even if their materiality does not make them very representative, if deemed appropriate to be analysed due to their impact on the Group's strategy, compliance with the global plan or due to their timely relevance.

### Qualitative analysis

In this phase, the overall quality of the qualitative forecasts process is assessed, and includes a review of the following aspects:

- Models used in the generation of forecasts and scenarios, scope, metrics covered and so on.
- Documentation available and provided in the generation process.
- The quality of the information included in the forecasts, the integrity of the data, the controls applied, the recommendations issued by Internal Audit, etc.
- Governance of the process, committees in which the forecasts have been presented and reviewed, approval by areas prior to final approval.

### Quantitative analysis

The defined metrics and components that affect projections of risk weighted assets (RWA), available capital, pre-provision net revenue (PPNR) and of provisions are quantitatively assessed. The tests conducted include analysis of volumes, trends, reasonableness and cross-checks against the development of macroeconomic variables and historic data series.

This phase calls for the involvement and appropriate coordination of all subsidiaries within the scope of the process, to conduct analysis of local projections, which in turn underpin Group-level projections.

### Conclusions and disclosure

Based on the outcomes from the capital planning and adequacy phases, the Group conducts a final assessment, at least encompassing the scope of analysis, the weaknesses and the areas for improvement detected in the course of the supervision process, reporting to senior management in accordance with the established governance.

If deemed necessary, a discussion of them will be proposed in the relevant first-line (capital committee) and second-line committees (risk control committee).

### Ongoing supervision of capital measurement

Ongoing supervision of the measurement of the Group's regulatory capital, ensuring an appropriate capital risk profile, is another capital risk control function.

For this purpose, the Group conducts qualitative analysis of the regulatory and supervisory framework and an ongoing review of capital metrics and specified thresholds.

Moreover, ongoing monitoring of compliance with the capital risk appetite is conducted aiming to maintain capital above the regulatory requirements and market demands.

To fulfil this function, the following phases have been established, in accordance with the process described below:



### Definition of metrics and thresholds

A set of metrics and thresholds that are used in the supervision process and provide the capital risk monitoring and control view are specified on an annual basis.

The metrics consist of:

- Primary metrics: these cover capital ratios and its components in numerator and denominator at the highest level, in addition to the transformation ratio, the EAD and expected loss.
- Secondary metrics: these include a greater breakdown than the above (credit RWA's under the Basel category or the basis on which market RWA's are calculated).
- Supplementary metrics: these allow for a more detailed analysis than the above.

Thresholds are set in certain metrics which, if breached, trigger a more detailed analysis and an explanation of the causes of the breach.

The metrics, their thresholds and the sources of information used are outlined in the internal 'Guidelines of Metrics of Capital Measurement Control'.

### **Preliminary analysis**

At this phase of the control process, the qualitative issues, such as process governance and regulatory framework are analysed.

In addition, the steps taken in connection with capital to fulfil recommendations and instructions issued by supervisory authorities and by internal audit function are examined.

### **Measurement assessment**

Based on the information provided, the capital risk function analyses the metrics defined in the process, according to the following procedure:

- Review of primary and secondary metrics to detect variations that exceed the defined thresholds, and where they do, perform a detailed analysis of the causes and analysing supplementary metrics.
- If the origin of the incidence lies in a specific unit or corporate area, more detailed information is requested.
- Incidences found must be duly explained in terms of their causes (change in volumes, changes in the profile, one-offs, BAU initiatives, capital actions, etc.) and discussed with the unit or corporate function involved, and with the regulatory capital and pensions function.

### **Conclusions and disclosure**

The report with the conclusions is discussed by the governance body responsible for capital risk control and risk forecasting and is distributed to the regulatory capital and pensions function.

If deemed necessary, the report will be proposed for discussion in the relevant first line (Capital committee) and second-line committees (Risk control committee).

### **Oversight of significant risk transfer assessment**

In addition, capital risk carries out the supervision of significant risk transfer (SRT) of securitisations. This process is a prior step and a fundamental requirement for the execution of securitisations that have SRT.

## **5.3 Key metrics**



For more detail see chapter Economic and financial review, section 3.5 'Capital management and adequacy. Solvency ratios'.

# 6. Operational risk

## 6.1 Introduction

Following the Basel framework, the Group defines operational risk (OR) as the risk of losses arising from defects or failures in its internal processes, people, systems or external events, thus covering risk categories such as fraud, technological, cyber, legal and conduct risk.

Operational risk is inherent to all products, activities, processes and systems and is generated in all business and support areas. For this reason, all employees are responsible for managing and controlling the operational risks generated in their sphere of action.

The Group's goal in terms of OR management and control is focused on identifying, evaluating and mitigating sources of risk, regardless of whether they have materialised or not. The analysis of OR exposure contributes to the establish risk management priorities.

It is worth mentioning the risk analysis improvement carried out in 2018 through different initiatives such as data quality enrichment, the incorporation of additional risk appetite metrics and improvements in the process of determining, identifying and evaluating critical theoretical controls together with a greater integration of operational risk within the Group's strategic planning.

Mitigation plans have been promoted on aspects with special relevance (fraud, data and cybersecurity and suppliers control, among others), focused on both the implementation of corrective actions and the adequate monitoring and management of projects under development. In addition, contingency and business continuity plans have been improved, as well as in terms of crisis management.

## 6.2 Operational risk management

In the Group, OR is managed in accordance with the following phases:

### **Risk identification, measurement and assessment model**

A series of quantitative and qualitative corporate techniques and tools have been defined by the Group to identify, measure and assess operational risk. These are combined to produce a diagnosis on the basis of the risks identified and an assessment of each area or local unit, through their measurement and evaluation.

The **quantitative analysis** of this risk is carried out mainly with tools that record and quantify the level of potential losses associated with operational risk events. The qualitative analysis seek to assess aspects of exposure and hedge (including the control environment)

The most important operational risk tools used by the Group are the following:

- **Internal events database.** The objective is to capture the Group's operational risk events. This is not restricted by thresholds (i.e. there are no exclusions for reasons of amount), and includes those events with impact on the financial statements or profit and loss account and those with no such impact.

Internal databases are supplemented by the significant events escalation process, which allows to inform and alert senior management the key operational risk events arising across the Group on a timely basis.

- **Operational risk control self-assessment (RCSA).** A qualitative process that seeks, using the criteria and experience of a pool of experts in each function, to determine the main operational risks for each function, the control environment and their allocation to the different functions on the Group.

The goal of RCSA is to identify and assess the material operational risks that could prevent business or support units from achieving their objective. Once they are assessed, mitigation actions are identified if the risk levels prove to be above the tolerable profile.

The Group also elaborates risk assessments for specific sources of operational risk, enabling a more granular and transversal identification of potential risks. These are applied in particular to technological risks, fraud and factors that could lead to regulatory non-compliance, and areas that are exposed to money laundering and terrorism financing risks. The two latter areas, together with the conduct risks factor, are set out in greater detail in section 7.3 'Compliance and conduct risk management', in this chapter.

- **External event database<sup>15</sup>.** The external database provides quantitative and qualitative information, allowing for a more detailed and structured analysis of relevant events that have occurred in the sector, the comparison of the profile of losses with the industry, both locally and globally and the appropriate preparation for the RCSA exercise and scenario analysis.
- **Analysis of OR scenarios.** The objective is to identify potential events with a very low probability of occurrence, but which could result in a very high loss for the Group. The potential effects are assessed and extra controls and mitigating actions are identified to reduce the likelihood of high economic impact. Expert opinion is obtained from the business lines and risk and control managers.
- **Corporate indicators system.** These are different types of statistics and parameters that provide information on an institution's risk exposure and control environment. The most significant indicators regarding the level of risk of the different factors are part of the metrics on which operational risk appetite is built.

- **Internal Audit and regulatory recommendations.** These provide relevant information on inherent risk due to internal and external factors, enabling weaknesses in the existing controls to be identified.
- **Customer complaints.** The Group's increasing systemisation of the monitoring of complaints and their root causes also provides relevant information for identifying and measuring risk levels. In this regard, the compliance and conduct function prepares a detailed analysis, as set out in section 7.3 'Compliance and conduct risk management' in this chapter.
- **Other specific instruments.** These enable a more detailed analysis of technology risk, such as control of critical system incidents and cybersecurity events.
- **Internal data model.** Application of statistical models is used to capture the Group's risk profile, mainly based on information collected from the internal loss database, external data and scenarios. The main application of the model is to help determine economic capital and estimate expected and stressed losses, as a tool for specifying operational risk appetite.

The risk profile is part of the non-financial risks risk appetite, and is structured as follows:

- A general statement setting out that Santander is, on principle, averse to operational risk events that could lead to financial loss, fraud and operational, technological, legal and regulatory breaches, conduct problems or damage to its reputation.
- General metrics of expected loss, stressed losses and overdue Internal Audit recommendations.
- An additional statement is included for the more relevant risk factors, together with a number of forward-looking monitoring metrics. Specifically, on the following: internal and external fraud, technological, cyber, legal, anti-money laundering, commercialisation of products, regulatory compliance and supplier management risk.

### Model implementation and initiatives

Almost all the Group's units are now incorporated into the OR model with a high degree of homogeneity.

