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Collateral easing in non-standard times: a review of the role of Additional Credit Claims in the Eurosystem collateral framework

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Abstract

In this paper we explore the role of the temporary and country-specific Additional Credit Claims (ACC) frameworks as a monetary policy implementation tool. We discuss their evolution and provide a novel and detailed description of all ACC measures adopted by the different euro area NCBs since 2012. Reviewing the literature, we document the channels through which ACCs contributed to liquidity distribution during the euro area sovereign debt crisis, the negative interest rate period and the pandemic. Drawing on panel data on the use of collateral and securities holding statistics, we document novel stylised facts about ACC mobilisation patterns during these episodes. A number of conceptual contributions and empirical findings emerge. While ACCs started out as a crisis instrument, the historical review highlights that ACCs constitute a policy tool that is suitable for enhancing monetary policy implementation. Empirically we find that pledging ACCs was not systematically associated with more concentrated collateral pools. Banks pledging ACCs were mostly universal banks and diversified lenders of varying size and were associated with higher funding costs for their short-term secured debt instruments, though the causality is unclear. Finally, drawing on the implementation and risk management experience with ACC frameworks as well as our empirical findings, we establish five lessons to inform future policy discussions on collateral.

JEL codes: E4, E5, E65

Keywords: Collateral framework, monetary policy implementation, Additional Credit Claims

Non-technical summary

Additional Credit Claims (ACCs) were initially introduced during the euro area sovereign debt crisis and designed to facilitate liquidity provision to banks by temporarily broadening the range of collateral eligible for ECB refinancing operations. This paper examines the evolution and impact of the Eurosystem's ACC frameworks as a monetary policy implementation tool over time and provides stylised facts about their use.

The paper provides several key findings. First, the patterns of temporary introduction of ACC frameworks by national central banks (NCBs) and banks' mobilisation of ACCs as collateral demonstrate their importance in supporting liquidity when traditional market conditions are disrupted. Having begun as a crisis measure in 2012, their use peaked during the pandemic and gradually started to fall from 2022 onwards.

Second, use was concentrated among a small group of banks that accounted for the vast majority of ACC collateral. These were primarily universal banks and diversified lenders which, despite their use of ACCs, did not exhibit more concentrated collateral pools than other banks. Instead, they used them to complement other asset classes, highlighting the role of ACCs as a supplementary tool rather than a primary source of collateral. Third, the study finds that ACC use is correlated with higher funding costs for short-term secured debt instruments. The paper also explores the substitutability of ACCs with marketable assets like asset-backed securities (ABSs) and covered bonds. Overall, we find limited co-movement of these asset classes except in specific jurisdictions such as France, where policy changes led to a shift from ACCs to covered bonds and ABSs.

Finally, the paper draws several lessons for monetary policy implementation. It emphasises the need for collateral frameworks to consider innovations in asset types and bank-specific characteristics. It suggests that expanding collateral acceptance to include riskier assets can be more efficient than reducing haircuts on collateral already eligible. The availability of robust credit assessment systems is crucial for managing the additional risks associated with these expansions.

In conclusion, ACC frameworks have demonstrated their value as flexible and effective tools for monetary policy implementation, particularly during crises. The study underscores the importance of understanding bank-specific factors and the broader financial context in designing effective monetary policy implementation tools.

1 Introduction

Ever since its inception the Eurosystem has accepted a range of assets as collateral in its standard refinancing operations, including credit claims (bank loans). The broad collateral framework reflects the heterogeneity in institutional set-ups and legal frameworks, and the resulting differences in collateral availability across jurisdictions and banking models (cf. Bindseil et al., 2017). Several NCBs accepted credit claims as collateral prior to the introduction of the euro in 1999 and continued doing so as NCB-specific collateral after the launch of the single currency. The Single List of eligible collateral assets[1] was created in 2007 as a harmonised euro area-wide set of both marketable and non-marketable assets, including credit claims.[2]

The Eurosystem has continuously adapted its monetary policy implementation framework to ensure smooth transmission of monetary policy across the euro area. Some of the most significant changes to the collateral framework since the Great Financial Crisis have been linked to supporting broad-based participation in (targeted) longer-term refinancing operations (T)LTROs. Since October 2008 the Eurosystem has operated both a general collateral framework, which is permanent, and a temporary collateral framework, which comprises crisis-related collateral easing measures amended over time.[3]

Building on the experience with regular credit claims, on 8 December 2011 the Governing Council decided to extend its temporary collateral framework by enabling NCBs to temporarily accept ACCs as collateral.[4] Specifically, compared to regular credit claims accepted under the general collateral framework, ACCs included new asset types (e.g. mortgages) and additional debtor types (e.g. private individuals), allowed for different mobilisation concepts (e.g. pools of credit claims) and lowered credit quality requirements below credit quality step (CQS) 3. Acceptance of ACCs was connected to the Governing Council decision on additional enhanced credit support measures to support bank lending and liquidity in the euro area money market, including targeted longer-term refinancing operations (TLTROs). Between 2012 and 2025 the aggregate share of ACCs in bank collateral pools ranged from 2% (in early 2012, when they were first introduced) to 19% (in the first quarter of 2023, in the aftermath of the pandemic). Empirical literature has pointed to the important role played by ACCs in monetary policy transmission (e.g. Mésonnier

1 For more information see 'The Single List in the collateral framework of the Eurosystem' in the ECB Monthly Bulletin, May 2006, pp. 75-87.

2 The list of eligible marketable assets is published on the ECB website at the level of individual ISINs, which is not possible for credit claims because they are usually non-public bilateral contracts between a bank and a debtor.

3 Bindseil et al. (2017) include a comprehensive list of changes to the temporary collateral framework, including announcement and implementation dates, and an overview of the relevant legal acts.

4 See Decision of the ECB of 14 December 2011 "on additional temporary measures relating to Eurosystem refinancing operations and eligibility of collateral" (ECB/2011/25), which was subsequently replaced by Guidelines ECB/2012/18, ECB/2013/4 and ECB/2014/31. The acceptance of ACCs is governed by Article 4 thereof (Admission of certain additional credit claims), which in indent 1 states "*NCBs may accept as collateral for Eurosystem monetary policy operations credit claims that do not satisfy the Eurosystem eligibility criteria*".

et al., 2022). However, despite ACCs' prominent role in the literature and their sizeable contributions to aggregate collateral availability over time, little is known about how ACC use affects banks' collateral pledging behaviour, individual bank characteristics or the micro foundations by which acceptance of ACCs as collateral contributes to the monetary policy transmission mechanism.

In this paper we comprehensively study the ACC frameworks and review their evolution and role as a monetary policy implementation tool over time. The paper follows a threefold approach. First, we review the historical evolution of ACC frameworks and their eligibility criteria and risk control measures. This is relevant because ACCs were initially accepted by only around one-half of euro area NCBs (see Section 2.1), but subsequently, following the announcement of pandemic collateral easing measures to support recourse to TLTRO III in April 2020 (see Section 2.2), by almost all of them. Acceptance of ACCs occurred in a heterogeneous manner across NCBs, with each having their own specific set of rules and criteria to reflect the needs of their domestic market and national law, although all were approved by the Governing Council and based on a common minimum set of criteria.[5] However, in March 2022 the Eurosystem started to gradually phase out the pandemic collateral easing measures[6] and in November 2024 took a further step by starting to gradually phase out the temporary framework, aiming for a more harmonised, flexible and risk-efficient Eurosystem collateral framework (see Section 2.3). Second, we consider this extensive non-standard period during which ACCs were used alongside other temporary collateral types to take stock of existing literature and elicit the micro foundations of how ACCs function. Guided by the literature and the institutional features established, we investigate how use of ACCs affected banks' use of collateral. Leveraging extensive panel data on their use of collateral and asset holdings, we document stylised facts on both concentration and substitution patterns of ACC mobilisation, and explore how use is associated with banks' size, business model and funding costs. Finally, the paper draws some key lessons from the experience of designing and implementing ACC frameworks.

A number of conceptual contributions and empirical findings from this paper. First, while ACCs were initially designed as a crisis instrument, the historical review of temporary ACC frameworks highlights ACCs have evolved and, with an appropriately designed risk control framework, could constitute a future policy tool suitable for enhancing monetary policy implementation. Second, this paper elicits a number of, partially novel, stylised facts. While 90% of the ACCs used as collateral between 2012 and 2024 accrue to just 42 banks, those banks pledging ACCs do not have systematically more concentrated collateral pools as ACCs were mostly used to complement other asset classes. This finding applies after controlling for country specificities and unobserved heterogeneity across banks. Banks pledging ACCs are mostly universal banks and diversified lenders of varying size, and to a lesser extent global systemically important banks (GSIBs). Moreover, ACC use is associated with higher funding costs for short-term secured debt instruments. Exploring the interplay

5 Country-specificities are discussed in greater detail in Annex 6.2.

6 See ECB announces timeline to gradually phase out temporary pandemic collateral easing measures, press release of 24 March 2022; and Decisions taken by the Governing Council of the ECB (in addition to decisions setting interest rates) – December 2023, ECB, 15 December 2023.

between ACC mobilisation and similar market alternatives related to structured finance, we find that substitution of demobilised ACCs by newly issued ABSs and covered bonds with similar underlying loans has been limited over time. The only exception is for residential mortgage ACC pools in one jurisdiction, where we document how demobilisation of ACCs translated into issuance and mobilisation of retained ABSs and own-used covered bonds. Overall, our empirical findings highlight the role of bank heterogeneity and the fact that the theoretical mechanisms underpinning the functioning of ACCs are often counteracted by bank- and jurisdiction-specific institutional features.

This paper relates and contributes to various strands of the literature on monetary policy implementation. First, this paper relates to a body of literature discussing the broadness of central bank collateral frameworks (cf. Nyborg, 2017) and various phases of its expansion in the euro area (e.g. Corsi and Mudde, 2022). In particular, our work relates to a small set of papers zooming in on non-marketable assets. As such this paper adds to the findings of Tamura and Tabakis (2013), who discuss the role of credit claims as collateral while also touching on the role of ACCs. Our main contribution is the novel and detailed documentation of the evolution of the ACC frameworks and their role over time across asset types and NCBs, while also providing an extensive micro-level analysis. Second, we add to the literature exploring the role of ACCs and spillovers on banks' balance sheets and lending. For instance, our paper is linked to research by Hartung (2024) and Grandia et al. (2019), who study how banks can obtain high-quality liquid assets (HQLAs) from Eurosystem credit operations by mobilising ACCs as a way of improving liquidity coverage ratios to fulfil regulatory requirements. It also ties to work by Greppmair et al. (2024), who find that the introduction of ACCs improved conditions in the money market as banks took advantage of the temporary extension of frameworks by pledging newly eligible credit claims to reduce the encumbrance of HQLA. As regards monetary policy transmission, our paper further relates to broader literature documenting the role played by ACCs in monetary policy pass-through (e.g. Cahn, Duquerroy and Mullins, 2024; Mésonnier et al., 2022; Benetton and Fantino, 2021). While most of these papers exploit the introduction of ACC frameworks as an exogenous event to identify causal effects, our paper is descriptive in nature. Our main contribution to this literature lies in gathering a series of stylised facts across jurisdictions, generally with a focus on individual countries or specific segments of the interaction with markets.

The remainder of this paper is structured as follows. Section 2 describes the architecture and main characteristics of ACC frameworks with respect to eligibility requirements and risk control measures, and how their use has evolved over time. Section 3 reviews the literature on the micro foundations of ACCs and discusses their role in monetary policy transmission. It also introduces the main empirical analysis of ACC use. Section 4 draws lessons. Section 5 concludes. The Annex includes a detailed overview of the evolution of ACC frameworks across countries and selected NCB publications.

2 Architecture and evolution of ACC frameworks

This section describes the architecture and evolution of ACC frameworks over three phases since December 2011. The initial phase covers inception and evolution up to the breakout of the pandemic in spring 2020 (Section 2.1). Their scope and use was significantly expanded in response over the course of 2020 (Section 2.2). Gradual phasing-out started in 2022 (Section 2.3). This section concludes by presenting the quantitative use of ACCs by country and type since inception (Section 2.4). Before delving into the details, Box 1 puts ACCs into a broader perspective and discusses how credit claims differ from marketable assets as collateral for monetary policy credit operations.

Box 1

How do credit claims differ from marketable assets as collateral for credit operations?

