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Are credit ratings procyclical?
A study of French banks' capital requirements during the Covid crisis

Credit ratings represent a point of reference for the banking and insurance regulatory framework. Although the literature appears to conclude that credit ratings are procyclical, that procyclicality is nevertheless limited in comparison with alternative methods of assessing credit risk (credit spreads, credit default swaps). An empirical analysis of the sensitivity of the six largest French banks' capital requirements to changes in the credit ratings of their corporate portfolios suggests that the spate of rating downgrades during 2020 did not lead to a significant increase in average risk weights and risk-weighted assets. The impact of external rating downgrades on risk weights was cushioned by the overwhelming use of internal rating models by large French banks, the marked prevalence of unrated exposures (weighted by default at 100%), and state-guaranteed loans.

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20.9%
the share of speculative-grade large exposures in the corporate portfolios of the six largest French banks at the end of 2020 (compared with 15.2% the previous year)

5.52%
the share of risk-weighted assets whose weight depended on a rating from an external credit rating agency in the total portfolios of the six largest French banks at the end of 2020

<1%
the proportion of European banks' internal models that use an external credit rating agency's rating scale to calculate probabilities of default

Point-in-time, through-the-cycle and rating agency credit risk assessment
(x-axis, time; y-axis, probability of default in %)

— Point-in-time
— Rating agency model
— Through-the-cycle
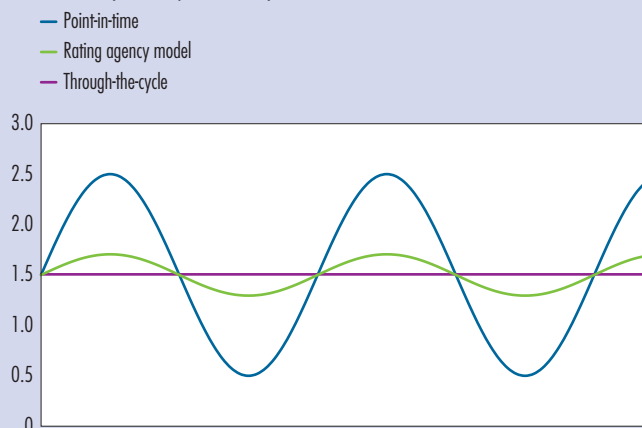
Source: Authors' calculations based on Banque de France research (2004).
Key: For a probability of default (PD) of 1.5% over a business cycle, the point-in-time approach shows PDs of 0.5% (during an expansion) to 2.5% (during a recession). The through-the-cycle approach, which is very close to the methods employed by credit rating agencies, only reflects the permanent component of credit risk. It here shows a probability of default of 1.5% over the entire business cycle.

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1 A review of the literature sheds light on the procyclicality of credit ratings

What is meant by procyclicality?

With reference to the concept of the financial accelerator of Bernanke et al. (1996), procyclicality can be defined here as the propensity of endogenous credit market developments to spread and amplify the effects of initial real or monetary shocks. This mechanism results from imperfections in the conduct of trade and the conclusion of contracts in capital markets, in particular information asymmetries between creditors and borrowers and the associated principal-agent relationship. These asymmetries explain why the premium paid by firms when seeking financing on credit markets (compared to internal equity funding) is higher when the borrower's net worth or wealth is lower.[1] Thus, when the borrowers' net worth fluctuates with the business cycle, for example due to the procyclicality of earnings and asset prices, the external financing premium is countercyclical: the decrease in net worth that follows the decline in asset prices increases the external financing premium. This therefore amplifies the effects of the initial shock to production, consumption and investment. Since the subprime mortgage crisis and the European sovereign debt crisis, credit ratings have often been accused of being procyclical in that, through the financial accelerator channel, a downgrade can increase a firm's or state's external financing costs and thus lead to a further deterioration of its solvency. The numerous methodological difficulties inherent to the process of rating borrowers' creditworthiness have pushed authorities to reduce the mechanical dependence of the financial regulatory framework on these entities' ratings.[2]