The main activities and global initiatives adopted in 2018 for effective operational risk management are:

- Continuous enhancement of available information, especially the internal loss database, key to ensure the integration of all instruments and be able to perform an information cross-analysis.
- Evolution and improvement of the objective qualification methodology for the evaluation and reporting of the main risks (Top risks) that include risk exposure, control and regulatory

15. Santander participates in international consortiums such as the ORX (Operational Risk Exchange).

environment and take into account the actual and forecasted elements.

This methodology provides a more detailed process for final determination of the risk level and trend. It encourages prioritisation in risk management and the definition of specific mitigation plans, while supporting periodic risk communication to senior management.

- Incorporation of additional risk appetite metrics related to internal fraud within the market operations scope and the cybersecurity risk.
- Process improvements for the determination, identification and assessment of critical theoretical controls, with the aim of strengthening and homogenizing the control environment in the Group.
- Greater integration of operational risk in the Group's strategic plan, by including information regarding the potential exposure of operational risk for the next three years as well as the estimated level of losses.
- Mitigation plans fostering for aspects of particular relevance (fraud, information security and cybersecurity in the widest sense, control of suppliers, among others): control of both, implementation of corrective measures and projects under development.
- Improvements to contingency, business continuity and, in general, crisis management plans (initiative linked to the recovery and resolution plans), also providing coverage to emerging risks (cyber).
- Fostering the control of risk associated with technology (control and supervision of the IT systems design, infrastructure management and applications development).

For the suppliers control previously mentioned, the Group, as part of its digitalisation strategy, aims to offer its customers the best solutions and products available in the market, which in many cases entail an increase in the outsourcing activities or the employment of third party services. This aspect, together with the intensive use of new technologies such as the cloud, the increase of cyber related risks and an increase in regulatory pressure in this area, make it necessary to reinforce procedures and controls to ensure that the risks arising from hiring suppliers are known and managed appropriately.

In this regard, in 2018 a new version of the corporate reference model was approved, and progress has been made in defining and implementing policies, procedures and tools in the Group's entities in order to reinforce its implementation and to ensure that adequate coverage is given to the current regulatory requirements regarding the General data protection regulation (GDPR) anticipating new requirements contemplated in the new EBA regulations related to outsourcing as well as agreements with third parties. In 2018, the efforts have been mainly aimed at:

- Establishment of the vendor risk assessment centre (VRAC) function within the purchasing of the Group's entity responsible for purchases, with the aim of making suppliers' evaluation more efficient and homogenised. To ensure that related risks are adequately covered, and homologation process is executed before the service is provided. In addition, VRAC should help to define and monitor the mitigation plans, and to reinforce those controls needed for the risks associated with services provider to acceptable levels according to the Group's risk appetite.
- Controls have been reinforced in the different phases of the model to ensure that services that involve access or processing of sensitive data, including personal data, are correctly identified and classified. Specifically:
  - Policies have been developed to define the criteria for data classification according to its sensitivity level and to establish the minimum protection requirements that must be observed for each confidentiality level (including those established by GDPR).
  - Development of specific questionnaires to evaluate supplier's controls against these requirements, and clauses that must be included in contracts with suppliers that process or store confidential information.
  - Establishment of a specific escalation and governance procedure for services approval that involve the treatment or storage, by the provider, of data considered to be particularly sensitive.
- During 2018, progress has been made with those providers identified as critical in the recovery and resolution plans, aiming to include clauses that ensure the continuity of the services provided in case it was necessary to activate those plans.
- The escalation policy has been revised to ensure that the essential outsourcing functions and the highest risk services are reviewed and approved in the appropriate forums and that the relevant incidents associated with suppliers that provide these services are escalated in time and manner for its review and decision-making.
- Indicators and dashboard definition and monitoring concerning the model implementation.
- Review and enhancing quality of data of inventories of relevant services and associated suppliers.
- Progress in the implementation of a management system that automates the different phases of the supplier management cycle to achieve enhanced process control and higher information quality.
- Training and awareness raising of risks associated with suppliers and other third parties.

The Group continues to work on the implementation and consolidation of the model, reinforcing and standardising the activities to be carried out throughout the management cycle of suppliers and third parties.

### Operational risk information system

The Group's corporate information system for operational risk, named Heracles, supports operational risk management tools, providing information for reporting functions and needs at both local and Group levels. Heracles main goal is to improve decision-making in the OR management process throughout the Group.

This is achieved by ensuring that those responsible for risks in every part of the Group have a complete view of the risk, and the supporting information they need, when needed.

This complete and timely view of risk is obtained as a result of the integration of several programs, such as risk and control assessment, scenarios, events and metrics with a common set of taxonomies, and methodological standards. The result of this integration is a more precise risk profile and a significant improvement in efficiency by avoiding redundant efforts and duplicities.

After the incorporation of the thematic evaluation and scenarios modules, in 2018 improvements have been made to strengthen the integration between the different modules and simplify the system flow. Likewise, progress has been done to improve reporting capabilities in complying with the Risk Data Aggregation regulation.

In order to achieve the latter goal, a reference technological architecture has been developed, providing solutions for information gathering, single database feeding (golden source) and the generation of operational risk reports.

In addition, further advances have been carried out by the Group regarding data supply automation from the local units' systems of record.

### Mitigation actions

In line with the model, the Group monitors those mitigation actions related with the main risk sources which have been identified through the internal OR management tools (internal event database, indicators, self-assessment, scenarios, audit recommendations, etc.) and other external information sources (external events and industry reports).

Active mitigation management has become even more important in 2018, in which both the first line of defence and the OR control function intervene, establishing an additional control through specialised business and support functions. Furthermore, the Group has continued to promote the preventive implementation of policies and procedures for OR management and control.

The most significant mitigation actions have been focused on improving the security of customers in their usual operations, the management of external fraud, as well as continuous improvements of processes and technology, sale of products management and adequate provision of services.

Regarding the fraud reduction, the main specific actions were the following:

#### Card fraud:

- Generalisation of the use of Chip & Pin (operation with PIN-cards, which require the signing off the transaction with a numeric code), both in ATMs and in physical stores, with advanced authentication mechanisms in the communication between the ATM and the point-of-sale and the Group's systems.
- Card protection against electronic commerce fraud attacks (which is still the fastest-growing fraud pattern in the industry):
  - Implementation of a secure e-commerce standard (3DSecure) via two-step authentication based on one-time passwords.
  - Innovative solutions based on mobile applications that let users deactivate cards for e-commerce use.
  - Issue of virtual cards using dynamic authentication passwords.
- Use in Brazil of a biometric authentication system in ATMs and branch cashier desks. Customers can use this new system to withdraw cash from ATMs using their fingerprint to sign off their transactions.
- Integration of monitoring and fraud detection tools with other systems, internally and externally, to enhance suspicious activity detection capabilities.
- Reinforced ATM security by incorporating physical protection elements and anti-skimming, as well as improvements in the logical security of the devices.

#### Online/mobile banking fraud:

- Validations of online banking transactions through a second security factor based on one-time use passwords. Evolution of technology, depending on the geographic area (for example, based on image codes -QR codes - generated from data for the transaction).
- Enhanced online banking security by introducing a transaction risk scoring system that requests further authentication when a given security threshold is breached.
- Implementation of specific protection measures for mobile banking, such as identification and registration of customer devices (Device Id).

- Monitor e-banking platform's security to avoid attacks on the systems.

### Cybersecurity and data security plans:

Throughout the year, Santander continued paying full attention to cybersecurity risks, which affect all companies and institutions, including those in the financial sector. This situation is a cause of concern for all entities and regulators, prompting the implementation of preventive actions to be prepared for any attack of this kind.

Santander has continued to develop its cybersecurity internal regulation with the definition of a set of policies that reinforce the Global cybersecurity framework, aligned with international best practices.

In relation to second line internal regulation, it should be noted that in July 2018 the executive risk committee approved a new version of the cyber supervision and control model, incorporating the technological risk within its scope.

The Group is involved in an ambitious program to transform cybersecurity in order to strengthen detection, response and protection mechanisms. Innovation and continuous improvement in cybersecurity is key to address current and emerging threats, and it is a priority for Santander.

Also, observation and analytical assessment of the events in the sector and in other industries enables Santander to update and adapt its models for emerging threats.

### Other relevant mitigating actions:

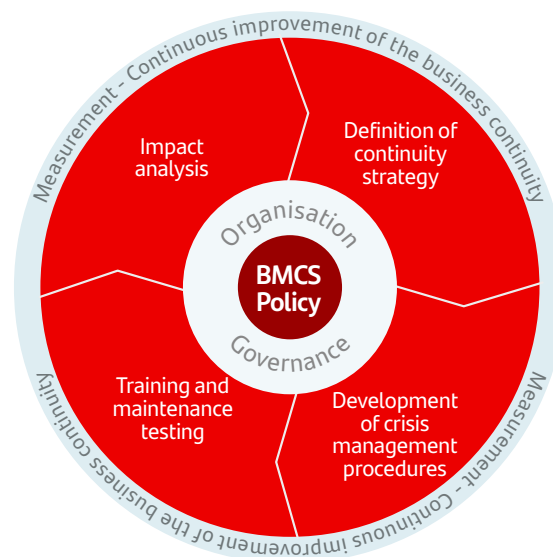
The Group has established mitigation actions in order to optimise management processes according to our customer's needs.