The Eurosystem collateral framework for its credit operations rests on three pillars, which differentiate between marketable assets and credit claims as collateral.[7] These are (i) collateral eligibility requirements, including credit quality requirements, (ii) valuation, and (iii) risk control measures, primarily haircuts.[8] Marketable assets are traded securities and thus highly standardised and usually associated with ratings from credit rating agencies that the Eurosystem uses in a non-mechanistic way. Marketable assets are valued daily at market prices and their haircuts mitigate the market, liquidity and credit risks after a counterparty's default. All credit claims are non-marketable assets and thus differ from marketable ones in all three regards, as discussed in more detail below.

First, the collateral eligibility requirements for credit claims reflect their lower level of standardisation, public information and liquidity in comparison with marketable assets. The debtors of credit claims are often smaller corporates, in particular small and medium-sized enterprises (SMEs), or smaller public-sector entities that do not issue traded debt instruments. The legal and operational requirements for credit claims are thus more stringent than for marketable assets.[9] Given the limited coverage by credit rating agencies, the Eurosystem mainly uses information from NCBs' in-house credit assessment systems (ICASs) and counterparties' internal ratings-based systems (IRBs) to determine the credit quality of corporate credit claims.

Second, as credit claims are not regularly traded and thus do not have market prices, the Eurosystem values them at their outstanding amount. In the absence of market prices,

7 See Annex 6.1 for a primer on how the Eurosystem mitigates financial risks in its credit operations, and Chapter 2 of ECB (2015) for a more detailed description of the three pillars of the collateral framework.

8 The haircut is a valuation discount applied to the value of a collateral asset mobilised by a bank at the request of the ECB to secure repayment of the credit, and constitutes a key tool for ensuring collateral adequacy and mitigating the financial risks involved in the ECB's collateralised credit operations. The formulation of valuation haircuts is determined mainly by risk management considerations. (see Adler et al., 2023).

9 See, for example, Tabakis and Tamura (2013) for more detailed information on the Eurosystem eligibility requirements and operational procedures relating to credit claim collateral, including in comparison to other central banks.

determining theoretical prices for credit claims poses significant challenges and uncertainties. The Eurosystem has thus decided to accept credit claims at their nominal value and aims to mitigate the associated additional financial risks via commensurate haircuts.

Third, the Eurosystem applies a granular haircut scheme depending on the credit quality, maturity and interest rate structure of the credit claims. The approach for determining haircuts for individual credit claims is similar to that used for corporate bonds,[10] but takes into account the expected longer liquidation periods for credit claims and the valuation at nominal value instead of daily market prices. Box 2 looks into the Eurosystem-wide minimum eligibility criteria and risk control measures for ACCs.

2.1 Origin and initial phase

ACCs were first accepted as Eurosystem collateral on 8 December 2011 as part of measures to support bank lending and money market activity, along with the launch of two LTROs with a three-year maturity. In view of tensions in wholesale funding markets, as a way of increasing collateral availability and enabling participation in the new operations the Governing Council decided to further extend its temporary collateral framework by allowing NCBs to temporarily accept performing credit claims (i.e. bank loans) that satisfied country-specific eligibility criteria as additional collateral. The risks entailed in acceptance were to be borne by the NCB authorising their use.[11] This is referred to as "non-loss sharing". Specifically, NCBs that decided to accept ACCs as collateral had to establish eligibility criteria and risk control measures in line with Article 18.1 of the Statute of the ESCB,[12] which stipulates that all Eurosystem credit operations must be based on adequate collateral. These country-specific criteria (the ACC frameworks) were subject to prior approval by the Governing Council, which ensured certain minimum criteria. All frameworks submitted for approval met minimum credit quality requirements and risk control measures as well as reporting and monitoring requirements in respect of the credit assessment sources used to assess credit quality. Nevertheless, the inherent complexity and legal complications of accepting jurisdiction-specific collateral resulted in a degree of fragmentation. Acceptance of ACCs was therefore subject to greater scrutiny to ensure compliance with the adequacy of collateral requirement under Article 18.1 of the ESCB Statute. By December 2012 the Governing Council had approved the ACC frameworks of nine

10 Adler et al. (2023) describe the role of haircuts within the risk control framework in detail and explain how the Eurosystem calibrates the haircuts for marketable assets, without covering those for credit claims.

11 See ECB announces measures to support bank lending and money market activity, press release of 8 December 2011 and the associated FAQs.

12 Protocol (No 4) on the Statute of the European System of Central Banks and of the European Central Bank (OJ C 202, 7.6.2016, p. 230).

NCBs: those of Ireland, Greece, Spain, France, Italy, Cyprus, Austria, Portugal and Slovenia.[13]

Since 1 January 2014 ACC frameworks have been consolidated and subject to a common and comprehensive set of eligibility criteria and risk control measures. To further improve consistency across frameworks the Governing Council approved a refined set of minimum eligibility criteria and risk control measures applicable to pools of ACCs and individual ACCs backed by real estate in particular which became effective on that date.[14] In general acceptance of ACCs in pools or portfolios represented a new feature for collateral mobilisation, not least for counterparties with limited access to structured finance markets. ACC pools aimed to integrate well diversified portfolios of smaller credit claims from a homogeneous asset class, e.g. residential mortgages or loans to SMEs. Together with the criteria already established in 2012, the set of minimum eligibility criteria and risk control measures set the basis of a common minimum ACC framework applicable to all country-specific frameworks. Some of the initial frameworks were subsequently redesigned to fulfil these minimum criteria, or expanded to include additional permitted features. Acceptance of ACCs remained subject to prior approval by the Governing Council and the condition that losses arising from their mobilisation be borne solely by the NCB accepting them. Box 2 includes an overview of the minimum eligibility criteria and risk control measures common to all NCBs as consolidated in 2013 and applicable from 2014 onwards.

On 22 May 2014 the Governing Council decided to accept certain short-term debt instruments (STDIs) issued by non-financial corporations (NFCs) under the ACC frameworks. These did not satisfy the Eurosystem eligibility criteria for marketable assets. However, since they were considered close substitutes for short-term credit claims they could be mobilised as collateral under the ACC frameworks, provided they complied with specific criteria.[15]

Acceptance of ACCs as collateral was repeatedly extended with the launch of each of three series of TLTROs. To support the effectiveness of these and ensure that sufficient collateral was available for banks to participate in the schemes, with the launch of each series the validity of ACC frameworks was sequentially extended until the maturity date of the final operation of each series.[16] In June 2019, following

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13 See ECB's Governing Council approves eligibility criteria for additional credit claims, press release of 9 February 2012. The ACC frameworks of the NCBs of Greece and Slovenia were approved following publication of the press release.

14 The Governing Council took these decisions in 2013 as part of the review of the risk control framework (see press releases in July 2013 and September 2013). While a minimum set of eligibility criteria and risk control measures was also designed and approved for individual ACCs backed by real estate, this framework was never implemented since the two NCBs which had mobilised such loans before 2014 (those of France and Cyprus) choose to continue doing so under pools of ACCs.

15 See Decisions taken by the Governing Council of the ECB of July 2014. Specifically, STDIs had to be i) issued by NFCs established in the euro area, ii) denominated in euro, and iii) not admitted to trading on a market regarded as acceptable by the Eurosystem under its general collateral framework. Further, they were subject to the minimum credit quality requirements and risk control framework applicable to individual ACCs.

16 See Decisions taken by the Governing Council of the ECB of June 2014, February 2018 and June 2019 for the sequence of announcements.

the launch of the third series of TLTRO (TLTRO III), the Governing Council approved extension of the validity of existing ACC frameworks until end-March 2024.[17]

Box 2
Common minimum eligibility criteria and risk control measures

This box outlines the minimum eligibility criteria and risk control measures common to all national-specific ACC frameworks since 2014.[18] The existence of a minimum set of criteria implied that NCBs were able to choose more conservative eligibility and risk mitigation criteria under their national frameworks and/or not make use of all the features allowed by the common framework.

1. Minimum eligibility criteria and risk control measures for individual ACCs

Individual ACCs could have a lower credit quality than the minimum requirements applicable in the general collateral framework. More specifically, performing ACCs could be accepted with a credit quality threshold equal to a probability of default (PD) of up to 1.5% over a one-year horizon, corresponding to a maximum of CQS 5 on the Eurosystem's harmonised rating scale.

Table A
Eurosystem harmonised rating scale

Credit quality step (CQS)	1&2	3	4	5	6	7	8
Probability of default (PD) – upper bound	≤ 0.1%	≤ 0.4%	≤ 1.0%	≤ 1.5%	≤ 3.0%	≤ 5.0%	>5.0%

Notes: PD refers to the probability of default over a one-year horizon. CQS 3 is the minimum for the general collateral framework. NCBs could accept individual ACCs up to CQS 5 and pools of ACCs constituted of loans up to CQS 8, depending on the respective NCB's approved ACC framework.

In addition to systems approved under the Eurosystem credit assessment framework (ECAF), the credit quality of individual ACCs could also be assessed by non-ECAF-approved sources. This was in line with the policy intention to expand use of credit claims collateral by broadening possible credit assessment systems until formal acceptance under the ECAF.[19] Also before the minimum common framework was established, acceptance of IRBs and internal NCB credit assessment systems was allowed without ECAF approval, though these systems were expected to gradually gain ECAF acceptance. Some rating tools that did not meet certain ECAF requirements were also permitted for the credit quality assessment of individual ACCs until the decision to fully phase out rating tools from the collateral framework.[20]

17 On 7 June 2019 the ACC frameworks were extended until the maturity date of the final TLTRO III operation, so the prolongation of the maturity of the TLTRO III operations announced on 12 September 2019 implied the ACC frameworks were extended until end-March 2024.

18 See also the ECB ACC explainer on ACC frameworks for a high-level description of the minimum eligibility criteria and risk control measures applied to ACCs.

19 As stated in ECB announces measures to support bank lending and money market activity, press release of 8 December 2011, "The Governing Council would welcome wider use of credit claims as collateral in the Eurosystem's credit operations on the basis of harmonised criteria and announces that the Eurosystem is aiming to: i) enhance its internal credit assessment capabilities; and ii) encourage potential external credit assessment providers (rating agencies and providers of rating tools), and commercial banks that use an internal ratings-based system, to seek Eurosystem endorsement under the Eurosystem Credit Assessment Framework."

20 The Eurosystem phased out the use of rating tools from its general framework for monetary policy operations in May 2019, and subsequently also from the ACC frameworks, owing to cost-benefit considerations (see the related press release).

To mitigate the additional risks from these expanded eligibility criteria, individual ACCs were subject to a minimum haircut schedule calibrated for lower credit quality thresholds compared to the general framework (CQS 4 and 5). The same reporting and monitoring process applicable to ECAF sources also applied to additional credit assessment systems used only for the credit quality assessment of ACCs. If these relied on data and methodologies associated with greater uncertainties than ECAF-approved systems, they were also subject to a more conservative mapping to the Eurosystem's harmonised rating scale.

Individual ACCs could be also denominated in Australian dollars, Canadian dollars, Swiss francs, pounds sterling, Japanese yen or US dollars. In this case valuation markdowns applied over the outstanding amount of the ACCs before the application of haircuts, to address the additional exchange rate risk.

2. Minimum eligibility criteria and risk control measures for pools of ACCs

Acceptance of credit claims in pools or portfolios represented a new feature for collateral mobilisation since the inception of the ACC framework. The aim was to expand eligible collateral by allowing counterparties to mobilise credit claims with lower credit quality and/or debtors or guarantors not rated by ECAF sources, but which overall, at portfolio level, reached a minimum credit risk quality through portfolio diversification and granularity of exposures.

A group of ACCs could qualify as a pool under two conditions: homogeneity and granularity. First, they should only consist of performing ACCs belonging to a homogeneous asset class, namely residential mortgages, commercial mortgages, SME loans to NFCs, auto loans, consumer loans or leases.[21] Similar to ABSs, loan-level data for pools should be reported monthly to a Eurosystem-accepted repository using ABS-type templates designed to account for the particularities of ACCs. Second, with respect to granularity, the concentration in a pool was controlled via a maximum Herfindahl Hirschman Index (HHI), computed based on the share of performing loans in the pool.