The question of the procyclicality of external ratings thus requires an understanding of the methods used by agencies to assign ratings and how they take the business cycle into consideration. First, it is important to make a distinction between the procyclicality of rating methods or policies (implying stricter standards during a recession than during an expansion) and the procyclicality of the ratings themselves: more downgrades during a recession than during an expansion is not necessarily proof of a procyclical ratings policy as credit risk increases mechanically during a recession. Lastly, the use of – and reaction to – external ratings by institutions and market participants (investors, central banks, supervisory authorities, etc.) constitutes a third source of procyclicality. Their reaction, subject to regulatory frameworks, market conventions, the position of the business cycle and possible constraints linked to investment mandates, can trigger a procyclical dynamic. This section aims to shed light on the procyclicality, or absence thereof, of rating agencies' methods and the ratings themselves. The third source of procyclicality will be considered in the third section.

The procyclicality of credit ratings – nuanced findings

Credit rating agencies (CRA) maintain that their ratings are forward-looking opinions measuring the relative credit quality of issuers from a long-term perspective. They claim to establish indicators that are relatively immune to the cyclical influences of the market and of the real economy (the "through-the-cycle" (TTC) approach), which results in ratings that are broadly stable throughout the business cycle. This claim is endorsed by certain economists (Amato and Furfine, 2003). Although rating agencies do not disclose the exact length of their rating cycle, Moody's and Standard & Poor's maintain that they constantly monitor their ratings and carry out reviews at least once a year (and every six months in the case of Moody's sovereign ratings). By contrast, economic studies show that market indicators measuring credit risk (credit default swaps (CDS), credit spreads) are generally regarded as more reactive, but also more volatile, as they are more influenced by short-term factors, and represent a real-time market signal (the "point-in-time" (PIT) approach) of an issuer's probability of default (PD) (Kiff et al., 2013; see Chart 1 below).

The through-the-cycle approach is designed to measure the average credit quality of an entity throughout the cycle. It thus smooths out cyclical market fluctuations. As the rating agencies point out, this means that ratings are a

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[1] Here, net worth is defined as the value of the assets that can be provided as collateral by the borrower, less liabilities. This inverse relationship is due to the fact that when borrowers have little capital to contribute to the financing of a project, the potential divergence of interests between the borrower and external fund providers is greater, implying higher monitoring costs, for which lenders must be compensated with a higher premium.

[2] In this respect, U.S. regulation has been more successful in removing references to external ratings than the European authorities (see section 939 of the Dodd Frank Act).

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C1 Comparison of different credit risk assessment methods

a) Types of credit risk assessment systems

Point-in-time (PIT) e.g. CDS premiums	Merton-type model	Internal ratings-based, IRB	**Rating agency method**	Through-the-cycle (TTC) e.g. probability of default under Basel III

←──→

Short-term horizon, severe rating volatility. Takes into account both current macroeconomic factors and the borrower's risk profile

Long-term horizon, weak rating volatility. Predicts average default rate over a business cycle, disregarding current macroeconomic factors as well as short-term changes in an issuer's probability of default

b) Point-in-time, through-the-cycle and credit rating agency methods
(x-axis, time; y-axis, probability of default in %)

— Point-in-time — Rating agency model — Through-the-cycle

Source: Authors' calculations based on Banque de France research (2004).
Note: CDS – credit default swaps.

relative – not absolute – measure of credit risk[3] and as such should not be construed as a short-term probability of default.[4]

Altman and Rijken (2005) concluded that rating agencies use a through-the-cycle approach built on two criteria: (i) a long-term assessment of credit risk based solely on its permanent component and filtering out the cyclical component; and (ii) a cautious policy for changing ratings that tolerates movements in credit quality within a given band (an estimated 1.8 notches on the rating scale) without prompting a rating change. According to the authors, these two aspects reduce the timeliness of agency ratings.[5]