With regard to mitigation measures relating to customer practices, products and business, Santander is involved in continuous improvement and implementation of corporate policies on aspects such as the selling of products and services and prevention of money laundering and terrorism financing, as described in section 7.3 '[Compliance and conduct risk management](#)', in this chapter.

Also related with the same category of operational risk, within the continuous process carried out in Brazil to improve the internal processes and products offered, in order to provide a better service to our customers and, thereby, reduce the volume of incidents and legal claims, it is noteworthy the creation of joint and multidisciplinary working groups for the identification, definition and implementation of mitigation actions, as well as monitoring of their effectiveness.

### Business continuity plan

The Group has a Business Continuity Management System (BCMS), to guarantee the continuity of the business processes of its entities in the event of a disaster or serious incident.



The basic goal is to:

- Minimise the potential damage on people, and adverse financial and business impacts for the Group, caused by the interruption of normal business activities
- Reduce the operational effects of a disaster, providing pre-defined and flexible guidelines and procedures to be used to re-launch and recover processes.
- Restart time-sensitive business operations and associated support functions, in order to achieve business continuity, stable profits and planned growth.
- Protect the public image of, and confidence in, the Group.
- Meet the Group's obligations to its employees, customers, shareholders and other stakeholders.

In 2018, the Group continued to advance in implementing and continuously improving its business continuity management system. The new model has been implemented in all countries and the definition and implementation of cybersecurity scenarios has been pursued.

Furthermore, several crisis simulation exercises have been carried out, coordinated between the local units and the corporation, involving the Group's various crisis management committees and senior management.

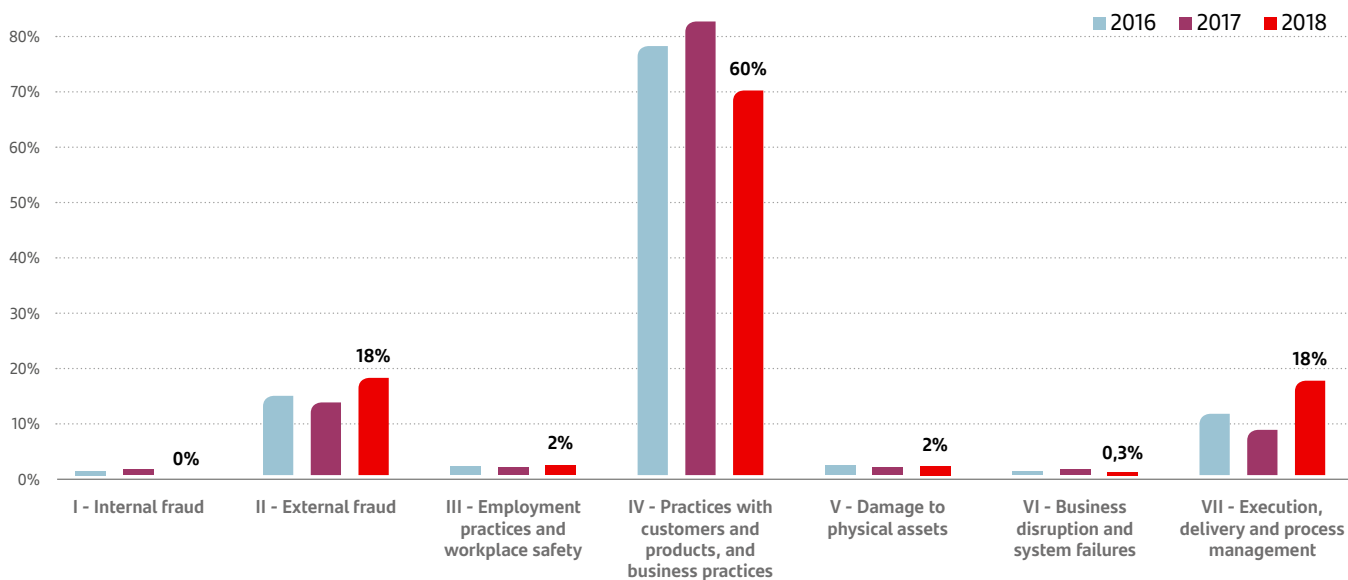
The Group has also updated the corporate application that is used to register and store the Group's continuity plans to allow for associating the economic functions set by the European Banking Union's resolution authority, the SRB.

## 6.3 Key metrics

Net losses (including both incurred loss and net provisions) by Basel<sup>16</sup> risk category over the last three years is as follows:

### Distribution of net losses by operational risk category<sup>17</sup>

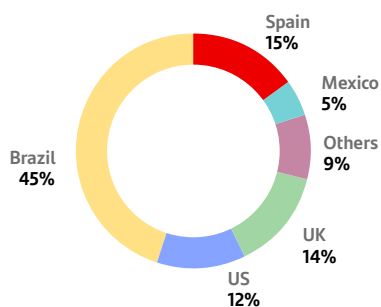
(% s/total)



In relative terms, the losses in the category of customers, products and business practices decrease regarding the previous year, although for external fraud has increased.

The net losses by geography are presented in the following chart:

### Net losses by country



Employee's litigation in Brazil is managed as personnel expenses. It is not included in the operational figures since they are considered, from a point of view of management view, as part of the entity's personnel cost. The Group's governing bodies perform a continuous monitoring of the levels of expenditure as well as of the measures designed for their reduction. According to the Basel Operational risk framework, these expenses are reporting according to the applicable categorisation.

In 2018, the most significant losses by category and geography correspond to litigation in Brazil where a set of actions is in place to improve customer service (gathered in a complete mitigation plan, as described in section 6.2 'Operational risk management' in this chapter). On the other hand, in 2018 the volume of losses in the UK and the US has decreased due to the reduction in provisions that cover cases of product commercialisation, regulatory inspections and processes failures.

Regarding external fraud, the main concentration risk is still related to the fraudulent use of debit and credit cards, with a significant rise in fraud in non-physical card. The forecast for next year is for this trend to continue, with an intensification of the activity of fraudsters in payment transactions and electronic commerce.

16. The Basel categories incorporate risks which are detailed in section 7 "Compliance and conduct risk".

17. Includes losses from the B. Popular and other perimeter changes.

## 6.4 Other aspects of control and monitoring of operational risk

### Analysis and monitoring of controls in market operations

Due to the specific nature and complexity of financial markets, the Group considers it necessary to continuously improve operational control procedures to keep them in line with new regulations and best practices in the market, with a focus on:

- Adapting the control model to new regulatory requirements, such as MiFID II, EMIR, PRIIPS, IFRS9 and GDPR, among others.
- Constant improvement with the monitoring of global standards on controls related to market activity. These include those that mitigate the risk of unauthorised trading and that are measured periodically through a specific risk appetite metric for this issue.
- Strengthening business continuity plans by incorporating – among other improvements – new scenarios reflecting new risks in the industry.
- Reinforcing controls ensuring appropriate functional separation in market operations systems.
- Improvements in the tool to control the communications that occur in the treasury desks.
- Intensified scrutiny of markets-related suppliers, given the critical nature of this topic in view of market trends in online trading.
- Incorporation of new controls on algorithmic trading following the best practices of the industry and the requirements of MiFID II.

For more information on issues relating to regulatory compliance in markets, refer to section [7.3 'Regulatory compliance'](#).

Lastly, it is important to note that the business is also undertaking a global transformation that involves modernising its technology platforms and operational processes. This will allow, among other objectives, for reinforcing the control model and reduce the operational risk associated with the business.

### Insurance's role in operational risk management

The Group regards insurance as a key element in the management of operational risk. In 2018, we have continued to develop procedures with the goal of achieving better coordination between the different functions involved in the management cycle of insurance policies used to mitigate operational risk.

Once the functional relationship between the own insurance and operational risk control areas is established, the primary goal is to inform the different first line risk management areas of adequate guidelines for effective management of insurable risk. The following activities are particularly important:

- Identification of all risks in the Group that can be hedged with insurance, including identification of new insurance coverage for risks already identified in the market.
  - Establishment and implementation of criteria to quantify the insurable risk, backed by loss analysis and the scenarios that enable the Group's level of exposure to each risk to be determined.
  - Analysis of coverage available in the insurance market, as well as preliminary design of the conditions that best suit the identified and assessed needs.
  - Technical assessment of the protection provided by the policy, its costs and retention level that the Group is assuming (franchises and other elements borne by the insured) in order to evaluate and decide about its formalisation regarding those risks that should be covered.
  - Negotiating with suppliers and contract allocation in accordance with the procedures established by the Group.
  - Monitoring of incidents declared in the policies, as well as of those not declared or not recovered due to an incorrect declaration, establishing protocols for action and specific monitoring forums.
  - Analysis of the adequacy of the Group's policies for the risks covered, taking appropriate corrective measures for any shortcomings detected.
  - Close cooperation between local operational risk executives and local insurance coordinators to strengthen operational risk mitigation.
  - Active involvement of both areas in the own insurance forum, the Group's highest technical body for defining coverage strategies and contracting insurance, (replicated in each geography to monitor the activities mentioned in this section), the claim monitoring forum, and the Corporate operational risk committee.
- Our own insurance area is a permanent member of different forums/committees of the Group related to risk management (damage to physical assets, fraud, scenarios, management of special situations, etc.), thereby increasing its interaction with other Group functions and its capacity to appropriately identify and evaluate the insurable risks and optimise the protection of the income statement.