At loan level, ACCs mobilised under pools could deviate from certain general eligibility criteria applicable to credit claims. In the case of residential mortgages, consumer or auto loans, private individuals could be also considered eligible debtors/guarantors. Loans with amounts below the minimum size threshold applicable in the general framework could be included too. In addition, performing loans with a credit quality lower than CQS 5 could be mobilised as part of pools, since the minimum requirements were applied at the pool level. Finally, in line with individual ACCs, claims pledged under pools could be also denominated in Australian dollars, Canadian dollars, Swiss francs, pounds sterling, Japanese yen or US dollars.

Minimum credit quality requirements and risk control measures were established at pool level, reflecting in particular probability of default (PD), loss given default (LGD) and the diversification of the loans constituting the pool. The maximum PD of pools had to be comparable to the minimum credit quality requirement for individual ACCs. The minimum valuation haircut applied to pools took into consideration the diversification of the pool and was derived from the PDs over a one-year horizon of the underlying loans (debtors) and the respective LGD, in conjunction with the residual maturity of the loans. The PDs and LGDs were further adjusted, taking

[21] NCBs also had the option to accept ACCs backed by real estate (e.g. residential mortgages) on an individual basis. Two did so, however after the establishment of the minimum common framework, they chose to accept such loans as part of pools.

into account stressed conditions and the diversification of loans in the pool.[22] In the case of non-euro denominated loans, the same minimum foreign exchange markdowns as for individual ACCs applied to the outstanding amount. The minimum haircut also included a valuation markdown to cater for the valuation risk of underlying loans, which, unlike marketable assets, are not subject to daily valuation. Finally, a haircut floor ensured that the minimum haircut was above this threshold in all cases.

Sufficient granularity in pools of ACCs was ensured via limits and additional minimum haircuts for less diversified pools. In addition to the maximum concentration limit of a pool measured by the HHI mentioned above, the minimum framework foresaw a minimum haircut add-on applied to pools of ACCs with intermediate concentration.

To obtain the PDs and LGDs of individual loans/debtors from the pools, additional credit assessment systems could be used. In addition to systems approved under the ECAF, PD/LGDs were also accepted from IRBs approved for capital requirements purposes or in line with the related requirements. These systems had to ultimately receive ECAF approval. They could also be derived based on NCBs' internal credit assessment capabilities, namely from conservative PD/LGD determination approaches set out by NCBs and approved by the Governing Council. Additional sources not employed under the general collateral framework were nevertheless subject to the same reporting and performance monitoring as ECAF-approved ones.

The common minimum eligibility and risk control framework described in this box remained largely unchanged until the pandemic in 2020. Only minor changes to the minimum set of criteria occurred after 2014, notably as part of the Eurosystem's regular reviews of the risk control framework. However, the common ACC framework was substantially changed and expanded as part of the pandemic-related collateral easing measures described in the following subsection.

NCBs implemented features of the common minimum ACC framework in a heterogenous manner in their different national frameworks, leading to a more fragmented Eurosystem collateral framework. Acceptance of individual ACCs with a lower credit quality threshold was relatively broad-based across eight of the nine NCBs that set up an ACC framework in 2012 (those of Greece, Spain, France, Italy, Cyprus, Austria, Portugal and Slovenia). While most of these accepted individual ACCs up to CQS 5, some frameworks only allowed up to CQS 4 (equivalent to a PD of 1.0%). However, ACC pools were implemented in the frameworks of only five NCBs (those of Ireland, France, Italy, Cyprus and Portugal), with three main types of underlying loans mobilised: unsecured consumer loans, residential real estate mortgages and corporate loans (including loans to SMEs and leasing structures), subject to overall conservative risk control measures.[23] The expansions were supported by the ability to accept additional credit assessment systems not employed under the general collateral framework. For an interim period, three NCBs (in Ireland, Spain and Cyprus) permitted loans assessed by IRB models that were not ECAF-approved to be accepted. Three others (in Greece, Italy and

[22] See France for an example of an NCB framework for pools of ACCs that includes stressed PDs and valuation adjusted LGDs compliant with the minimum ACC framework applicable at the time (Tables 1, 2 and 3).

[23] For example, in the original Portuguese ACC framework before 2014, a flat haircut schedule of 70%, 75% and 85% was applied for pools of credits to NFCs, mortgages and consumer loans respectively.

Portugal) also used rating tools that were not ECAF-approved under their ACC frameworks for interim periods, but subject to yearly performance monitoring. Two (in Italy and Cyprus) developed their own specific PD/LGD approaches based on conservative assumptions to establish minimum credit quality requirements and haircuts for pools of ACCs. For instance, Italy used a statistical PD approach sometimes referred to as the Statistical In-house Credit Assessment System (S-ICAS)[24] when it expanded its framework to include portfolios of ACCs to NFC and broadened the scope of eligible debtors to include SMEs. The NCBs in Italy and Cyprus operated a simplified PD/LGD determination approach for pools of residential mortgages. Only four NCBs (those of Ireland, Spain, France and Cyprus) accepted non-euro denominated ACCs in their frameworks and one (Portugal) decided to accept STDIs. **Annex 6.2** includes a high-level description of national ACC frameworks since their initial phase and their evolution over time during the subsequent phases described below.

2.2 Expansion in response to the pandemic

The ECB's monetary policy response to the pandemic included a set of collateral easing measures to facilitate access to Eurosystem credit operations.[25] These were adopted in April 2020 and implemented over the course of 2020. They are summarised in Table 1 and served three interconnected objectives: (i) pre-empting shortages of collateral for banks, (ii) providing NCBs with additional flexibility to address the collateral needs of domestic banks, and (iii) countering adverse procyclical feedback effects from the reduced availability of collateral, e.g. due to rating downgrades. In hindsight the quantitative contribution from collateral easing measures of around €285 billion (close to one-quarter of the total increase in collateral positions after haircuts up to February 2022) was predominantly driven by extensions to the ACC frameworks of NCBs, which accounted for more than 50% of the total effect, and the temporary haircut reduction, which accounted for about 40%.[26]

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24 In line with, e.g., Auria et al. (2021), the term we use in this paper for statistical PD approaches taken by NCBs is S-ICASs. In view of the positive experiences with their temporary acceptance, on 19 December 2024 the Governing Council approved a harmonised framework for S-ICASs, meaning they will be accepted as an additional credit assessment source in the general collateral framework from 2026, subject to compliance with the harmonised framework (see Decisions taken by the Governing Council of the ECB of 31 January 2025). Both these future S-ICASs and their temporarily accepted precursors assess the credit quality of NFCs (and SMEs in particular) based on quantitative approaches, for which human intervention would be an exception. NCBs' full ICASs also assess NFCs, but are based on a quantitative and a qualitative approach where the human expert assessment takes into account additional qualitative information not covered by the quantitative model. The use of S-ICASs was expanded during the pandemic (see Section 2.2).

25 See press releases of 7 April 2020 and 22 April 2020. The measures were described in de Guindos and Schnabel (2020). Their relevance to supporting TLTRO III operations was highlighted in Box 1 entitled "TLTRO III and collateral easing measures" of the article entitled "TLTRO III and bank lending conditions", *Economic Bulletin*, Issue 6, ECB, September 2021.

26 See Bakker et al. (2022).

Table 1

Overview of ECB collateral easing measures adopted in April 2020

Category	Collateral easing measure
Expansion of credit claims	ACCs – pandemic-related government/public-sector guaranteed loans accepted
	ACCs – availability of credit assessment systems increased (i.e. S-ICASs, other NCB-specific PD/LGD approaches and CRR-approved IRBs accepted)
	ACCs –frequency of reporting requirements reduced
	Minimum size threshold for credit claims removed
Increase in Eurosystem risk tolerance	Eurosystem risk tolerance increased by proportionately reducing all haircuts for all assets by 20%
	Haircuts reduced for individual credit claims in the general framework, individual ACCs and pools of ACCs
	Concentration limit for unsecured bank bonds increased to 10%
Reducing procyclicality of rating downgrades	Collateral eligibility frozen with a floor of CQS 5 (CQS 4 for ABSs)
Greek waiver	Greek sovereign bonds accepted as collateral

Note: The table only lists collateral measures introduced in response to the pandemic.
Source: de Guindos and Schnabel (2020)

As a key part of its pandemic collateral easing measures, the Eurosystem further expanded the scope of ACC frameworks in 2020. The ECB Governing Council approved new ACC frameworks for eight NCBs (those of Belgium, Germany, Estonia, Latvia, Lithuania, Malta, Slovakia and Finland,), as well as expansions to eight of the nine frameworks already in place (in Ireland, Greece, Spain,[27] France, Italy, Austria, Portugal and Slovenia) between April and November 2020.[28] As of December 2020, the pandemic collateral easing measures, including these ACC expansions, were valid until end-June 2022.[29] By that time, 17 out of the 19 euro area NCBs had an approved ACC framework.[30] In many cases the changes to frameworks included not only new collateral measures, but also elements already permitted under the pre-pandemic common minimum framework, like lowering the minimum credit quality requirement for individual ACCs or accepting additional types of ACC pools (see Section 2.1 and Box 2).

Quantitatively, the most relevant extension of eligible collateral was accepting additional types of guarantees, loans and debtors as ACCs. The Governing Council allowed NCBs to accept loans with partial government/public-sector guarantees under pandemic schemes that were not fully compliant with the eligibility requirements for guarantees under the general collateral framework. These guarantee schemes were granted under the EU's Temporary Framework for state aid to support the economy and address the liquidity shortage faced by NFCs in particular.[31] Since they also covered very small enterprises such as self-employed individuals, the scope of debtors eligible for corporate ACCs was correspondingly extended. Overall, 11 NCBs accepted such guaranteed loans after the Eurosystem

27 A specific country-level study focusing on the impact of COVID-related collateral measures on Spanish counterparties is provided by Escolar and Yribarren (2021).

28 The NCB of Cyprus did not change their ACC framework in 2020. The NCBs of Luxembourg, Netherlands and Croatia (which joined the euro area on 1 January 2024), have never implemented one.

29 See the press release of 10 December 2020.

30 See also the ECB's ACC explainer of 15 May 2020 (updated on 14 January 2021).

31 See the EU Commission's press release of 19 March 2020.

had carried out a resource-intensive risk management, legal and operational assessment of each jurisdiction's public guarantee scheme to ensure a level playing field and appropriate risk control frameworks.[32] These NCBs also adapted their internal collateral management systems to accept this new type of credit claims as collateral. Corsi and Mudde (2022, p. 32-33) provide more detailed information on the acceptance of guaranteed loans.

The Eurosystem supported acceptance of additional debtors and loans by increasing the availability of its internal credit assessment systems. NCB ICASs play an important role in the ECAF to determine the credit quality of NFC debtors, which is relevant for eligibility and haircuts. Over the course of 2020 several NCBs with an ICAS decided to follow the example of Italy and start complementing their existing system with a more resource-efficient statistical ICAS or S-ICAS. These use quantitative approaches to facilitate the assessment of a wider range of debtors, in particular small and medium-sized enterprises, while ensuring adequate risk protection. They were accepted as a credit assessment source not only for assessing debtors of loans included in pools of ACCs, but also individual ACCs.[33] Some NCBs enlarged their internal credit assessment capabilities to assess the creditworthiness of even smaller firms (e.g. partnerships) and households using additional conservative approaches approved by the Governing Council. In addition, the ECAF requirements for banks' IRB models used to assess the credit quality of ACCs were softened. NCBs could rely solely on approval by the competent supervisory authority according to the capital requirements regulation ("CRR-approved IRBs") for initial IRB acceptance.

These changes were complemented by measures to simplify and speed up the mobilisation process of ACCs. One element was the streamlined initial acceptance process for IRBs already mentioned. Loan-level reporting requirements were also reduced to allow counterparties to benefit from ACC frameworks even before the necessary reporting infrastructure was put in place.

To complement the extension of eligible collateral, the ECB also decided to temporarily tolerate more risk on its balance sheet by reducing its haircuts. These were cut by 20% for all eligible collateral assets, including the minimum applicable haircuts for ACCs. The reductions had an immediate expansionary impact on the entire current collateral pool (at the cost of less risk protection for the Eurosystem), as they enabled more lending for the same amount of collateral mobilised. In addition, as part of the regular review of its risk control framework, the ECB decided to adjust the haircuts applied to non-marketable assets, both in the general collateral framework and for ACCs, by fine-tuning some of the haircut parameters. For example, the ECB decided to permanently remove the valuation

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[32] For example, to address the partial coverage of most pandemic-related guarantees NCBs applied to each loan a haircut that took into account the guarantor's rating (equivalent to that of the relevant sovereign or the public sector entity issuing it) for the percentage of the loan backed by the guarantee, and the debtor's credit quality for the remaining part. If the debtor's credit quality was not compliant with the minimum credit quality criteria accepted in the respective framework (e.g. CQS 4 or 5 according to the accepted sources in each framework), the haircut contribution attributed to the non-guaranteed part was set at 100%.