Numerous studies conclude that the through-the-cycle approach applied by credit rating agencies is flawed. Nickell et al. (2000) and Amato and Furfine (2003) demonstrate that agency ratings are still sensitive to the business cycle, illustrated by the higher frequency of downgrades during a recession. The Banco de España came to the same conclusion in an article for its *Financial Stability Review* published in 2020. Likewise, a Banque de France publication (2004) points out that when rating agencies make a change, they tend to overreact in relation to prevailing conditions. Amato and Furfine explain that this phenomenon is the consequence of excessive optimism (or pessimism) on the part of rating agencies during expansions (or recessions). Sy (2009) also shows that the

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3 Agencies insist on the ordinal and multicycle approach of their assessments, and on the absence of a default rate target or expected loss rate.

4 See the Basel Committee on Banking Supervision (2002) for a precise definition of default.

5 In other words, the process of changing a rating is only triggered when the permanent credit quality component of an issuer moves more than 1.8 notches from the average credit quality of a given rating. The authors estimate that the through-the-cycle approach adopted by agencies causes lags in changing a rating of 0.56 years (downgrading) and 0.79 years (upgrading), and decreases the probability of a rating change over a six-month period by a factor of 7.4 (compared to a point-in-time approach).

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cautious rating change policy operated by agencies, which is integral to the through-the-cycle approach, can lead to threshold effects with initially stable ratings subject to abrupt downgrades of several notches. These threshold effects are a logical consequence of the acyclicality of credit agencies' methods, which is incompatible with continuous or overly frequent rating adjustments.

In addition to rating sensitivity to the business cycle, some studies highlight that in the event of a financial crisis, agencies tend to downgrade issuers more severely or update their rating policy. In an article on financial stability published in 2011, the Bank of England noted that during the subprime mortgage crisis, there was a sharp increase in credit rating downgrades on structured products by the three main agencies, even though the majority of those products had had excellent and surprisingly stable ratings from 1984 to 2006. Sy (2009) reports that rating agencies typically revise their methodologies in the aftermath of rating crises, which can lead to further downgrades.[6] However, it is important to note that some of these studies were conducted more than ten years ago and some even consider the period prior to the 2008 crisis. Consequently, their findings may no longer be relevant, and several indications suggest that agencies now make less frequent rating adjustments during the business cycle.

Although the sensitivity of ratings to the business cycle alone is not enough to confirm with certainty the procyciclicality of the agencies' methods (cyclical fluctuations are not amplified), these studies do, however, call into question their use of a purely through-the-cycle approach. This conclusion is consistent with the Banque de France's classification of risk assessment methods, which positions the agencies' methods near to the extreme "purely through-the-cycle" end of the scale (see Chart 1a).

2 External credit ratings are widely used for regulatory purposes, while market indicators provide valuable additional information

The regulatory uses of external ratings

In the European Union, central banks and supervisors use external ratings in the implementation of monetary policy and of banking and insurance regulation. Under prudential banking regulation, external ratings are mainly used – subject to the capital requirements regulation (CRR) – by banks applying the standardised approach to calculate capital requirements for credit risk.[7] Banks are required to calculate their risk-weighted assets (RWAs) on the basis of standardised risk weights. These are broken down into six credit quality steps (CQS) that correspond to external rating ranges and depend on the type of issuer (sovereign, financial institution, non-financial corporation (NFC), etc.). The risk weights used for firms are shown in the table below.

Mapping between external credit assessment institution (ECAI) assessments and credit quality steps (CQS) under the standardised approach for firms

	Investment grade exposures			Lower quality ("speculative") exposures			Unrated exposures
Credit quality steps (CQS)	1	2	3	4	5	6	∅
Corresponding ECAI rating	AAA/Aaa to AA–/Aa3	A+/A1 to A–/A3	BBB+/Baa1 to BBB–/Baa3	BB+/Ba1 to BB–/Ba3	B+/B1 to B–/B3	CCC+/Caa1 and below	
Risk weight	20%	50%	100%	100%	150%	150%	Risk weight of the central government in whose jurisdiction the firm is incorporated (maximum 100%)

Source: European Banking Authority (2021).
Note: An external credit assessment institution (ECAI) is a credit rating agency registered or certified in accordance with Regulation 1060/2009, or a central bank issuing credit ratings that are exempt from the application of Regulation 1060/2009.