# 7. Compliance and conduct risk

## 7.1 Introduction

The Compliance and Conduct function fosters the Group's adherence to the rules, supervisory requirements, and principles and values of good conduct, by setting standards, advising and reporting in the interest of employees, customers, shareholders and the community as a whole.

This function addresses all matters related to:

- Regulatory compliance.
- Prevention of money laundering and terrorism financing.
- Governance of products and consumer protection.
- Reputational risk.

Under the current configuration of the three lines of defence at the Group, compliance and conduct is an independent second-line control function organisationally under the Group CRO, reporting directly and regularly to the board of directors and its committees, through the Group Chief Compliance Officer (Group CRO). This configuration is aligned with the requirements of banking regulation and with the expectations of supervisors.

The Group's goal is to minimise the probability of non-compliance events and to identify, assess, report and quickly resolve any irregularities that may occur.

In accordance with the mandate entrusted to the Compliance and Conduct function improvements were made, in 2018, in the strategic compliance programme. In the two previous years, the scope and objectives of the Compliance and Conduct target operation model (TOM) were defined, and the initiative was implemented in the Group's local units and at the Corporate

centre, towards the end of 2018, thus achieving a Compliance and Conduct function that is on par with the best standards in the financial industry.

The Group sets out in its risk appetite framework its zero tolerance for Compliance and Conduct risks, with the clear goal of minimising the probability of any economic, regulatory or reputational impact occurring within the Group. Compliance and Conduct risk is managed through a homogeneous process in units, by establishing a common methodology and taxonomy, according to the standards of the Risk function, which consists of setting a series of Compliance and Conduct risk indicators and assessment matrices which are prepared for each local unit, as well as qualitative statements.

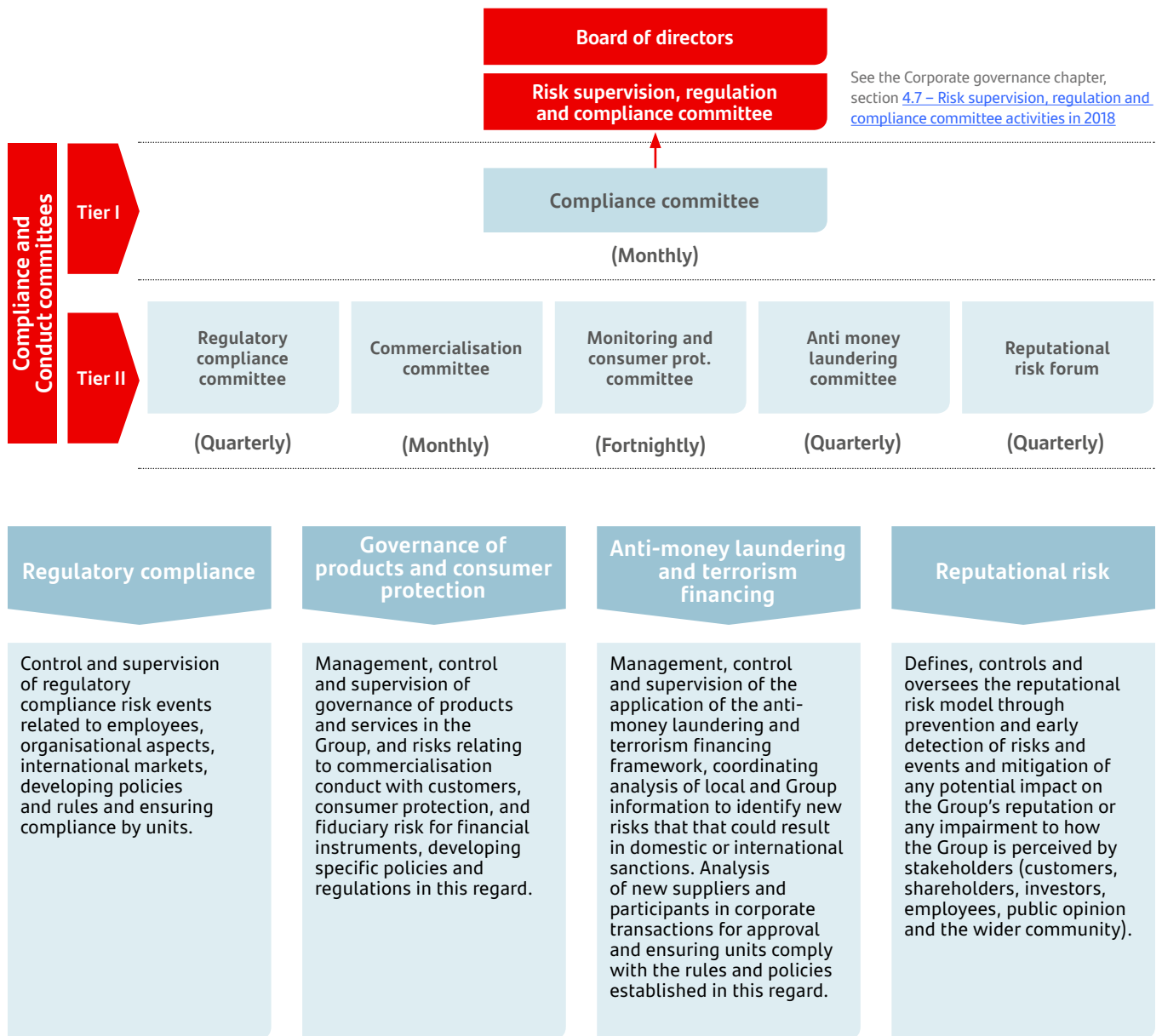
During 2018, the Compliance and Conduct function has taken part in the annual formulation of the risk appetite, with the objective of verifying that the current model is suitable for measuring the function's risk appetite. The corporate thresholds of two of the indicators were adjusted, reducing them, and the calculation of another was reformulated in order to provide a more accurate picture and align it with the strategy of the function and its risk tolerance. The relevant committees approved the adjustments and these were sent to the different local units.

## 7.2 Governance

The Group CRO reports to the Group's governing and management bodies. This is independent of the Risk function's other reporting to the governance and management bodies of all Group risks, which also includes compliance and conduct risks.

The following are the compliance and conduct corporate committees, each of which has a corresponding local replica:

Group Compliance & Conduct – committees landscape



The **corporate compliance and conduct committee** is the high-level collegiate body of the compliance and conduct function, bringing together the objectives of the committees referred to below. Its main functions are as follows:

- Proposing updates and modifications to the General compliance framework and corporate function frameworks for ultimate approval by the board of directors.
- Reviewing significant compliance and conduct risk events and situations, the measures adopted and their effectiveness, and proposing that they be escalated or transferred, whenever the case may be.
- Setting up and assessing corrective actions when risks of this kind are detected in the Group, either due to weaknesses in the existing management and controls management, or due to emerging new risks.
- Monitoring new issued regulations or those modified, and establishing their scope of application in the Group, and, if necessary, defining adaptation or mitigation actions.

The **regulatory compliance committee** is a collegiate governance body whose main functions are the following:

- Specifying the Group CRO regulatory compliance risk control model based on common regulations applicable to several countries.
- Deciding on significant regulatory compliance issues that might pose a risk to the Group.
- Interpreting the General Code of Conduct and specialised codes, and making proposals for their improvement.

The **corporate commercialisation committee** is the collegiate governance body for the approval of products and services. It has the following key functions:

- Validating new products or services proposed by the parent company or by any subsidiary/Group local unit, prior to their launch.
- Establishing the commercialisation risk control model, including risk assessment indicators, and proposing the commercialisation and consumer protection risk appetite to the Compliance committee.
- Establishing interpretative criteria and approving the reference models to develop the corporate commercialisation framework, and its rules, and to validate the local adaptations of those models.
- Assessing and deciding on significant commercialisation issues that might pose a risk for the Group.

The **monitoring and consumer protection committee** is the collegiate governance body for the monitoring of products and services, and the assessment of customer protection issues. It has the following key functions:

- Monitoring the commercialisation of products and services by country and by product type, reviewing all the available information and focusing on products and services under special monitoring, and costs of conduct, compensation to customers, sanctions, etc.
- Monitoring the common claim measurement and reporting methodology, based on root cause analysis, and the quality and sufficiency of the information obtained.
- Establishing and assessing how effective corrective measures can be when risks are detected in the governance of products and consumer protection.
- Identifying, managing and reporting preventively on the problems, events, significant situations and best practices in commercialisation and consumer protection in a transversal manner.

The **anti-money laundering/terrorism financing committee (AML/TF)** is the collegiate body in this field, and its main duties are as follows:

- Defining the AML/TF risk control model in the Group.
- Creating reference models for the development of the AML/TF framework and its implementing regulation.
- Monitoring projects for improvement and transformation plans for AML/TF and, where appropriate, setting in motion supporting or corrective actions.