[33] See Box 1 on "ICASs and the ECB's response to the COVID-19 pandemic" in Auria et al. (2021) and footnote 24.

add-on and reduce the haircut floor for pools of ACCs, as new data had provided evidence that the remaining minimum eligibility and risk control framework was sufficiently conservative.

2.3 Gradual phasing-out

In 2022 the ECB initiated a gradual phasing-out of the ACC frameworks. On 24 March the Governing Council announced it was halving the temporary reduction in collateral valuation haircuts across all assets from 20% to 10%, including for ACCs. In addition, the phasing-out of the temporary easing of some technical requirements for the eligibility of ACCs fully restored the frequency of the loan-level reporting requirements and the ECAF acceptance requirements for banks' own credit assessments from their IRBs. At the same time the Governing Council also decided that it would, in principle, phase out the pandemic-related extensions of ACC frameworks in March 2024. This followed a comprehensive review of the frameworks examining banks' collateral needs for continued participation in Eurosystem credit operations, notably the outstanding TLTRO III transactions running until December 2024.[34]

In 2023 the next steps were taken. In June the Eurosystem phased out the remaining 10% temporary reduction in collateral valuation haircuts to return to the ECB's pre-pandemic risk tolerance level.[35] On 30 November the Governing Council decided to discontinue some components of the ACC frameworks that made only a limited contribution to collateral. This applied to: (i) certain STDIs issued by NFCs that did not satisfy the Eurosystem eligibility criteria for marketable assets, (ii) ACCs denominated in Australian dollars, Canadian dollars and Swiss francs, and (iii) commercial real estate mortgage loans. Other components of the ACC framework, including the extensions adopted during the pandemic, were left in place until the end of 2024.[36]

Several NCBs supplemented these ECB decisions by terminating some parts or all their ACC frameworks on their own initiative. Some decided to terminate their framework entirely (Germany and Latvia in 2022; Belgium and Malta in 2024). Others discontinued just some components, such as the pandemic-related partial public guarantees (Finland in 2022 and Spain in 2023), pools of residential mortgages and auto loans (France in 2023), individual ACCs with a credit quality below CQS 3 (France in 2024) and short-term debt instruments (Portugal in 2023).

In 2024 the ECB decided on a further step towards completely phasing out ACC frameworks.[37] The Governing Council decided to discontinue many of the

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34 See ECB announces timeline to gradually phase out temporary pandemic collateral easing measures", press release of 22 March 2022 and Bakker et al. (2022), "Gradual phasing-out of pandemic collateral easing measures", ECB Economic Bulletin, Issue 3/2022.

35 The Governing Council took this decision as part of a broader set of changes to haircuts, see ECB reviews its risk control framework for credit operations, press release of 20 December 2022.

36 See Decisions taken by the Governing Council of the ECB of December 2023.

37 See ECB announces changes to the Eurosystem collateral framework to foster greater harmonisation, press release of 29 November 2024 and Alexopoulou et al. (2024).

remaining components, expected to be implemented by the end of 2025. This relates to the phasing-out of (i) private individuals and pools of credit claims backed by real estate assets as eligible debtor and asset types, (ii) individual ACCs with a credit quality below CQS 3, (iii) credit assessment approaches developed by NCBs to estimate the PD and LGD of ACCs, and (iv) loans denominated in US dollars, pounds sterling and Japanese yen. In addition, pandemic-related partial public-sector guarantees will no longer be accepted once the preparatory work related to the integration of pools of NFC loans into the general framework has been completed (see below).

In November 2024 the Governing Council decided to integrate some temporary collateral measures, including certain components of the ACC frameworks, into the general collateral framework.[38] In line with the outcome of the review of the operational framework,[39] the Governing Council decided in principle to accept pools of loans to NFCs as eligible collateral under the general framework, subject to further preparatory work on the associated risk control framework and technical requirements. In addition, S-ICASs operated by NCBs will be accepted as an additional credit assessment source under the general collateral framework, subject to compliance with the new harmonised framework.[40]

2.4 Use over time

The three phases outlined above are clearly visible in the pattern of mobilisation of ACCs and reflect how collateral needs have evolved since 2012, influenced not least by the changing monetary policy environment. First, ACC mobilisation exceeded €80 billion within a few months of heightened liquidity needs until summer 2012, before declining slightly to below €70 billion in 2014 (Chart 1). Use then increased slowly but steadily to €110 billion by the end of 2019. Second, when Eurosystem lending to banks increased from under €700 billion in 2019 to up to €2,230 billion in 2021 with the TLTROIII operations, the increased collateral needs together with the pandemic collateral easing measures meant that banks had mobilised almost €00 billion of ACCs by the end of 2021.[41] Third, the gradual phasing-out process started in 2022 led to use returning to the levels observed in 2019.

In line with their monetary policy purpose, use of ACCs was relatively concentrated in just a few countries. NCBs could adapt the rules on eligibility and use to specific national requirements to meet particular collateral needs in their respective jurisdictions. In terms of volume, the most extensive users of ACCs were

38 See references in footnote 37 above.

39 See Changes to the operational framework for implementing monetary policy, statement of 13 March 2024.

40 See Decisions taken by the Governing Council of the ECB of 31 January 2025 and footnote 24.

41 ACCs were the collateral asset type that showed the strongest increase in mobilisation, reflecting their broad availability on banks' balance sheets and low opportunity cost (see, e.g., Corsi and Mudde, 2021). However, mobilisation of more liquid assets with a higher opportunity cost also increased substantially between the fourth quarter of 2019 and the fourth quarter of 2021, for example central government securities rose €220 billion (+102%) and covered bonds €338 billion (+89%).

French and Italian banks, followed by Greek, Portuguese and Spanish counterparties (Chart 1, Panel A); this reflects the breadth of the ACC frameworks and the different collateral needs in these countries. Relative to total collateral pledged, Irish and Cypriot banks also used ACC heavily. Cross-country heterogeneity in the acceptance of ACCs helped avoid the threat of fragmented implementation of monetary policy in the euro area (see Section 3) while still taking country-specific availability of adequate collateral into account.[42] In several euro area countries counterparties were able to mobilise credit claims with similar characteristics as part of the underlying collateral pools of retained ABSs and own-used covered bonds. Chart 12 in Annex 6.3 illustrates the distribution of mobilised own-used covered bonds and retained ABSs over time. Section 3 further investigates the correlation of pledging ACCs and ABSs or covered bonds from an empirical perspective.

Residential mortgages were the most sizeable contributor of additional collateral, but were also associated with specific challenges related to the availability of credit risk assessments. Pools of residential mortgages represented more than 50% of ACCs mobilised up to 2023 (Chart 1, Panel B); other types of consumer loan were hardly used. Corporate loans, mobilised either individually or within a pool, and since 2020 often with a pandemic-related government or public-sector guarantee, accounted for almost all of the balance. Only a very few NCBs had the information to assess the credit quality of residential mortgages, so the Eurosystem had to mostly rely on banks' IRB models for such loans, and not all counterparties had these. Since French pools of residential mortgages were phased out in summer 2023, ACCs have consisted primarily of corporate loans.

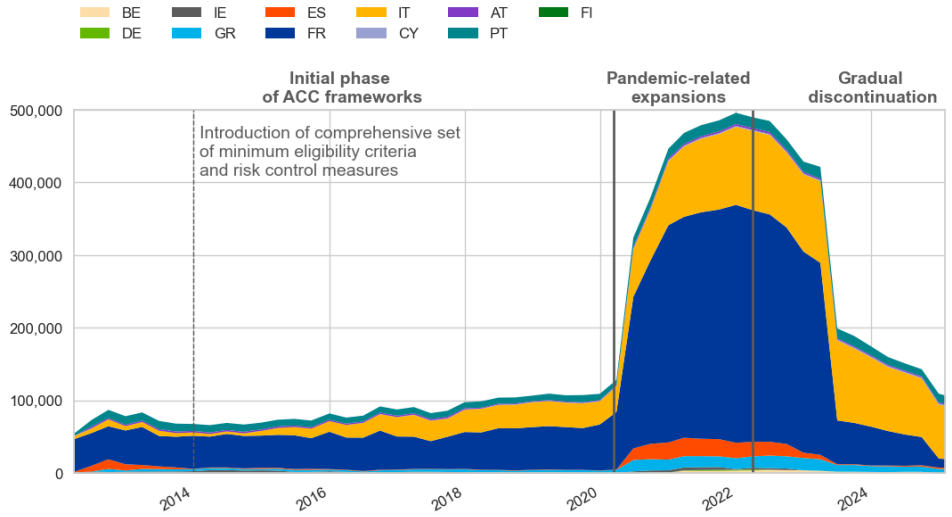
[42] For example, a Eurosystem task force concluded that national discretion associated with the acceptance of ACCs proved to be particularly relevant in the case of COVID-19-related government/public sector guarantee schemes given the heterogeneity in the legal implementation of the public guarantee schemes across jurisdictions, while Governing Council oversight ensured a common minimum eligibility and risk control framework across the euro area (see Corsi and Mudde, 2021).

Chart 1

Mobilisation of ACC frameworks during the three phases

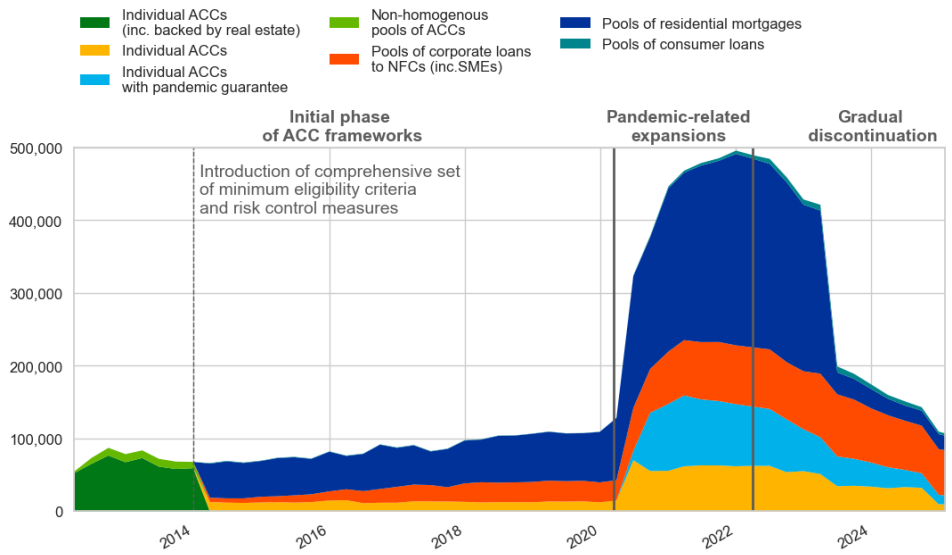
Panel A: By Country

(Collateral value after haircuts in EUR million, end of quarter data)



Panel B: By asset category

(Collateral values after haircuts in EUR million, end of quarter data)



Source: ECB.
Notes: First observation date 28 March 2012; last observation date 30 January 2025.
In Panel B the category “Individual ACCs (inc. backed by real estate)” includes ACCs on GD-eligible debtors (e.g. NFCs and public-sector entities) as well as from private individuals, unsecured or backed by real estate, mobilised before the introduction of the minimum eligibility and risk control framework in 2014. After 2014, Individual ACCs such as consumer loans or those backed by real estate were only mobilised under pools. Similarly, the category “Non-homogenous pools of ACCs” refers to the pools of ACCs mobilised before the introduction of the minimum eligibility criteria and risk control framework for pools of ACCs in 2014. The category “Individual ACCs” refers to claims on GD-eligible debtors (e.g. NFCs including SMEs and public-sector entities) with a lower credit quality threshold (CQS>3) as assessed by ECAF or non-approved ECAF sources in EUR or foreign-denominated. The category “Individual ACCs with pandemic guarantee” refers to ACCs on NFCs or self-employed debtors backed by a guarantee issued under a pandemic scheme.