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6 For example, after the Asian crisis, rating agencies emphasised the need for greater focus on countries' balance sheet mismatches, the risks associated with otherwise creditworthy countries' dependence on short-term debt, and better recognition of the risks presented by a fragile banking system (including contingent liabilities).

7 The standardised approach (SA) involves calculating regulatory requirements using ratings from rating agencies, while the foundation internal ratings-based (F-IRB) and advanced internal ratings-based (A-IRB) approaches apply the bank's own estimates in the calculation. External ratings are also used as part of the securitisation framework for market risk.

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Banks applying the internal approach can align their internal probability-of-default scale with that of an external credit assessment institution (ECAI). In a 2017 report on modelling practices, the European Banking Authority (EBA) showed that take-up of this provision is limited, with each exposure class reporting less than 5% of their exposure at default (EAD) based on an ECAI scale, or barely 1% for EAD across all classes (see Chart 2).

Alternatives to external ratings

Internal credit risk assessments: indicators that fail to balance simplicity and risk sensitivity

Internal credit risk assessments are used alongside or instead of external ratings to quantify an issuer's probability of default (PD) and loss given default (LGD). Among the many and varied indicators and methods available and used by market participants, there are two indicators (or risk drivers) that serve to assess the credit risk of corporate

C2 Distribution of probability of default estimation models by counterparty type
(%)
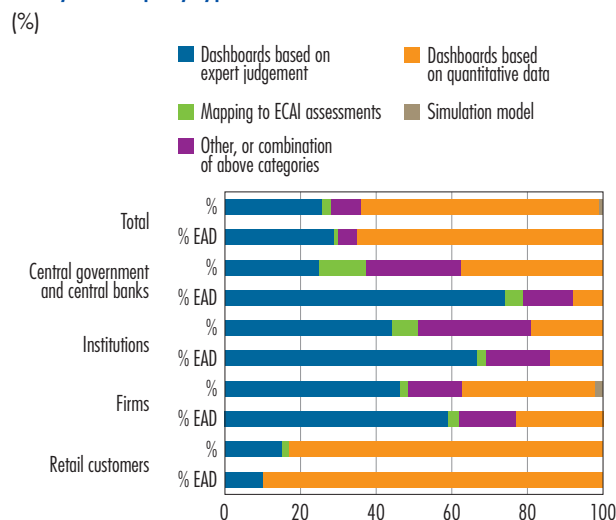
Source: European Banking Authority (2017).
Notes: The "%" rows show the proportion of probability of default (PD) models reviewed by the European Banking Authority (EBA) according to the method used. The "% EAD" rows weight these proportions according to exposure at default (EAD).
ECAI – external credit assessment institution.

BOX

The Covid-19 crisis triggered an increase in rating downgrades in 2020

The Covid-19 crisis resulted in a downturn in asset quality trends (measured by their rating). The share of debt securities held or issued by a euro area economic agent that are regarded as "speculative" (with a credit quality step (CQS) greater than or equal to four; also known as high yield or non-investment grade – non-IG) increased throughout 2020 from 14.6% in the fourth quarter of 2019 to 18.7% in the fourth quarter of 2020.

This was also the case for the six largest French banks' large exposures to non-financial corporations, although there was a particularly steep deterioration in the second quarter of 2020 (see Charts a and b below). In reality, this sudden deterioration stemmed largely from the downgrading of a limited number of very large enterprises that were already nearing "speculative" grade before the crisis, and to which French banks continued to provide financing to support their cash flow through state-guaranteed loans (SGL).