The **reputational risk forum** is the body created to support the different governing bodies of the Group in the supervision and control of reputational risk, ensuring its proper management and understanding. Its main functions are:

- Monitoring and continuous supervision of risks and reputational events, verifying if the profile of this risk is within the limits of the group's appetite.
- Developing action plans to reduce the impact of this risk and monitor them.
- Reviewing and preparing reports and other documentation of reputational risk presented to the different governing bodies of the Group.

## 7.3 Compliance and conduct risk management

The first line of defence has the primary responsibility for managing compliance and conduct risks together with the business units where such risks originate, as well as the Compliance and Conduct function. This is performed either directly or through assigning compliance and conduct activities or tasks.

The Compliance and Conduct function is responsible for setting up, fostering and ensuring that the local units adhere to the corporate frameworks, policies and standards applied throughout the Group. Compliance and Conduct continue to make progress in the development and design of the function's regulatory tree and in the supervision of local units' degree of adherence to it.

The Corporate centre has the necessary components to ensure ongoing control and oversight of the compliance and conduct model, establishing robust systems of governance and systematic reporting and interaction with the local units in accordance with the Group's subsidiary governance model.



Additional detail regarding the Group's governance model is available in the Corporate governance chapter, section 7 'Group structure and governance framework'.

Furthermore, Internal Audit - as third line of defence function - performs the tests and audits necessary to verify that adequate controls and oversight mechanisms are being applied, and that the Group's rules and procedures are being followed.

Corporate frameworks for the Compliance and Conduct function are the following:

- General compliance framework.
- Products and services commercialisation and consumer protection framework.
- Anti-money laundering and terrorism financing framework.

The General Code of Conduct (GCC) enshrines the ethical principles and rules of conduct that govern the actions of all the Group's employees. It is supplemented in certain matters by the rules found in other codes and their internal rules and regulations.

The Compliance and Conduct function oversees the effective implementation and monitoring of the General Code of Conduct under the supervision of the compliance committee and of the risk supervision, regulation and compliance committee. The GCC establishes the following:

- Compliance functions and responsibilities.
- The rules governing the consequences of non-compliance with it.
- A whistleblowing channel for the submission and processing of reports of allegedly irregular conduct.

During 2018, the Compliance and Conduct function has carried out several risk assessments in coordination with the Risk function, notably:

- A regulatory compliance assessment focused on the Group's main local units. This exercise is carried out annually, following a bottom-up process, where the first line of defence of the local units identify the inherent risk of those rules and regulations that apply to them. First, an assessment is made on the consistency of the controls that mitigate such inherent risk, and then the residual risk in each of these obligations is determined. Action plans are established and followed by both the local and corporate compliance functions.
- Conduct assessment in products and services with a scope of 17 geographies of the Group and 26 legal entities, where the first line of defence functions evaluate the main risks of conduct in commercialisation, the suitability of the controls that mitigate said risks and establish action plans in those cases where risk assessments exceed the defined risk appetite.

- Assessment of AML/TF on the units considered as obliged entities in this matter (or equivalent) in the Group. This annual self-assessment exercise is carried out by the business units and the local AML/TF prevention officers, under the supervision of the Corporate centre AML/TF prevention function.

The common methodology adopted by the Group for the above mentioned assessments can be broadly summarised in a three phase process:

1. Assessment of unit's inherent risk (deriving from its activity).
2. Assessment of control environment (as a mitigating factor of the inherent risk).
3. Calculation of net residual risk (derived from the combination of the two previous point's measures according to a predefined scale). Where appropriate, and depending on the result obtained, the corresponding action plans are defined.

In 2018, the main geographies consolidated the reputational risk model that contains the main elements for risk management and identifies the most significant sources of this type of risk. It establishes a preventive approach for its correct management and determines the functions involved in the management and control of this risk and its governance bodies.

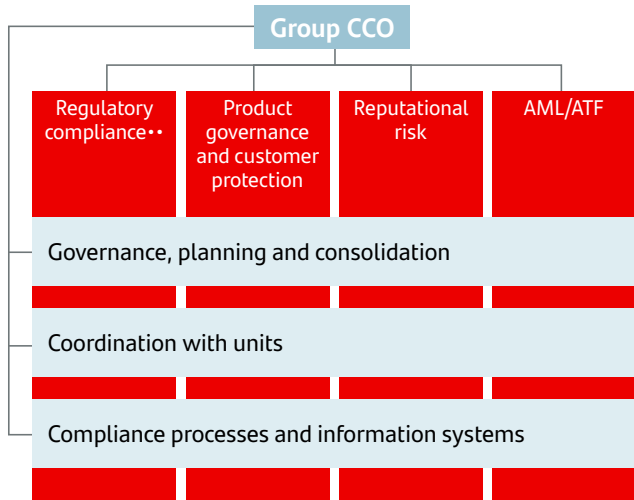
#### Transversal corporate projects

In accordance with the organisational principles defined in the Group Compliance and Conduct TOM, transversal functions support specialised vertical functions, providing them with methodologies and resources, management systems and information and support in executing multidisciplinary projects.

One of the key pillars of all the corporate functions is monitoring the units' deployment of models. For this purpose, a methodology that enables the following has been defined:

- To acquire an objective knowledge of the TOM's degree of implementation in each one of the units.
- Regularly follow up on progress in deploying the TOM.
- Be used as a source for joint identification (Group-units) of the annual work plans defined every year.

Horizontal teams support vertical teams by leading execution and coordination of generalist activities, among them:



**Key transversal functions**

- Promote the relationship of Compliance and Conduct functions among the Corporate centre and the different units.
- Coordinate the definition and monitoring of the annual compliance programs.
- Provide methodologies, resources, systems and management information and support in the execution of multidisciplinary projects.
- Jointly with the vertical functions, follow-up of the deployment of the models by the units.
- Lead the digitalisation of processes.
- Set up common report templates, combining qualitative and quantitative metrics.
- Coordinates the creation of the regulations global repository and manages the Regulatory Radar Governance aimed at assigning regulatory implementation responsibilities.
- Promote thematic fora and workshops, identify and promote the execution of the annual training programs, and prepare a biannual magazine.
- Participate in the appointment and setting of the CCO's objectives.

- Digitalisation of processes and continuous improvement. Having defined the function's process map and documented its main activities, the Group completed in 2018 the automation of processes in financial intelligence, corporate actions, annual compliance programme, product governance, the Code of Conduct in Securities Markets, and acceptance of reputational risk transactions. The design phases were also completed in two new processes, namely management of committees and internal governance bodies, and the development of regulatory components.
- On-line collaboration with units is improving, favouring platforms and structured spaces for information exchange, such as the compliance portal and the Verum platform for assessing the maturity of the compliance model.
- Access to external information sources to enhance compliance control processes (regulatory sources, online media, stakeholder perceptions, etc.).
- Management information and analytical environments, leveraging new big data and multidimensional reporting capabilities to enhance generation and distribution of compliance and conduct management reports and optimise the response to money laundering and terrorism financing alerts.
- Global programme of MiFID II implementation. With the coming into force of MiFID II regulation in January 2018, the Group has provided the necessary support to local units affected by the regulation. The project's main focus of attention in 2018 has been the development and effective implementation of a robust control model. Accordingly, the compliance and conduct function in the Corporate centre has defined a theoretical control framework and supervised the transposition and implementation

of controls in each local unit. Further, it has established a set of risk indicators that will be regularly reported to both local governing bodies and to Corporate centre teams.

- Concerning management information, a common compliance and conduct risk reporting template was deployed in 2018 in the Group's units, with minimum content specified by the Corporate centre and common chapters, risk dimensions by family and combining quantitative metrics and expert qualitative analysis, to which units may add local information if relevant. At year-end 2018, virtually all of the Group's main units have adopted this new form of reporting.
- The Regulatory Radar function has consolidated its role, which develops and coordinates the creation and administration of the global repository of rules and regulations, through a multidisciplinary process in which the different functions participate, and manages the regulatory radar governance aimed at assigning regulations implementation responsibilities and the appropriate monitoring.
- The Group strengthened best practices sharing and cooperation between the Corporate centre and the local units. Thematic forums and workshops were organised on reputational risk, corporate defence, the GDPR, product governance and consumer protection, anti-money laundering and countering terrorism financing.
- In addition to the traditional training – mandatory or not – for which the function is responsible, a biannual review of compliance and conduct and awareness-raising actions are now carried out through the Group's internal networks.

### Regulatory Compliance

The Regulatory Compliance area is responsible for controlling and supervising regulatory risk related to employees, organisational aspects, international markets and securities markets, developing policies and rules and ensuring compliance by units.

The following functions are in place for adequate control and management of regulatory compliance risks:

- Application and interpretation of the General Code of Conduct and other codes and rules and regulations that implement it, including management of the corporate defence model and the Group's whistleblowing channel.
- Development and application of policies and rules aimed at preventing market abuse.
- Control and supervision of application of regulation related to: (i) markets, with respect to MiFID II, EMIR, Dodd-Frank Act and the Volcker Rule and (ii) the organisation, in the competencies of GDPR, FATCA and CRS.
- Disclosure of relevant Group information (material facts).