3 ACCs and mobilisation behaviour: state of the literature and stylised facts

Drawing on the institutional features of ACC frameworks established above, this section empirically zooms in on the question of ACC use at the micro level. The analysis is complementary to the study of how frameworks have evolved. Looking at the way ACCs in aggregate have evolved tells us which of their features have been most used in particular jurisdictions, but masks the heterogeneity in how their use ultimately interacts with the pledging of other asset classes or bank characteristics. These interactions span various dimensions, including concentration and substitution patterns of different collateral asset classes, as well as questions related to ACC use and the linkage with different business models and funding structures.
Understanding how changes in banks' pledging behaviour relates to the introduction of ACC frameworks ties to strands in the literature that have pointed to the impact of collateral policies favouring illiquid assets (e.g. Nyborg, 2017). In the next subsection we first review the related literature and summarise the main channels through which ACCs affected banks' mobilisation behaviour and thus ultimately monetary policy transmission. We then introduce the setup and data for the empirical analysis and present our findings.

3.1 Literature review

ACC frameworks facilitate banks' access to refinancing operations by broadening the set of eligible collateral. At micro level their functioning as collateral generally mimics that of credit claims under the general framework, but ACCs generally have a higher level of idiosyncratic risk. The literature has identified at least two drivers for use of ACCs.

First, credit claims, and thus also ACCs, exhibit a low opportunity cost collateral compared with other asset classes. As documented in the literature (cf. Nyborg, 2017; Tamura and Tabakis, 2013), credit claims can be considered less useful in the market due to their lower liquidity. Consequently, the literature has argued that credit claims, and thus also ACCs (with their wider scope), are attractive for banks as a way of obtaining liquidity through refinancing operations.

Second, mobilising credit claims as collateral has a positive impact on banks' balance sheets by enabling them to obtain funding from the Eurosystem and easing the encumbrance of existing HQLAs on their balance sheets. Banks can obtain HQLAs from Eurosystem credit operations by mobilising non-HQLA assets such as credit claims, thereby improving liquidity coverage ratios to fulfil regulatory liquidity requirements (e.g. Hartung, 2024; Grandia et al., 2019). While lending against high-quality collateral is known to protect central banks against losses it can also adversely affect the creation of liquidity in markets, since high-quality assets are pledged to the central bank rather than circulating; this may make it advantageous

for a central bank to lend against less liquidity collateral when money market conditions are stressed (Choi et al., 2021). Greppmair et al. (2024) find that the introduction of ACCs improved conditions in the money market, as banks affected by the temporary extension of the frameworks pledged newly eligible credit claims to reduce the encumbrance of their high-quality marketable assets. Banks thus lend out these marketable assets as collateral in the repo market, which helps to alleviate asset scarcity.[43]

Linked to the expansion of (T)LTROs, ACCs amplified the pass-through of monetary policy by shifting both the lending volumes and financing costs of eligible debtors. The empirical literature has documented the linkage of the ECB's extended central bank lending via TLTROs and banks' financing activities. Mésonnier et al. (2022) exploit the introduction of the first TLTRO series in France and the corresponding ACC frameworks to estimate an eligibility discount to corporate loan spreads using data from that country. Consistent with previous work on eligibility premia for central bank collateral (e.g. Cassola and Koulischer, 2016), Mésonnier et al. (2022) find that the extension of collateral eligibility to medium-quality corporate borrowers as part of ACC frameworks induced an average eligibility discount to the spreads on loans to newly eligible firms. The authors also find evidence of increased lending volumes to NFCs. Likewise, Cahn, Duquerroy and Mullins (2024) exploit the introduction of TLTROs (hence relating to the expansion of ACCs) and explore whether there is a differential pass-through of monetary policy lending to firms with multiple bank relationships in comparison with firms with a single bank relationship. They find that the transmission of the LTRO in 2012 via lending to single-bank firms is selective, i.e. targeted to specific firms; however, this is not the case for multi-bank firms, because banks apply higher lending standards to single-bank firms. By contrast, the paper illustrates that banks appear to transmit monetary policy lending nearly uniformly across multi-bank firms. These findings are consistent with other strands in the literature documenting the heterogeneous expansion of lending under the ACC frameworks (e.g. Benetton and Fantino, 2021) as well as studies suggesting that eligibility of their corporate bonds improves firms' access to the capital market and helps them maintain higher levels of leverage (e.g. Pelizzon et al., 2024).

3.2 Setup and data

Guided by empirical and theoretical findings established in the literature, this subsection investigates the role of ACC use empirically at individual bank level. The focus of the remaining analysis is to provide stylised facts at micro level on how collateral pool composition and counterparty pledging behaviour relates to the use of ACCs as collateral. For this purpose, we zoom in on the individual mobilisation patterns of banks pledging ACC collateral and how this has evolved over time.

First, we focus on concentration patterns of banks mobilising ACCs, as theory predicts that the eligibility of non-marketable assets may affect collateral pool

[43] In a related strand of literature, Ahnert et al. (2019) study banks' asset encumbrance and its consequences for fragility, funding costs and prudential regulation.

composition.[44] In addition to concentration within pools, the analysis also investigates cross-pool concentration, i.e. whether ACC use is concentrated among certain counterparties. Nyborg (2017) and related literature predict that eligibility of illiquid assets creates incentives for banks' pledging behaviour which might affect the composition and, as we hypothesise, concentration of collateral pools. We therefore empirically explore the composition of the collateral pools of ACC users.

For this we construct a weekly bank-specific panel of mobilised collateral between 2012 and 2024 by matching data on this with NFC's financial and balance sheet information. To alleviate computational limitations the unit of measurement is a bank-snapshot date specific observation. We thus aggregate assets into categories and transpose their usage as collateral into shares of total collateral value after haircuts (CVAH) pledged at the given snapshot date. In total the dataset encompasses information on the mobilised collateral of 2,673 banks across a range of jurisdictions between 3 January 2012 and 28 December 2024. The data are linked to annual information on balance sheet and number of employees. Drawing on supervisory information, we also add to information on outstanding TLTRO and standard refinancing operation amounts as well as banks' total assets and business models.[45]

Second, we zoom in on patterns of substitution between ACCs and marketable assets. Since ACCs have the same underlying assets as some types of ABS and covered bonds (i.e. bank loans), economic intuition suggests that any variation in ACC use could be met by originating banks increasing their issuance of ABSs/covered bonds and subsequently mobilising the retained fraction of these. Alternatively, the ACC variation could be met by mobilising other marketable assets. To estimate the substitutability of ACCs for covered bonds and ABSs we investigate two different channels: replacement, i.e. substitution for other collateral assets within a bank's collateral pool, and issuance via newly issued assets backed by demobilised ACCs that become eligible assets.

The analysis on covered bond and ABS issuance and holdings draws on data from the Securities Holding Statistics of Banking Groups (SHS-G) registry linked with Collateral and Counterparties Database (C2D) and Centralised Securities Database (CSDB) data. To identify mobilisation and issuance the data are linked with asset information from CSDB and details of asset mobilisation and eligibility from C2D. Holdings and mobilisations are aggregated at banking group level to link C2D and SHS-G data. Note that SHS-G data only cover information on large banking groups; hence they are only helpful for investigating holding patterns for a subset of the banks participating in refinancing operations. They are also identified on a quarterly basis. C2D data are matched using weekly snapshot dates seven days before and after the SHS-G end-quarter reference date. The final dataset is uniquely identified at banking group-ISIN-quarter level. CSDB issuer information is used to complement SHS-G data whenever missing.

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44 Cf. for instance Nyborg (2017) for an extensive discussion.

45 The business model split is obtained based on supervisory data.

In the following subsections we present the methodologies and results of our analysis in more depth.

3.3 Bank characteristics and mobilisation patterns

For counterparties mobilising ACCs, on average ACCs constituted 14.8%[46] of their CVAH pledged for refinancing operations, but in absolute terms the use was concentrated on 42 banks. Of the 2,673 in the sample, 379 institutions (14.2%) mobilised ACCs at some point. Chart 2 illustrates the distribution of the unweighted average share of CVAH pledged across Eurosystem counterparties for ACCs between 2012 and 2024 for banks using ACCs at any point in time. The chart shows that reliance on ACCs for most counterparties is relatively limited, suggesting that ACCs serve as a complement to standard collateral asset classes for the majority of banks (50% have an average ACC share less than or equal to 5%). However, the chart highlights the existence of a smaller group of banks with collateral pools more reliant on ACCs.[47] The heterogeneity in the relative importance in banks' collateral pools masks a concentration in ACC usage at the aggregate level. Chart 3 shows the cumulative distribution of ACC CVAH pledged over time. The chart highlights that the top 42 banks together account for 90% of the total, suggesting individual ACC use is ultimately a function of a bank's size and business model. In line with the literature surveyed above, these findings suggest that in jurisdictions with an ACC framework liquidity distribution via ACCs can be seen as heterogeneous across banks. Thus the role of ACCs must be analysed in conjunction with banks' size, business model and funding structure. The following analyses zoom into the characteristics of banks pledging ACCs.

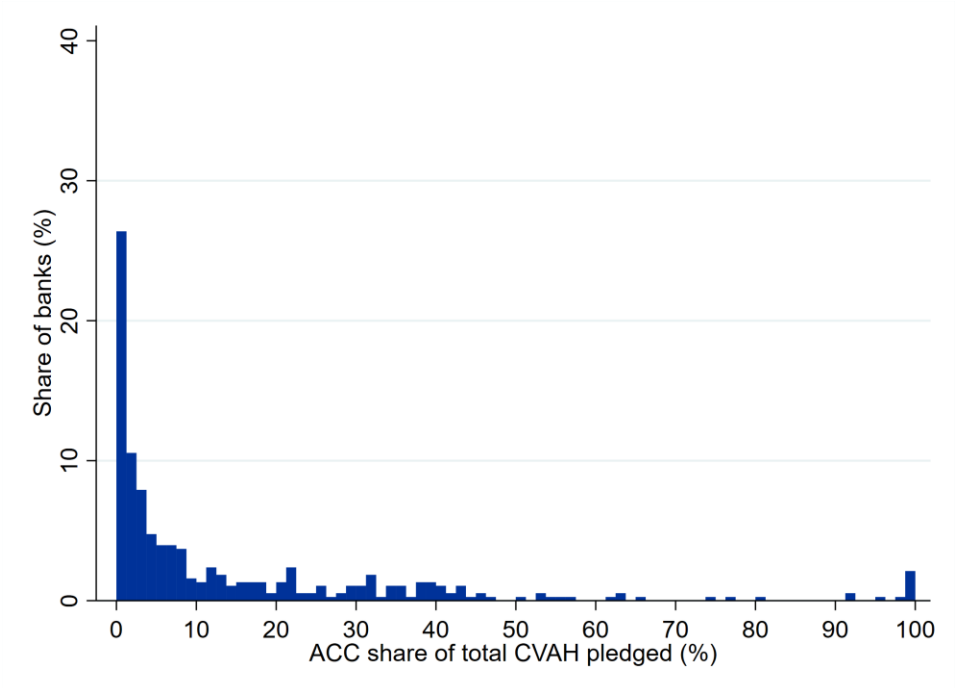
46 The volume-weighted average ACC share across time and ACC-mobilising banks is 8.7%.

47 Banks with a share of 90% and more are small subsidiaries of larger banking groups with a special lending profile. For comparison, Chart 9 in the Annex illustrates the distribution in comparison with standard credit claims.

Chart 2

ACC share in collateral pools

(Percentage)

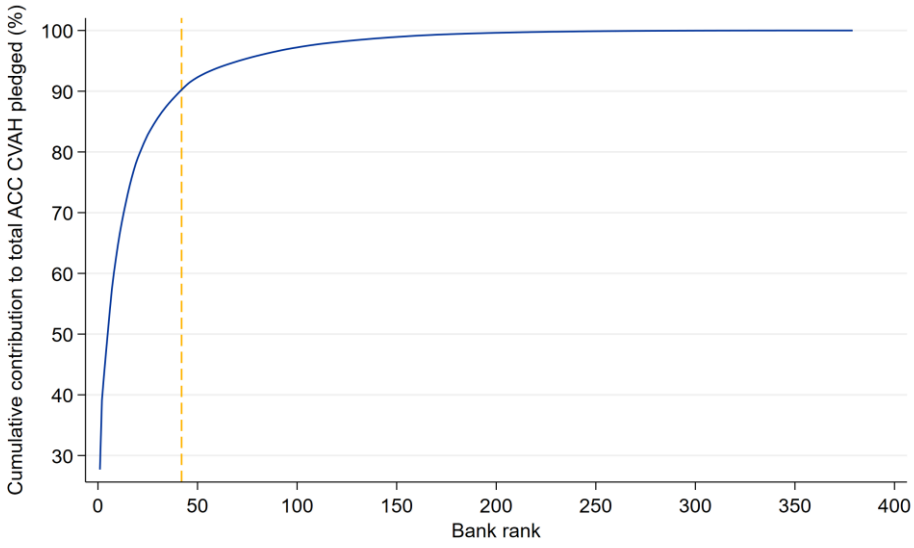


Source: ECB computations based on C2D/UC data.
Notes: The chart shows a histogram of banks' average share of ACCs pledged between January 2012 and December 2024. Banks with a zero share are not included.