Lastly, in addition to these downgrades, ratings were lowered across the entire scale, with potentially significant impacts on the risk weights of the six largest French banks' corporate portfolio. Indeed, for the corporate portfolio, a shift to speculative grade does not necessarily imply an increase in the credit risk weight under the standardised approach, as the weight remains at 100% for both CQS 3 and 4. However, a downgrade that leads to a change in CQS from 1 to 2 or from 2 to 3 would result in an increase in risk weights, even though the assets would remain investment grade. In 2020, the shares of the six major French banks' large exposures to non-financial corporations in CQS 1 and CQS 2 both declined, from 8.3% to 6.2% and from 35.6% to 29.4%, respectively.

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Ca Non-financial corporations' large exposures
by credit rating, excluding equity instruments
and derivatives

(%)

■ < B   ■ BB   ■ A   ◆ Speculative grade
■ B   ■ BBB   ■ AA
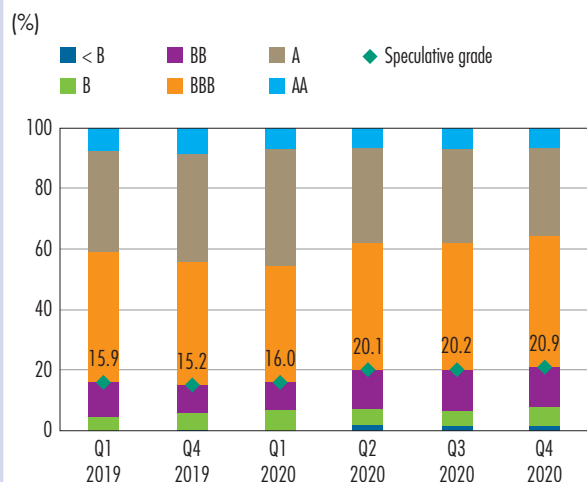
Cb Change in the share of "speculative-grade" large exposures
to non-financial corporations, excluding equity instruments
and derivatives

(%)

— Bank 1   — Bank 3   — Bank 5
— Bank 2   — Bank 4   — All euro area issuers/holders of securities
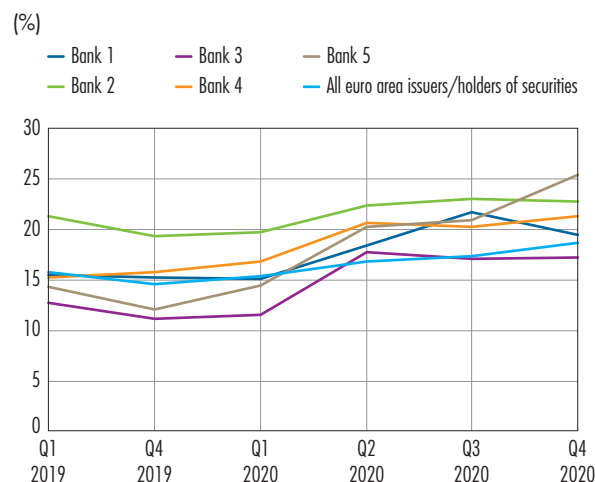
Source: Authors' calculations based on common solvency ratio reporting (COREP) of large exposures.
Note: Unrated firms (accounting for approximately one quarter of non-financial corporation large exposures in 2020) are not included in this breakdown.
Scope: Six largest French banks.

debt exposures: leverage and turnover.[8] A 2015 report by the Basel Committee on Banking Supervision (BCBS) indicates that of all accounting metrics, leverage has the best predictive power in credit risk models, particularly when used in combination with turnover (BCBS, 2015).

However, financial ratios do not capture all the information that is summarised in external ratings, such as country risk and the macroeconomic environment, even though they are decisive in assessing credit risk. As Chart 2 above shows, banks use a range of quantitative indicators as well as "expert" judgements that are very commonly applied in their corporate portfolios, which afford better sensitivity to risk than simple financial ratios.