The most relevant areas of the regulatory compliance function are described below:

#### A. Employees

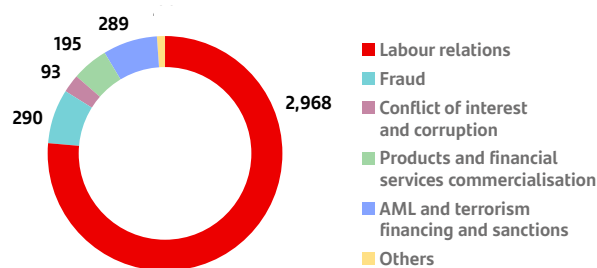
The objective - based on the General Code of Conduct - is to establish standards for the prevention of criminal risks and conflicts of interest and from a regulatory perspective, to cooperate with other areas in setting up guidelines for remuneration and dealings with suppliers. The prevention of criminal risks aims to minimise the impact of the potential criminal responsibility of legal entities for any crimes committed on their account or for their benefit by their directors or representatives and by employees as a result of a lack of control.

The Group has in place a corporate defence model, which is a specific compliance programme designed to implement awareness-raising activities as to the main criminal risks across the Bank. The Group has 14 whistleblowing channels available to all employees in all its main markets. They can access these through email, web site and app.

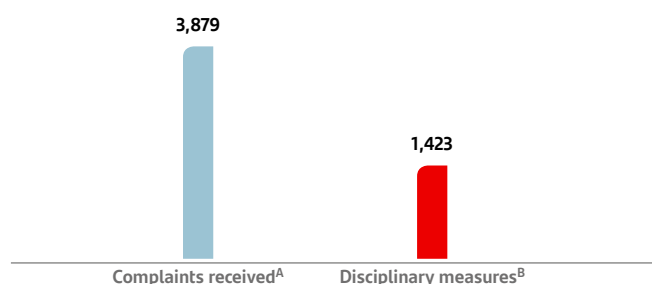
The internal procedure on the use and functioning of the Corporate centre's whistleblowing channel was updated in 2018, in order to:

- Allow employees to make anonymous reports if they wish.
- Reinforce the internal procedure for the anonymous communication of violations regarding anti-money laundering by employees, senior management or agents.
- Broadening the scope to include those accounting or audit practices, in accordance with the Sarbanes-Oxley Act. The compliance function reports periodically to the audit committee on this type of complaints.

### Types of complaints received in 2018



### Complaints that originated a disciplinary procedure



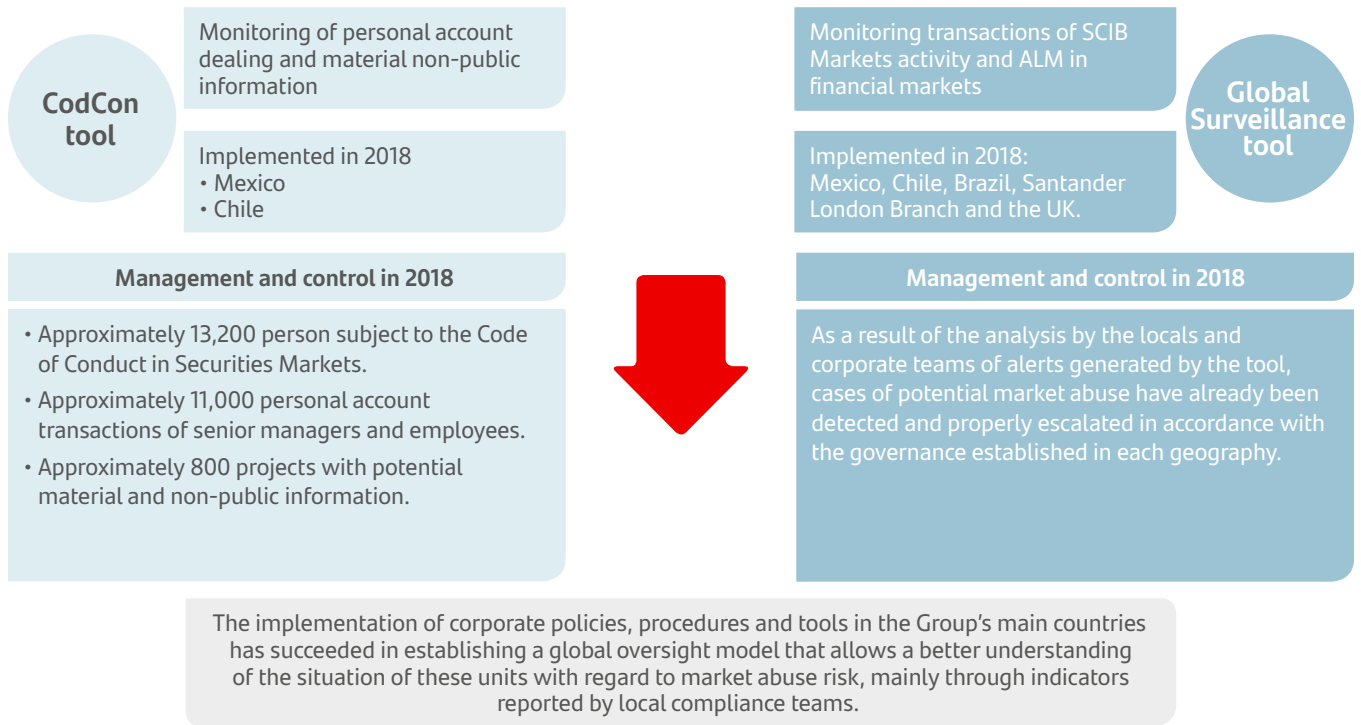
A. Consolidated data of the Top 10 local units and the Corporate centre, which includes the complaints received in all their whistleblowing channels, which are not comparable between each other.

B. This figure does not include the disciplinary measures from UK, as it is not available.

## B. Market abuse

Regulatory Compliance activity in 2018 focused on the implementation of corporate tools for market abuse risk management in the main geographies:

### Code of Conduct in Securities Markets (CCSM)



## C. Market regulations

Regulatory compliance carries out the risk management of the main market regulations that affect the Group. The most relevant actions carried out during 2018 are detailed below:

### MiFID II

During 2018, the Regulatory Compliance function has worked together with the MiFID II Corporate's PMO, as well as with the different units in the definition and implementation of a MiFID II control framework for each local unit, that will allow to supervise compliance with the regulation.

At the end of 2018, a country supervision manual for MiFID II was approved, which establishes the relationship model for the local units with the Regulatory Compliance function at a corporate level. Its main aspects are: internal policies and procedures, control framework and KPI reporting to the corporation, second line of defence testing exercise and training programs.

### Dodd-Frank Title VII

An in-depth review of the Swap Dealer Compliance Programme regarding the Dodd-Frank Title VII regulation was carried out in 2018, successfully strengthening internal controls and monitoring.

### Volcker Rule

With respect to the US Volcker Rule, oversight has continued of compliance with this regulation, which limits proprietary trading to very specific cases that the Group controls by means of a compliance programme.

This programme was satisfactorily implemented in 2018 in entities originating from the acquisition of Banco Popular.

### Relevant information

Regulatory compliance is responsible for disclosing relevant Group information to the markets. Banco Santander made public 48 material facts during the year, which are available on the Group's web site and the CNMV's web site.

**D. Data management**

The main actions carried out by regulatory compliance related to data management by the Group during 2018 are detailed below:

**GDPR**

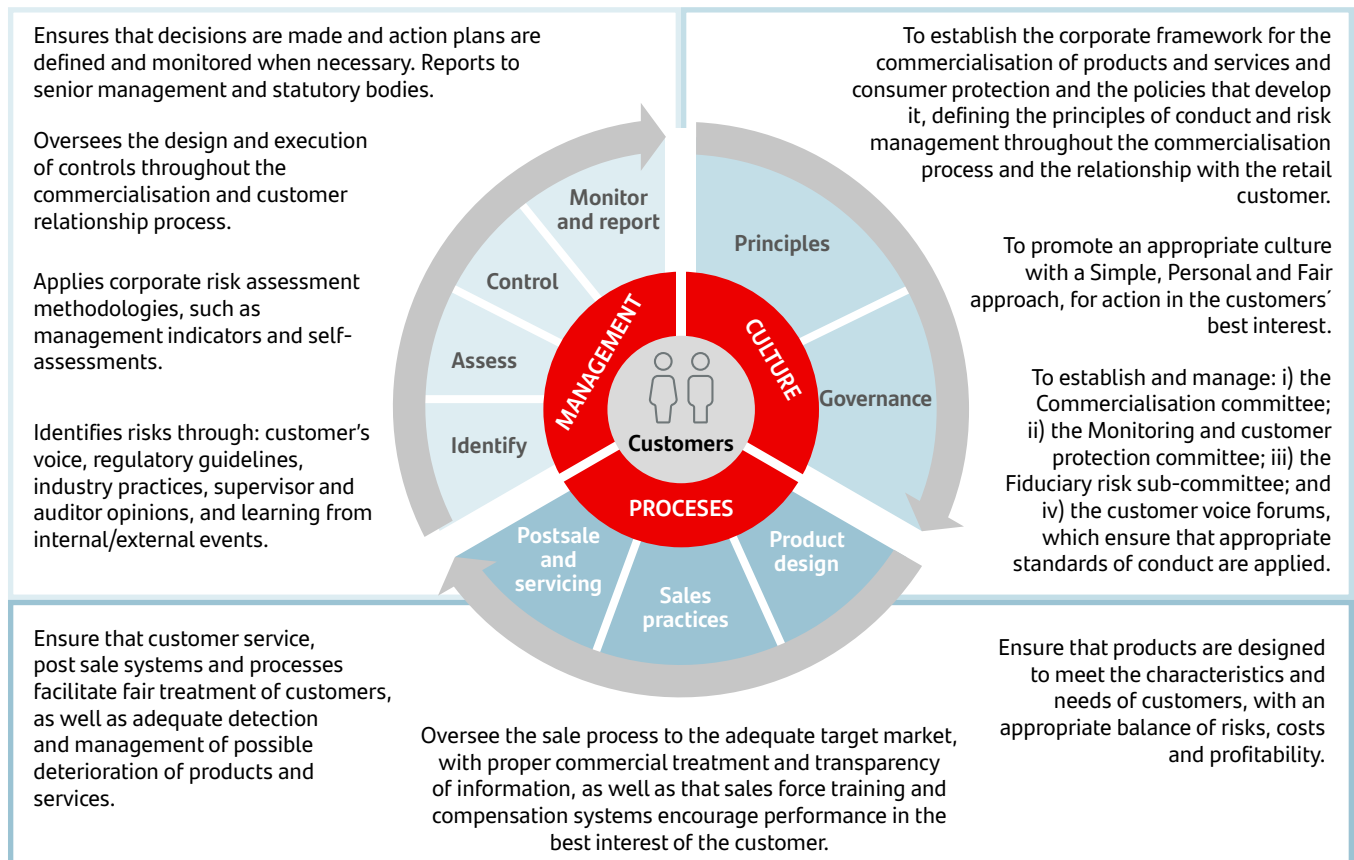
- The new requirements of the European GDPR were enforced on 25 May 2018.
- The regulatory compliance function has performed a key role in mobilizing and raising awareness among the Group units subject to the regulation. It has led a number of corporate initiatives aimed at ensuring the effective protection of the rights of data subjects.
- These initiatives include the approval of a new corporate data protection policy, the design and implementation of a governance model based on Data Protection Officers and a control and oversight programme.
- It has also raised awareness among the staff through different training initiatives and other activities such as courses, workshops and the publication of supporting documentation in the form of guidelines and operating criteria.

**FATCA and CRS**

- Further, and within the regulatory framework on automatic exchange of tax information between countries (FATCA and CRS), the following management areas stood out for their importance in 2018:
  - Fulfilment of reporting obligations to the local authorities in due time and form across all units.
  - Periodic certification and certification of the preexisting accounts of Group units.
  - Approval of new corporate policies on this matter.

**Product governance and consumer protection**

The product governance and customer protection mission is to ensure that the Group acts in the best interest of its customers by complying with regulations and the entity's values and principles.



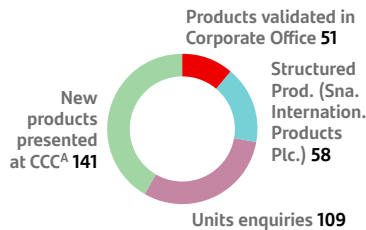
## Main product governance and consumer protection activities in 2018

### Governance strengthening

- Implementation of corporate consumer protection and fiduciary risk management policies in the Group's units.
- Development together with the Santander Digital team of a new "agile" procedure for the approval of innovative concept tests with impact on customers.
- Definition of good practices regarding sales force remuneration and monitoring of the implementation.
- Supervision of the implementation of the corporate custody procedure, having been presented to the executive risk committee for validation the new custody files of different Group units.
- Creation of the corporate forum for the supervision of the analysis of the voice of clients, root cause and definition of improvement plans.

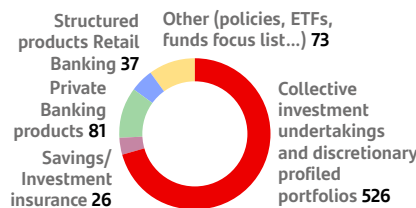
### Product and services validation

#### of product governance: 359



A. Of these proposals, one was not validated and others were modified in the process prior to the celebration of the Committee.

#### Proposals analysed by fiduciary risk subcommittee: 743



### Sales, post-sale and servicing conduct monitoring

- 25 sessions in 2018 of the monitoring and consumer protection committee, covering:
- The marketing of products and services by country and type of product with focus on: those in special monitoring, regulatory and supervisory environment, events and conduct costs and risk analysis through indicators.
  - Performance, exposure in portfolios and results for customers and compliance with mandates for products with fiduciary risk managed by the Group units or whose management is delegated to third parties.
  - Customer complaints, their management (28 countries, 36 business units and 9 CIB branches) and action plans to mitigate customer detriment.
  - The degree of control and volume of the 51 providers (42 of them external to Santander) that provide custody services for the Group's own positions or customers positions.

## Continuous improvement of products and processes of action with customers

The conduct risk management model, and specially the customer's voice, allows the customer risk identification, measurement and monitoring for the conduct risk mitigation and continuous improvement (retro alimentation) of the product design, sale processes and services delivery.



### Customer's voice

#### Customer complaints

**Due to product cancellation barriers:** new products analysis so that they can be cancelled using the same channels as the ones used for hiring new products and, if this is not the case, prioritise the necessary developments so it becomes a reality.

**Due to interests in revolving credit cards:** analysis on the approval of the applicable interest rate and comparison with a normal credit card and, in case it is more expensive, establishment of measures so that customers use them as a revolving credit card.

Launch of thematic reviews on root cause of complaints: **fraud, mortgages and recovery processes.**



### Business monitoring

#### Management indicators

**Early cancellation:** increase in disclosure requirements in the cross sale and action plans to improve the root cause analysis through the retention channels.

**Investment and pension funds performance:** review of product definition and/or its investment policies in case of detecting possible management deterioration or deviations regarding product competitiveness.

**Refusal of insurance claims:** the approval requires that the documentation for customers clearly includes the coverage exclusion.



### First line self assessment

#### Risk and Control Self Assessment

**Innovation in investment products:** increased focus on digital initiatives in the product approval process and through the follow-up of the customer's voice.

**Investment products adequacy in Europe:** corporate project for the implementation of a control model in the first and second line of defence.



### Events, sector practices and regulations

#### Data base

As a consequence of MiFID II, improvements are implemented in **commercialisation models** beyond regulatory requirements.

Transformation plans in **remuneration of the sales force** following good practices of regulators and the different geographies of the Group.

### Anti-money laundering and countering terrorism financing

One of the Group's strategic objectives is to maintain advanced and efficient anti-money laundering and countering terrorism financing systems, constantly adapted to international regulations, with the capacity to confront the development of new techniques by criminal organisations.

As a part of the second line of defence, the AML/TF function ensure that risks are managed in accordance with the risk appetite defined by the Group and promote a strong risk culture through the organisation. AML/TF Corporate function is responsible for supervising and coordination the AML/TF systems of the Group subsidiaries, branches and business areas, requiring the adoption of the necessary programmes, measures and enhancements.

The Anti-money laundering and countering terrorism financing policy in the Group is based on three main pillars: the highest international standards, their adaptation and compliance through global policies and technology systems that can enable such compliance.



During 2018, the Group has actively worked in the review of its internal regulations, strengthening management policies and placing a special focus on optimisation of systems, enhancing their effectiveness and considering and developing new technologies that are becoming available.

From the AML/TF global function, a relevant transformation projects have been addressed, highlighting the continuous improvement of supporting tools and risk management platforms, such as the one used for automation and improvement of adverse media identification and management processes, extending its scope to other units/areas within the Group (Banco Santander México and SCIB Boadilla), or updating the corporate money laundering and terrorism financing risks and controls self-assessment (RCSA ML/TF), being aligned with the rest of the RCSA methodologies in the Compliance function.

In addition, given that these standards and those adopted by the Group are mandatory, their correct implementation and application must be overseen. To do so, continuous work is carried out on the different Group entities, including monitoring of the training of Group employees.

The main activity data in 2018 is as follows:

<b>169</b>	<b>208,410</b>
Subsidiaries reviewed	Investigations carried out
<b>57,193</b>	<b>169,941</b>
Disclosures to authorities	Employees trained

The Group has training plans in place at both local and corporate level, in order to cover all employees. Specific training plans are also in place for the most sensitive areas from the perspective of anti-money laundering and countering terrorism financing.

### Reputational risk

In 2018, the Group made significant progress on implementing the corporate reputational risk model, consolidating its main features in the Group's most significant geographies.

The specific characteristics of reputational risk, which originate in a vast number of sources, require a single approach and control model that is different from those of other risks. The reputational risk management requires for a global interaction with both first and second lines of defence functions responsible for the relationship with stakeholders in order to ensure a consolidated oversight of the risk, efficiently supported on the current control frameworks. The aim is for reputational risk to be integrated into both business and support activities, and internal processes, thus allowing the risk control and oversight functions to integrate them in their activities.