Chart 3

Cumulative bank contribution to aggregate ACC usage

(Percentage)



Source: ECB computations based on C2D/UC data.
Notes: The chart shows the cumulative distribution of mobilised ACC CVAH between January 2012 and December 2024. The x-axis indicates the rank of a in the distribution, i.e. it orders banks by increasing contribution to total ACC CVAH mobilised.

ACCs are mostly pledged by universal banks and diversified lenders, and to a lesser extent by GSIBs. Chart 4 documents the distribution of ACC CVAH pledged by bank business model, as well as the weighted average CVAH share of banks' collateral pools within the specific business model. Two main findings emerge. First, the bulk of ACC volumes used as collateral (67.5%) relates to universal banks and diversified lenders with activities spanning a plethora of industrial sectors. On average, ACCs constitute between 13% and 16% of those banks' collateral pools.[48] This finding can in part be explained by the size of the banks operating under these business models. In Annex 6.3 (Chart 10) we document that those two business models alone represent 50.1% of the total assets on banks' balance sheets in our sample. While these banks are heterogenous, the findings point to the fact that ACCs are used as a complementary collateral instrument across the largest segments of the banking sector and thus support the monetary policy transmission mechanism in a broad manner. This aspect is discussed in greater detail in the next subsection. As discussed above, recent literature has pointed to a relationship between ACCs' low opportunity cost and banks' strategies for obtaining market liquidity at potentially lower cost (e.g. Nyborg, 2017). All other things being equal, this suggests that users of ACCs might enjoy lower funding costs. To assess this empirically, we next explore the relationship between funding costs and ACC use for collateral in more depth. Specifically, we proxy funding costs by extracting the yield-to-maturity for short-term debt instruments issued by banks pledging ACCs.[49] Intuitively, these can highlight the cost of funding in the short run by revealing the market pricing of idiosyncratic risks linked to the issuer's risk profile. Chart 5 illustrates the distribution of the average yields for bonds and money market instruments with a residual maturity of six months or less for banks active in refinancing operations using ACCs and those that do not. This shows an upward distribution shift in the funding costs of ACC users, pointing to a higher average cost of funding. The analysis is limited in that it does not account for other channels of funding such as unsecured debt instruments which may counteract the differential effect observed here. Moreover, the causality of ACC use and fundings costs could go in both directions; banks with higher funding costs could be systematically making greater use of ACCs, or conversely ACC use may increase funding costs, for instance via the direct effect on balance sheet encumbrance. A more formal assessment of the drivers of these patterns is left for future work. However, our findings cast doubts on common narratives in the literature (e.g. Nyborg, 2017) regarding the role of ACCs and other non-marketable assets in the Eurosystem collateral framework. In particular, both the widespread adoption across business models and the unclear relationship with funding costs suggest that, at a minimum, further research is required to assess the costs and benefits of ACCs and similar assets more rigorously.

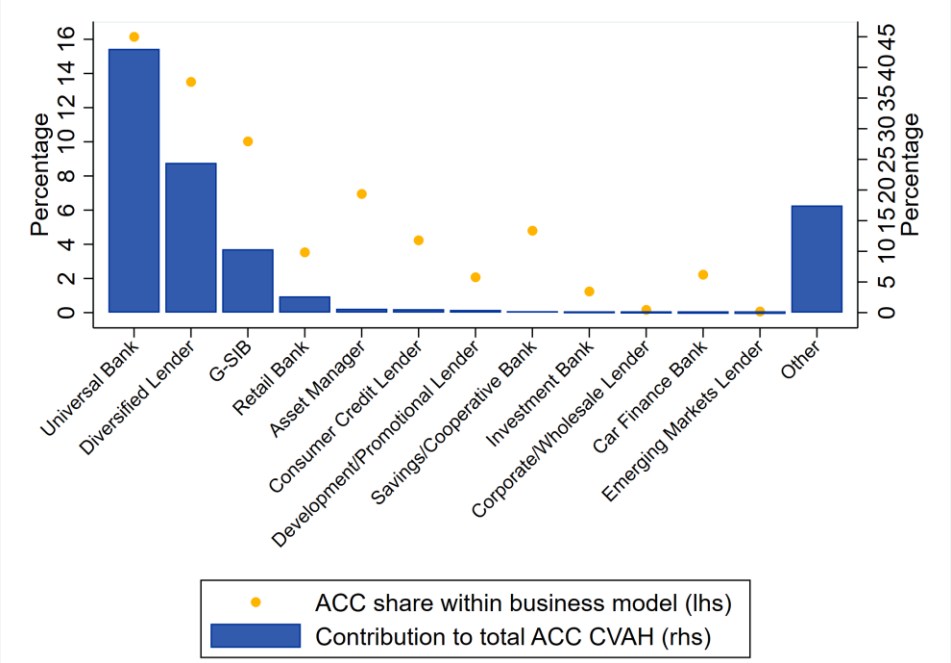
[48] The structure of the banking system, and thus the incidence of business models, differs across jurisdictions. Such structural features are not explored in this analysis, but their potential relevance in understanding the empirical patterns observed is acknowledged.

[49] Specifically, we group the dataset by ACC and non-ACC users across time and construct the average yield-to-maturity across all euro-denominated bonds and money market instruments with a residual maturity of up to one year. For computational reasons the analysis is only conducted for securities outstanding in 2022.

Chart 4

ACC usage by business model

(Percentages)

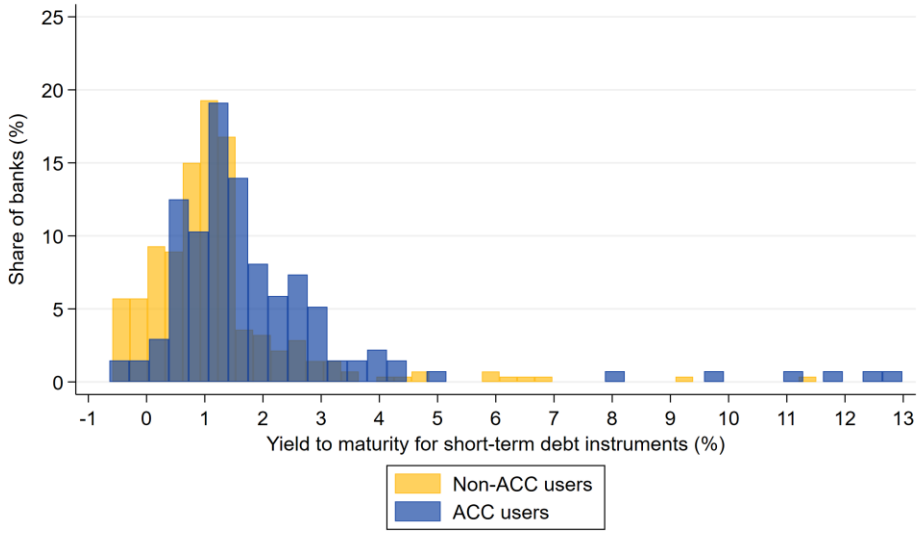


Source: ECB computations based on C2D/UC data.
Notes: The chart shows the cumulative distribution of mobilised ACC CVAH across business models (bars, RHS) and banks' total mobilised CVAH-weighted average ACC share within the business model total CVAH (dots, LHS). The category "Other" encompasses unclassified banks and business models other than those captured by the categories depicted in the chart that are retained due to confidentiality concerns.

Chart 5

Distribution of short-term funding costs for ACC users and non-ACC users

(Percentage)



Source: ECB computations based on C2D/UC and CSDB data.
Notes: The chart shows the distribution of average yields to maturity of euro-denominated debt instruments (bonds and money market) with a maturity of up to and including one year. For computational efficiency, only assets with a snapshot date in 2023 are taken into account. Yields to maturity are truncated below the 1st and above the 99th percentiles.

ACC use does not differentially affect the concentration of banks' collateral pools when accounting for bank heterogeneity. As discussed above, theory suggests that ACCs might affect collateral pledging behaviour by shifting the opportunity cost of eligible assets that could be used in alternative market transactions. This raises the question of whether varying concentration patterns of ACC users would also be reflected in stronger concentration of collateral pools. To test this formally we estimate a concentration add-on, in other words the extent to which concentration in collateral pools is different across ACC users and non-ACC users, in a panel regression framework that accounts for unobserved heterogeneity. For the analysis on collateral pool concentration we construct a bank and time-specific Herfindahl Hirschman Index (HHI) relying on the main asset classes in banks' collateral pools.[50] We use this to explore the extent to which ACC use is associated with stronger collateral pool concentration compared with counterparties not using ACCs. [51] Chart 6 documents the estimated add-on to the HHI of ACC users and does not support the view of an economically and statistically significant magnitude over time. This finding is in line with the analysis above showing that many banks use ACCs as a complement to other asset types, thus reaching similar levels of asset diversification.

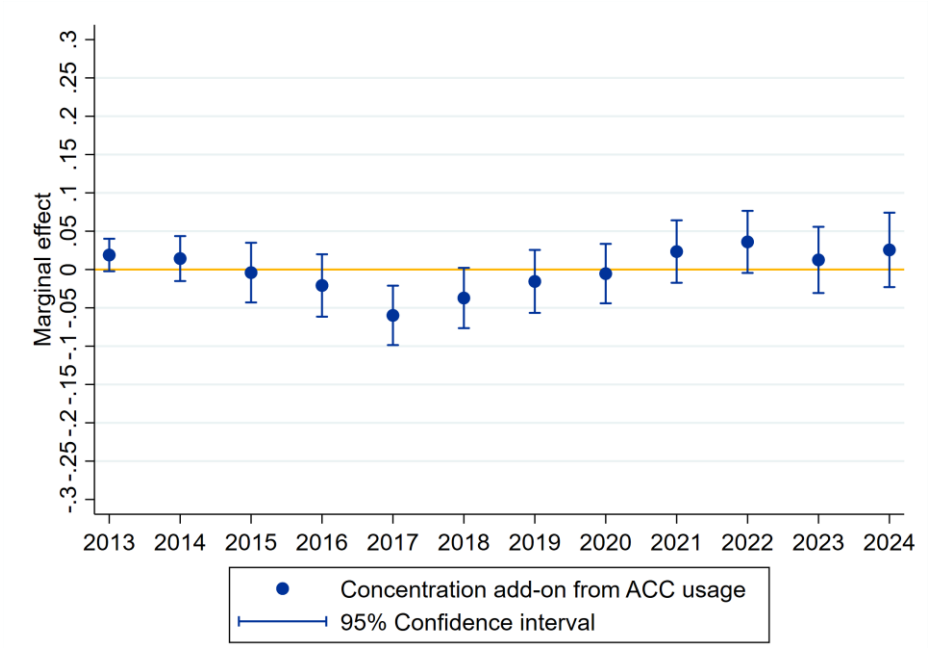
[50] To construct the index we build shares of collateral value after haircuts pledged, denoted $x_{i,j,t}$, of a set of asset classes, denoted $j = 1, \ldots, J$, pledged by a counterparty i as collateral at a given snapshot date t. The index is then defined as $HHI_{i,t} = \sum_{j=1}^{J} x_{i,j,t}^2$. The index can be interpreted as a concentration measure that varies between 0 (low concentration) and 1 (strong concentration).

[51] The estimated regression can be denoted as follows: $hhi_{i,t} = \gamma_0 + \boldsymbol{\gamma_1 D.ACC_{i,t}} \times \boldsymbol{d_t} + \gamma_2 D.ACC_{i,t} + d_t + a_i + \epsilon_{i,t}$, where $hhi_{i,t}$ denotes the bank-specific HHI, $D.ACC_{i,t}$ is a dummy variable for ACC use (being equal to 1 if a bank has positive ACC share in its collateral pool in the respective period) and d_t and a_i denote a set of year and bank fixed effects respectively. The vector γ_1 collects the main coefficients of interest.