**Market indicators: not readily available
to most issuing companies and too volatile to be a point
of reference for regulatory use**

The advantage of market indicators, mainly credit spreads and credit default swaps (CDS), is that they aggregate information from a wide range of market participants and reflect the actual supply and demand for particular financial instruments. CDSs are financial protection contracts that allow the buyer to hedge against a credit event in return for the payment of an annual premium, calculated on the notional amount of the asset at risk. CDS premiums, determined by market supply and demand, therefore vary depending on changes in the perception of the credit quality of the underlying asset. Market participants can therefore refer to premium levels to anticipate future credit events. Where available, market indicators are relatively cheap and generally more timely than external credit ratings (Kiff et al., 2013). However, CDS use is severely restricted by the limited number of issuers with a listed CDS (information on small and medium-sized issuers is lacking).

A substantial amount of research finds a correlation between bond yield spreads and real default rates (Hull et al., 2004). Credit spreads may be volatile but market reactions, even in the short term, can be valuable indicators of risk. Equally, CDS markets generally reflect useful information and convey it more quickly than changes in credit ratings, even in the presence of market stress.

8 The leverage ratio is a quantitative measure of a firm's total liabilities in proportion to its equity. Turnover is the total amount of a firm's sales of goods or services. It is equal to the total amount (excluding taxes) of a firm's transactions carried out with third parties in the course of its normal and current business.

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Conversely, during periods of market stress, certain indicators for certain instruments may be unavailable (because some CDSs may be withdrawn from trading, for example) or may not provide the reporting entities or supervisors with a clear point of reference that can be used to judge the relative credit risk of an issuer (for example, comparing the price of a bond to other similar bonds is more difficult during periods of severe market volatility). Furthermore, Di Cesare (2006) shows that although market indicators contain useful information for anticipating rating interventions (rating changes, decisions to place on watch), many of the signals sent are wide of the mark and should be interpreted with caution. Lastly, the volatility of market indicators means they are difficult to use as a regulatory point of reference, either for prudential or for monetary policy purposes.

3 The Covid crisis and rating downgrades: a limited impact on banks' average risk weights

Based on an analysis of the credit risk capital requirements of the six largest French banks, this study finds that the spike in rating downgrades in 2020 had no clear or economically significant effect on the average risk weight of corporate portfolios under the standardised approach; weights even decreased during the year (see Chart 4 below; see Appendix on "Data and methodology").

The study finds that among firms whose risk weight is determined directly from ECAI ratings, an increasing proportion of exposures have been assigned a 100% or 150% weight rather than a 50% weight (see Chart 6 below). However, use of an ECAI to determine risk weights only covers about a quarter of standardised approach exposures to firms (and an even smaller share of the standardised approach exposures to all counterparties – see Chart 3 below). The remainder is covered by a default weight of 100% or other specific provisions. Consequently, downgrading corporate ratings has only a modest, and even indiscernible, impact on the risk weights applied to the standardised approach exposures in this portfolio as a whole (see Chart 5 below).

Furthermore, as the majority of the corporate exposures of the six largest French banks are weighted using internal rating models, the impact of external rating downgrades on capital requirements is limited. The procyclical effect of external ratings is thus unlikely to be reflected under the internal approach through an increase in risk-weighted assets (RWAs) as external ratings play only a marginal role in determining probability of default (PD) and, ultimately, RWAs. In fact, in terms of firms' internal rating models, only 2% of PD models (the equivalent of 3% of exposures at default) are mapped to ECAI ratings, whereas 14% of models and 15% of exposures at default (EAD) use a combination of external ratings, expert judgement or other practices (see Chart 3). In 2020, the average weight of the corporate portfolio under the internal ratings-based approach for small and medium-sized enterprises (SMEs, excluding retail clients) and for large enterprises increased (up 1.3 percentage points), even though SMEs hardly use market financing and are therefore rarely rated. This does not support the hypothesis that external ratings have a procyclical effect on capital requirements for credit risk.