The reputational risk model is accordingly based on a prominently preventive approach to risk management and control, and also on effective processes for identification and management of early warnings of events and risks, and subsequent monitoring and management of both events and detected risks.

**Key actions in 2018:**

- Redesign of the Reputational risk forum with an executive focus that ensures adequate procedures for the identification, assessment, reporting and escalating of risks and reputational events, with the presence of all the first lines that manage relevant stakeholders.
- Implementation consolidation of the model in the Group's various geographies.
- Review and consolidation of policies relating to specific sectors (mining, soft commodities, defence and energy).
- Coordination with all corporate and local units to implement socio-environmental policies.
- In conjunction with the relevant functions, development of other reputational risk-related policies, such as financing policy for sensitive sectors.
- Definition and reporting of risk appetite metrics.

The launch of a new process of identification, assessment, reporting and subsequent monitoring of the main reputational risks that affect the Group in different geographies. The first reporting processes have already been carried out with this new methodology, which integrates other first lines (such as the Communications area) in a more tangible manner.

# 8. Model risk

## 8.1 Introduction

The Group has far-reaching experience in the use of models to help making all kinds of decisions, with particular relevance for risk management decisions.

A model is defined as a system, approach or quantitative method that applies theories, techniques or statistical, economic, financial or mathematical hypotheses to transform input data into quantitative estimates. The models are simplified representations of real world relationships between characteristics, values and observed assumptions. This simplification allows the Group to focus attention on specific aspects which are considered to be most important for applying a given model.

The use of models entails model risk, defined as the potential negative consequences arising from decisions based on the results of wrong, inadequate or incorrectly used models.

According to this definition, the sources of model risk are as follows:

- The model itself, due to the utilisation of incorrect or incomplete data, or due to the modelling method used and its implementation in systems.
- Incorrect use of the model.

The materialisation of model risk may cause financial losses, erroneous commercial and strategic decision-making or damage to the Group's transactions

The Group has been working towards the definition, management and control of model risk for several years. In 2015, a specific area was established within the Risk division to control this risk.

Model risk management and control functions are performed in the Corporate centre and in each of the Group's main subsidiaries. To ensure adequate model risk management there are a set of policies and procedures which establish the principles, responsibilities and processes to follow during the model's life cycle detailing aspects related to organisation, governance, model management and model validation, among others.

The supervision and control of model risk is proportional to the importance of each model. In this sense, a concept of tiering is defined as the attribute used to synthesise the model's level of importance or model significance, from which the intensity of the risk management processes that must be followed is determined.

At the end of 2017, we launched a strategic plan, model risk management 2.0 (MRM 2.0), as an anticipatory measure to reinforce the model risk management, revising each of the model governance phases and conveniently addressing new supervisors expectations set out in the 2018 ECB Guide on internal models.

MRM 2.0, currently underway, involves 3 phases (2018, 2019 and 2020) and includes 10 initiatives organised around 4 pillars:

- Key elements: Initiatives related to governance, risk appetite, management scope and risk policies.
- Processes: Initiatives related to the models life cycle phases.
- Communication: Internal and external communication (monitoring, reports, training, etc.).
- Model Risk Facilitators: infrastructure, tools and resources.

## 8.2 Model risk management

Model risk management and control is structured around a set of processes regarded as the model life cycle. The definition of the model life cycle phases in the Group is outlined as follows:

### Identification

As soon as a model is identified, it is necessary to ensure that it is included in the model risk control perimeter.

One key feature for a proper model risk management is to have a complete and exhaustive inventory of the models used.

The Group has a centralised inventory, created on the basis of a uniform taxonomy for all models used at the different business units. The inventory contains all relevant information of each model, which allows for a proper monitoring according to their relevance and the tier criteria.

The inventory enables transversal analyses of information (by geographic area, types of model, importance, etc.), thereby facilitating strategic decision-making in connection with models.

### Planning

It is an internal annual exercise, approved by the local units' governance bodies and validated in the Corporate centre, which aims to establish a strategic action plan for all models included in the scope of management of the model risk function. It identifies the needs for resources related to the models that are going to be developed, revised and implemented during the year.

### Development

This is the model's construction phase, based on the needs established in the model plan and with the information provided by the specialists for that purpose.

The development must take place using common standards for the Group, and which are defined by the Corporate centre. This ensures the quality of the models used for decision-making purposes.

### Internal validation

Independent validation of models is not only a regulatory requirement in certain cases, but it is also a key feature for proper management and control of the Group's model risk.

Hence, there is a specialised unit, autonomous from developers and users, which draws up technical opinions on the suitability of internal models, and sets out conclusions concerning their robustness, utility and effectiveness. The validation opinion is expressed through a rating which summarises the model risk associated with it.

The internal validation process covers all models within the model risk control scope, ranging from those used in the risk function (credit, market, structural or operational risk models, capital models, economic and regulatory models, provisions models, stress tests, etc.) to models used in functions that support decision-making.

The validation scope includes not only more theoretical or methodological aspects, but also the IT systems and the data quality that models rely upon for their effective functioning. In general, it includes all relevant aspects of management in general (controls, reporting, uses, senior management involvement etc.).

The internal corporate validation environment is fully aligned with the internal validation criteria of advanced models produced by the financial regulators with authority over the Group. This maintains the criterion of a separation of functions between units developing and using the models (first line of defence), internal validation units (second line of defence) and Internal Audit (third line) which, as the last layer of control, is responsible for reviewing the effectiveness of the function and its compliance with internal and external policies and procedures, and issuing an opinion on its level of effective independence.

The internal validation function is executed in a decentralised manner through five validation units. The coordination and harmonisation of the validation practices and processes is ensured through a specific initiative, which has been reinforced within the MRM 2.0 project.

One of these pillars is the consistency analysis process carried out by the validation units, which includes the review of the issued recommendations, the severity thereof and the rating assigned. In this way it acts as an important point of control of the consistency and comparability of the validation works. The validation works are only concluded once this phase of consistency has been completed.

### Approval

Before being deployed and therefore used, each model must be submitted for approval to the corresponding governance bodies.

### Deployment and use

This is the phase during which the newly developed model is implemented in the system in which it will be used. As noted, above, this implementation phase is another possible source of model risk. It is therefore essential that tests are conducted by technical units and the model owners to certify that the model has been implemented pursuant to the methodological definition and functions as expected.

### Monitoring and control

Models have to be regularly reviewed to ensure their correct performance and that they are suitable for their purpose. Otherwise, they must be adapted or redesigned.

Also, control teams have to ensure that the model risk is managed in accordance with the principles and rules set out in the model risk framework and related internal regulations.

# 9. Strategic risk

## 9.1 Introduction

Strategic risk is the risk of loss or harm arising from strategic decisions or poor implementation of decisions affecting the long-term interests of the Group's main stakeholders, or inability to adapt to changes in the environment.

The Group's business model must be taken into account, as a key factor on which strategic risk pivots. It has to be viable and sustainable; therefore it has to be able to generate results in accordance with the Group's targets, every year and at least during the following three years, as well as being consistent with the long-term view.

Within strategic risk, three main components are differentiated:

- 1 Business model risk:** the risk associated with the Group's business model. This includes, among others, the risk of it being obsolescent, irrelevant, and/or losing value, and so not being able to deliver the expected results. This risk is caused by both external and internal factors.
- 2 Strategy design risk:** the risk associated with the strategy set out in the Group's five-year strategic plan, including the risk that the strategic plan may not be adequate per sé, or due to its assumptions, and thus the Group will not be able to deliver on its unexpected results.
- 3 Strategy execution risk:** the risk associated with executing long-term strategic plans and three-year plans. The risks to be taken into account include both the internal and external factors described above, the inability to react to changes in the business environment, and, lastly, risks associated with corporate development transactions.

## 9.2 Strategic risk management

For Santander, strategic risk is considered to be a transversal risk, and counts with a strategic risk control and management model which is used as a reference by the Group subsidiaries. This model encompasses the procedure and necessary tools for the correct risk monitoring and control:

- **Long-term strategic plan and three-year plan:** the strategic risk function, with the support of different areas of the Risk division, monitors and challenges, in an independent way, the risk management activities performed by the strategy function, adding an integrated section, although independent, to the long-term strategic plan and three-year financial plan (Risk assessment).
- **Corporate development transactions:** the Strategic risk function, with the support of different areas of the Risk division, ensures that the corporate development transactions consider an adequate risk assessment and its impact on both Santander's risk profile and risk appetite.
- **Top risks:** the Group identifies, evaluates and monitors those risks that have a significant impact on its results, liquidity or capital that might involve undesirable concentrations affecting the entity's financial health. It consists of two main categories: i) macroeconomic and geopolitical and ii) idiosyncratic (competitive environment and customers, regulatory environment and internal factors).
- **Strategic risk report:** is a report executed jointly by the strategy function and strategic risk, as a combined tool for the monitoring and assessment of the Group's strategy, as well as associated risks. This report is presented to the board of directors and contains: strategy execution, strategic projects, corporate development transactions, business model performance, main threats (top risks) and risk profile.