Chart 6

Collateral pool concentration add-on from ACC usage

(percentage points)



Source: ECB computations based on C2D/UC.
Notes: The chart shows the marginal difference in collateral pool concentration between ACC users and non-ACC users measured in percentage points of a Herfindahl Hirschmann Index. The chart is based on a panel regression of the bank-specific collateral pool concentration (measured via a Herfindahl Hirschmann Index computed at bank-asset category level in every time period) on a dummy variable, which is 1 if a bank is an ACC user and 0 otherwise, as well as year fixed effects and their full interaction. The chart depicts the interaction terms of the estimated coefficients on these interaction terms. The term for 2012 is excluded due to multicollinearity. The 95% confidence intervals are based on heteroskedasticity-robust standard errors.

3.4 Substitutability of ACCs with marketable assets

On average, the correlation between pledging ACCs and pledging marketable assets, especially ABSs and covered bonds, is limited when bank-specific characteristics are kept constant, owing to banks' institutional features, asset heterogeneity and the fixed cost associated with issuing covered bonds or ABSs. To assess the covariation of ACC collateral with pledged ABSs and covered bonds we estimate a log-log regression using Ordinary Least Squares (OLS) in three different variants. In all of these the left-hand variable is the log of CVAH mobilised pertaining to ABSs and covered bonds. The main independent variable is the log of CVAH pertaining to mobilised ACCs.[52] Due to statistical considerations, we restrict the focus to countries which have had ACC exposures since the onset of the ACC

[52] Zero values are imputed with 0.00001 since the log is not defined for 0. In variant 1 we do not employ any control variables. In the second specification we add year fixed effects as control variables as well as categorical variables for balance sheet size and number of employees. While the firm variables proxy for firm size, year fixed effects absorb variations over time stemming from common factors as well as over-time trends. Such factors include, for instance, changes to the collateral framework or changes in asset valuations over time. Specification 3 adds to that of specification 2 bank fixed effects to control for different business models and idiosyncratic characteristics of banks. All models are estimated using a constant and heteroskedasticity-robust standard errors.

frameworks, namely Greece, Spain, France, Italy and Portugal.[53] The analysis does not allow for a causal interpretation, but provides the *partial* correlation of both asset classes in terms of their use as collateral. The sign of the coefficient can therefore provide information about the complementarity or substitutability of these assets, holding other factors constant. To explore this link further we investigate the dynamics of covered bond and ABS *holdings* for banks pledging ACCs as collateral. The objective is to trace back the use of ABSs and covered bonds on the balance sheets of large banking groups upon issuance of such asset types, as well as its aggregate relationship to ACC use. Any covariation encountered within the collateral pool due to replacement of ACCs by marketable assets should be then mirrored by a shift in covered bond and ABS holdings on banks' balance sheets.

Chart 7 presents the results of the aforementioned OLS estimation. The results are presented with controls and bank fixed effects (yellow) and without any controls (blue). The coefficient can be interpreted as a partial correlation coefficient, i.e. the percentage change in ABS and covered bond mobilisation associated with a 1% change in ACC mobilisation.[54] The results without controls are large in magnitude and, in contrast to intuition, the sign is positive, which suggests a positive association between the two asset classes. When including all controls, the coefficients for France and Italy change sign and the coefficients shrink in magnitude.[55] In the results for the specifications without year bank fixed effects[56] we observe a substantially higher coefficient (about ten times the size of the current ones).[57] Intuitively, these findings appear to mirror the important role of unobserved heterogeneity among mobilising banks. Specifically, the stark decline in magnitude of coefficients when moving from a regression without the one including bank fixed effects suggests these individual effects absorb a high amount of variation in the data that arguably stems from unobserved heterogeneity across banks. This encompasses different ACC frameworks across NCBs, different bank business models and also, most notably, financial specificities not otherwise explained by other variables in the model.[58] The analysis therefore empirically supports the view that ultimately a bank's ability to substitute ACCs with marketable assets depends strongly on characteristics, such as size, funding mix and the ability to bear the fixed costs involved in securitising assets. Issuing comparable marketable instruments causes additional organisational and operational costs compared to creating a pool of ACCs, e.g. for rating agencies, arrangers, servicing and credit enhancement, so

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53 n sum, the full specification can be denoted as follows: $log(m_{i,t}) = \gamma_0 + \gamma_2 log(acc_{i,t}) + x\beta + a_i + d_t + \epsilon_{i,t}$ where $acc_{i,t}$ is the CVAH of ACCs mobilised, $m_{i,t}$ is either the CVAH for the full set of marketable assets or ABSs and covered bonds, x is a vector of controls (firm size and balance sheet size as categorical variables), a_i are MFI fixed effects, and d_t are year fixed effects.

54 We acknowledge that due to various endogeneity concerns the coefficients cannot be interpreted as causal, but must be seen instead as correlations. An intuitive source of such endogeneity is reverse causality, with the coefficient capturing movements from the dependent variable to the independent one rather than vice versa. We discuss this further below.

55 While staying statistically significant, the economic significance can be deemed small.

56 As explained above, the estimation includes year dummies to control for common over-time variation across banks.

57 Similar findings hold when including the log of all marketable assets as a dependent variable.

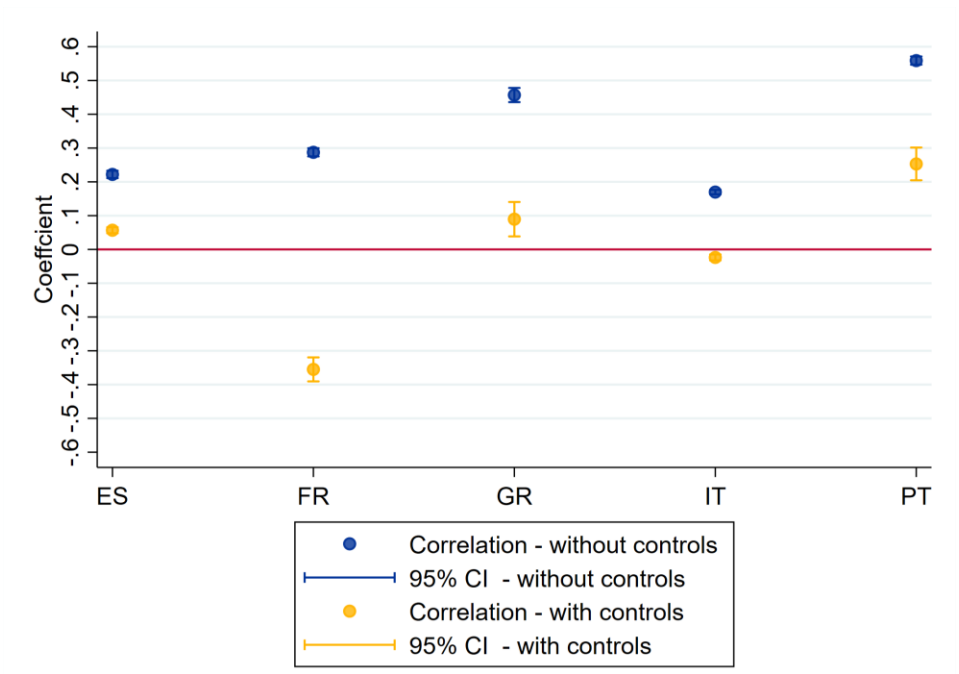
58 A separate analysis at business model level (results not shown here but available on request) confirms this view. It shows that the gap between the two estimations narrows when repeated at business model level.

access to structured finance markets can be impaired for smaller counterparties.[59] In addition, structured finance markets differ in size depending on the segment, with residential mortgage securities the largest in both the ABS and covered bond markets.[60] To isolate these effects more carefully, we focus on a country case study covering French banks that exploits variations in the local ACC framework to identify the issuance channel more precisely. Finally, we acknowledge that the estimation result suffers from standard econometric shortcomings. For example, variation in ACC mobilisation is endogenous and likely a function of other factors, and is also reversely correlated with the left-hand variable. The estimation also ignores various factors not otherwise captured by control variables. However, given that these additional factors likely absorb more variation from the main coefficient of interest, the expected magnitude is likely to be even lower and the results therefore nevertheless support our analysis.[61]

Chart 7

Partial correlation of pledging ACCs and ABSs/covered bonds as collateral

(Log-Log coefficient)



Source: ECB computations based on C2D data.
Notes: The chart shows the elasticities of ACC collateral vs. ABS and covered bond collateral using an OLS estimation both with and without control variables. The control variables include balance sheet size, revenue, year and bank fixed effects as well as the log of TLTRO outstanding. The 95% confidence intervals are based on heteroskedasticity-robust standard errors.

59 For example Ghen et al. (2019) for instance study complexity in the US structured finance market and document that issuers and underwriters of home equity ABSs (i.e. residential real estate) are usually large investment banks, with a concentration among a few large institutions.

60 See for instance ESMA, press release of 21 September 2023.

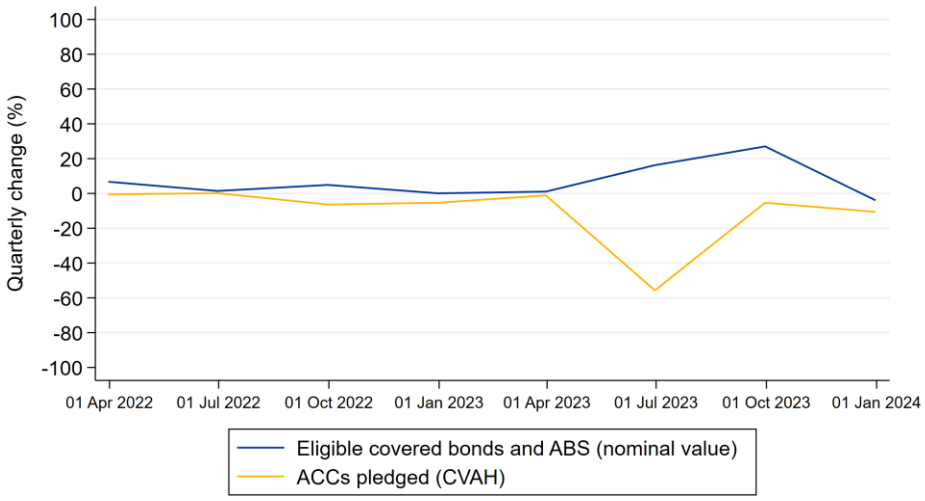
61 **T**he theoretical channel outlined above suggests coefficients could be inflated due to the inclusion of non-retained ABS**s** and not own-used covered bonds. As further described below, empirical evidence on holdings confirms the relevance of cross-institutional asset flows for the mobili**s**ation of assets and therefore the coefficient likely captures a compound effect. In results not shown here we find that the coefficients shrink in magnitude and become close to zero or negative when restricting the estimation to retained ABS and own-used covered bonds in the dependent variable.

The correlation patterns for French banks can be explained by the phasing-out of French ACC residential mortgage pools and hence a pronounced demobilisation of collateral as part of large-scale TLTRO repayments in the summer of 2023. To identify a substitution effect by banks we turn to the phase-out of parts of the French ACC framework. As mentioned above, on 3 October 2022 the Banque de France announced that following the redemption of TLTRO III on 30 June 2023 it would phase out pools of residential mortgages and auto loans from its ACC framework.[62] The policy shift, though potentially anticipated by parts of the market, caused banks pledging large volumes of residential mortgage ACC pools as collateral to find alternatives. Chart 8 documents the growth rates in ACC collateral pledged by French banking groups and changes in banking groups' holdings of covered bonds and ABSs around the implementation date of this change. It shows an initial decline in average ACC use after the announcement date (October 2022), followed by a sharp drop just before the implementation date. This is mirrored by an increase in ABS and covered bond holdings, reflecting the replacement of some of the ACC residential mortgage pools by covered bonds and retained RMBSs. However, despite this directional correlation, because they start at different levels changes in ACCs and in covered bonds and ABSs do not necessarily coincide in terms of volume.

Chart 8

Change in covered bonds and ABSs held and ACCs pledged by French banking groups

(percentage)



Source: Staff computations based on C2D and SHS-G data.
Note: The chart shows the quarterly change in eligible covered bond and ABS volumes held by French banking groups (blue line) and their ACCs pledged (red line).