Lastly, the impact of a rating downgrade on a state-guaranteed loan (SGL)[9] granted by a bank depends on the credit risk mitigation technique applied. Banks under the standardised approach apply the substitution approach, whereby state-guaranteed amounts are moved to the general government portfolio and are thus weighted at 0%. However, the unguaranteed portion (10% to 30%) is kept in the corporate portfolio and is weighted as for a conventional credit exposure. In this case, SGLs have no mitigating impact on the transmission of rating downgrades to the average weights of the corporate portfolio. However, when the unfunded protection is taken into account by adjusting the risk parameters (LGD/PD)[10] under the internal ratings-based approach, the impact of a rating downgrade on the average weights of the corporate portfolio can be cushioned by SGLs, because the debtor's risk parameters can be substituted by the LGD/PD that the bank would have attributed to a direct exposure to the guarantor, the French state.

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9 The guarantee covers between 70% and 90% of the total outstanding amount for large enterprises, depending on whether their turnover exceeds EUR 5 billion (70%) or is between EUR 1.5 billion and EUR 5 billion.

10 Loss given default/probability of default.

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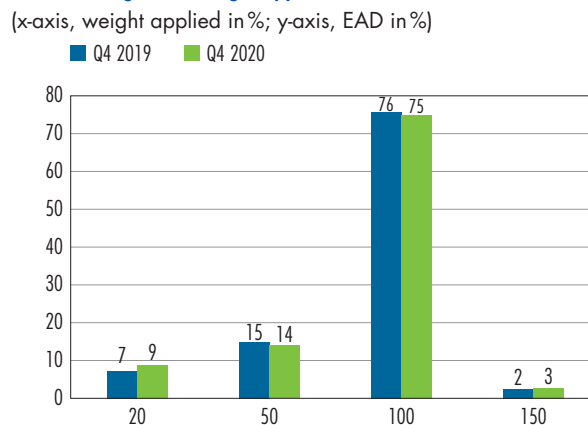
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C3 Preponderance of the internal or standardised rating approach for credit risk for all portfolios (risk-weighted assets broken down by bank), as at end-December 2020
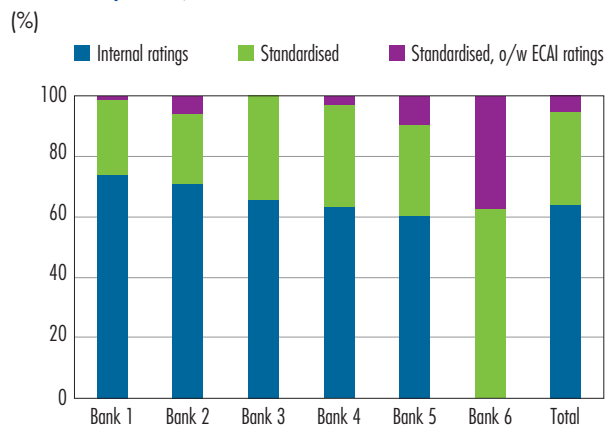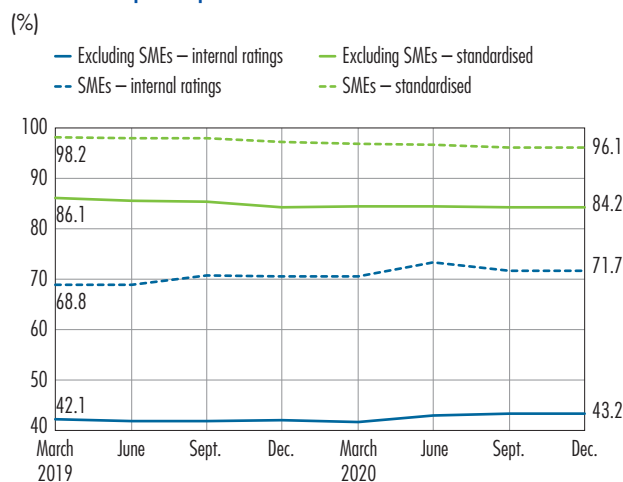
(%)

- Internal ratings
- Standardised
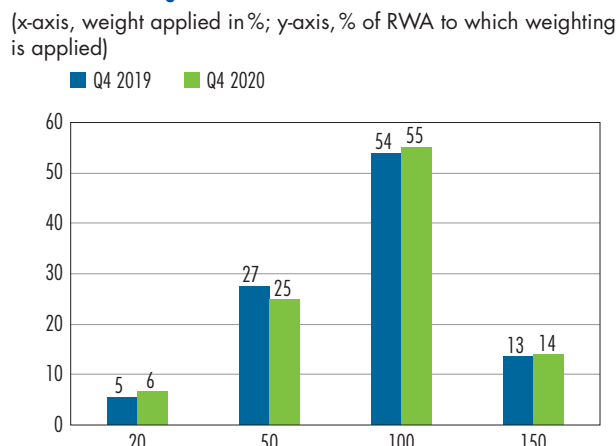- Standardised, o/w ECAI ratings

Source: Common solvency ratio reporting (COREP).
Notes: RWAs are taken before support to small and medium-sized enterprises (SMEs), to neutralise the impact of early implementation of CRR2.
ECAI – external credit assessment institution.
Scope: Six largest French banks, their corporate portfolios, worldwide.

C5 Distribution of the exposure at default (EAD) on the corporate portfolio under the standardised approach, according to the weight applied

(x-axis, weight applied in %; y-axis, EAD in %)

- Q4 2019
- Q4 2020

	20	50	100	150
Q4 2019	7	15	76	2
Q4 2020	9	14	75	3

Source: Common solvency ratio reporting (COREP).
Note: RWAs are taken before support to small and medium-sized enterprises (SMEs), to neutralise the impact of early implementation of CRR2.
Scope: Six largest French banks, their corporate portfolios, worldwide.

C4 Change in the average risk-weighted asset (RWA) density of the corporate portfolio

(%)

- — Excluding SMEs – internal ratings
- — Excluding SMEs – standardised
- -- SMEs – internal ratings
- -- SMEs – standardised

Source: Common solvency ratio reporting (COREP).
Note: RWAs are taken before support to small and medium-sized enterprises (SMEs), to neutralise the impact of early implementation of CRR2.
Scope: Six largest French banks, their corporate portfolios, worldwide.

C6 Distribution of risk-weighted assets (RWA) by risk weight in the corporate portfolio, where risk weights are directly derived from an ECAI rating

(x-axis, weight applied in %; y-axis, % of RWA to which weighting is applied)

- Q4 2019
- Q4 2020

	20	50	100	150
Q4 2019	5	27	54	13
Q4 2020	6	25	55	14

Source: Common solvency ratio reporting (COREP).
Notes: RWAs are taken before support to small and medium-sized enterprises (SMEs), to neutralise the impact of early implementation of CRR2.
ECAI – external credit assessment institution.
Scope: Six largest French banks, their corporate portfolios, worldwide.

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Appendix
Data and methodology

In order to quantify the sensitivity of bank capital requirements to credit ratings, we draw on quarterly regulatory data provided by the Common Reporting Framework (COREP), particularly data from large exposures reporting. Large exposures reporting, also disclosed quarterly, covers exposures to customers or groups of related customers whose value is greater than or equal to 10% of the institution's eligible capital, or exposures whose value is larger than or equal to EUR 300 million. This analysis focuses on the six largest French banks by balance sheet and covers the period from June 2019 to December 2020, thus spanning the Covid-19 pandemic shock.

We first examine the predominance of the internal ratings-based approach and the standardised approach for credit risk for the portfolios of the six largest French banks. We identify exposures that are weighted using a credit rating for the standardised approach only. We then analyse the average risk-weighted asset (RWA) density of the corporate portfolio of the same banks, distinguishing between exposures to small and medium-sized enterprises (SMEs) and other companies, depending on the approach used (internal rating or standardised). Finally, we present the distribution of the exposure at default (EAD) on the corporate portfolio under the standardised approach for the six banks, comparing the weights applied in the fourth quarters of 2019 and 2020. To this end, we distinguish between exposures whose weight has been calculated directly using a credit rating.