62 See press release.

4 Lessons for monetary policy implementation and risk management

This section summarises the key lessons to be learned from the various ACC frameworks as far as monetary policy implementation and central bank risk management is concerned. The focus on implementation takes the policy need for collateral expansion as a given and thus abstracts from the monetary policy transmission aspects covered in the literature review above. As explained, the introduction of ACCs encompassed a series of legal, systemic and policy-related innovations in comparison with standard collateral. In the following we highlight five important lessons that emerge from this complex interaction.

First, expansions to the collateral framework benefit from taking into account innovations in asset type and focus on assets held on banks' balance sheets in sizeable amounts that are relatively simple to assess and mobilise. For example, pandemic-related ACCs with partial public-sector/government guarantees were an innovative addition to the Eurosystem collateral framework used on a significant scale in some countries under the EU's State Aid Temporary Framework adopted in March 2020. Nevertheless, not all types of ACCs proved to be equally effective as a way of enhancing the availability of collateral. For example, ACCs backed by real estate were significantly mobilised in pools, but not at all individually. Similarly, only a few NCBs accepted foreign-denominated loans and pools of consumer loans, probably not least owing to the related additional legal complexity, and even where they were accepted counterparties hardly used them.

Second, the design of collateral expansions can help address challenges linked to a heterogenous banking system. Despite the widespread use of ACCs by a large percentage of eligible counterparties, our empirical findings point to the relevance of bank heterogeneity as an important factor when it comes to the use of ACCs, the relationship with funding costs and the mobilisation of other asset classes. The experience with ACCs suggests the Eurosystem collateral framework provides the basis to deal with such heterogeneity.

Third, the acceptance of additional riskier collateral can be more risk-efficient than lowering haircuts on collateral already mobilised. The various episodes involving ACC suggest that expanding collateral availability on the extensive margin (i.e. additional collateral) is possible and more risk-efficient – given the monetary policy benefit in the form of additional collateral relative to cost in terms of additional financial risk for the central bank (see ECB, 2015) – than measures on the intensive margin (i.e. lower haircuts). This is provided the eligibility criteria and risk control measures for the additional collateral aim to make risk after haircut equivalent to the risk of collateral assets already accepted.[63] The underlying mechanism is that lower

[63] Besides the financial risk equivalence focusing in particular on credit, market and liquidity risks, the eligibility criteria and risk control measures also need to take into account the specific legal and operational challenges associated with new types of collateral to be prepared for the resolution process after a potential counterparty default.

haircuts reduce the risk protection for the central bank, as banks can borrow more (and thus increase the risk for the central bank) against the same set and amount of mobilised collateral. In contrast, the central bank can mitigate its risk increase from additional bank borrowing if the banks mobilise additional collateral. However, in the case of ACCs these considerations clearly need to be weighed against the inherent complexity and legal challenges of accepting jurisdiction-specific collateral, which leads to a more fragmented collateral framework.

Fourth, the availability of sound credit assessment systems for the additional collateral is an important operational requirement. The Eurosystem needs to understand the credit risk of the collateral it accepts so it can determine eligibility and design appropriate haircuts to ensure compliance with the statutory requirement for adequate collateral. For the ACC expansions, the NCBs relied on internally developed systems, in particular leveraging information in their national credit registers or the European AnaCredit dataset (see Auria et al., 2021), or by using external credit scoring tools and rating providers as well as banks' IRB models.

Fifth, operational readiness can help speed up the mobilisation process when liquidity needs are urgent. Rapid mobilisation of additional collateral requires both central banks' and counterparties' systems to be prepared. The ACC expansion showed that the best form of preparation is to use the systems in normal times too. Some adjustments to regular processes, like a streamlined initial acceptance process for IRBs or reduced reporting requirements for certain asset types, can support counterparties during the initial phasing-in period – even if they come at the cost of greater operational risk.

5 Conclusions

This paper provides a comprehensive study of the Eurosystem's ACC frameworks and reviews their evolution and role as a monetary policy implementation tool over time. Zooming in on the related literature and how ACC frameworks and the related risk control measure have evolved over time, we document stylised facts about mobilisation patterns related to ACC use and banks' characteristics. A number of conceptual contributions and empirical findings emerge.

First, the paper represents a comprehensive reference document covering the history of the ACC framework from its inception in December 2011 to its almost complete phasing-out in December 2024. The description of the evolution and the architecture of the ACC frameworks across the euro area highlights three phases: the origins in the euro area sovereign debt crisis and subsequent low-inflation environment, the contribution to collateral easing measures in response to the pandemic, and the gradual phasing-out since 2022. A novel and detailed description of all ACC measures adopted by the different euro area NCBs since 2012 is included in Annex 6.2.

Second, a literature review summarises how ACCs have contributed positively to monetary policy transmission. While they started out as a crisis instrument, the historical review of the frameworks highlights that with an appropriately designed risk control framework, ACCs could constitute a future policy tool suitable for enhancing monetary policy implementation.

Third, the paper elicits a number of, partially novel, stylised facts: while 90% of the ACCs used as collateral between 2012 and 2024 related to just 42 banks, institutions pledging ACCs do not have systematically more concentrated collateral pools. This is because, once we have controlled for country specificities and unobserved heterogeneity across banks, we find ACCs are mostly used as a complement to other asset classes. Banks pledging ACCs are mostly universal banks and diversified lenders of varying size, and to a lesser extent GSIBs. Moreover, banks with higher funding costs for short-term secured debt instruments show higher use of ACC collateral.

Exploring the interplay between ACC mobilisation and similar market alternatives related to structured finance, this paper finds that substitutability between ACCs and ABSs/covered bonds with similar underlying loans has been limited over time. The only exception involves residential mortgage ACC pools in one jurisdiction, where we document how demobilisation of ACCs translated into issuance and mobilisation of retained ABSs and own-used covered bonds.

Finally, the paper summarises a series of lessons for policymakers on the challenges associated with monetary policy implementation when expanding collateral and the best practices for addressing them. Expansions to the collateral framework benefit from taking into account innovations in asset type and focus on assets held on banks' balance sheets in sizeable amounts that are

relatively simple to assess and mobilise. Banks' characteristics matter when using newly introduced asset types as collateral. It can be more risk-efficient to accept additional riskier collateral than to lower haircuts on collateral already mobilised. Credit assessment systems for the additional collateral must be available to ensure adequate collateral. Operational readiness can help speed up the mobilisation process when liquidity is needed urgently.

Some parts of the ACC frameworks will continue to play a role in the Eurosystem collateral framework. As decided by the Governing Council on 29 November 2024, elements of the ACC framework such as NCBs' S-ICAS will be integrated with a new harmonised S-ICAS framework into the permanent general collateral framework as an additional credit assessment source. The Governing Council has also launched preparatory work on including pools of NFC credit claims in the general collateral framework; this is ongoing while this paper is being written. The outcome of that discussion may affect some of our findings. This paper is largely descriptive in nature, however it has identified some empirical patterns that would benefit from deeper analysis. In particular, work to develop a more rigorous understanding of collateral pledging behaviour and how this is linked to banks' funding and balance sheet constraints is left for the future.

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6 Annexes

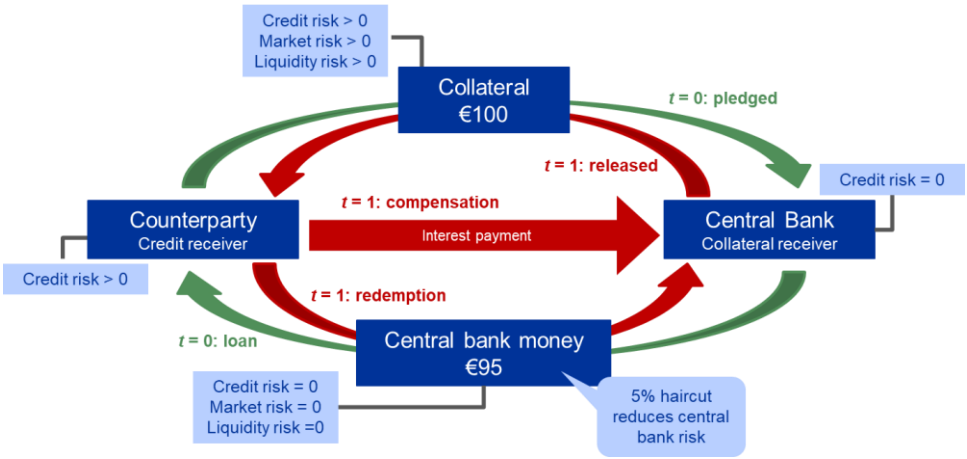
6.1 Primer on financial risk mitigation in Eurosystem credit operations

The Eurosystem mitigates financial risks in its credit operations via its counterparty and collateral frameworks. Any lender faces the risk of the borrower's default on its obligations, and the Eurosystem has to strike the right balance between risk management requirements and policy needs. As a first layer of risk protection, the Eurosystem lends only to financially sound credit institutions. Collateral serves as a second layer of protection.

The Eurosystem has a statutory obligation to only provide credit to its counterparties against "adequate" collateral.[64] The collateral framework addresses the credit risk associated with the collateral accepted as well as the market and liquidity risk of an adverse movement in the price of the collateral assets between their last valuation and realisation. In addition, it addresses operational and legal risks to ensure the Eurosystem can liquidate collateral when it becomes the effective owner following a counterparty default. Chart 9 illustrates the transactions and financial risks of Eurosystem credit operations; European Central Bank (2015) provides further details.

Chart 9

Financial risks involved in Eurosystem credit operations



Source: ECB.
Notes: The valuation haircut of 5% is used as an example. The collateral value of €100 reflects the illustrative daily market price for marketable collateral assets and the nominal outstanding amount for credit claims.

64 See Article 18.1 of the Statute of the European System of Central Banks and of the European Central Bank.

6.2 Detailed overview of the evolution of ACC frameworks by country

Table 2

Evolution of ACC frameworks by country since 2012[1)]

NCB	High-level description of ACC framework in terms of deviations from the general framework and changes over time
Belgium	Initially approved by the Governing Council in April 2020 as part of the collateral easing measures, the framework consisted of credit claims on NFCs, public-sector entities and self-employed individuals with a minimum CQS 5 according to ECAF sources, while maintaining all other eligibility requirements under the general framework unchanged. The framework also included accepting: i) IRBs approved under a simplified/light procedure as credit assessment sources; ii) Loans to NFCs with a public-sector guarantee issued under a pandemic guarantee scheme pledged as individual credit claims. This framework was phased out as of December 2024.
Germany	Initially approved by the Governing Council in October 2020, the framework consisted of individual credit claims on NFCs and public-sector entities that at 7 April 2020 were eligible under the general framework (up to CQS 3) but thereafter downgraded to CQS 4 or 5. The credit assessments sources accepted were restricted to ECAF-accepted External Credit Assessment Institutions (ECAIs) for the eligibility assessment of public-sector entities, and to Germany's ECAF-accepted In-house Credit Assessment System (ICAS) for NFCs. Acceptance of credit assessments provided by the German ICAS was extended to CQS 4 and 5 for the purposes of this framework (see terms and conditions). This framework was phased out as of June 2022 (see Counterparty notice).
Estonia	Initially approved by the Governing Council in June 2020 as part of the collateral easing measures, the framework consisted of credit claims on NFCs and public-sector entities with a minimum CQS 5 according to ECAF sources, while maintaining all other eligibility requirements under the general framework unchanged. The framework included acceptance of IRBs approved under a simplified/light procedure as credit assessment sources.
Ireland	Initially approved by the Governing Council in February 2012, the framework consisted of: (i) Pools of performing secured loans (i.e. residential and commercial mortgage loans); (ii) Pools of unsecured credit claims with a minimum CQS 5. The credit quality of all ACCs was established by CRR-approved IRB models, which initially were not ECAF-approved. In the case of residential mortgages, the loans in the cover pool had to be secured against residential property in either Ireland or the UK and could also be denominated in sterling (see the repeatedly updated Additional Temporary Measures Supplement). Once the common minimum ACC framework had been established in 2014, the NCB decided to maintain the eligibility of (i) pools of credit claims secured by commercial mortgages, and (i) unsecured credit claims advanced to NFCs prior to 31 December 2014. However, neither were ever mobilised by Irish counterparties. Pools of residential mortgages continued to be allowed under a Special Mortgage-Backed Promissory Notes (SMBPN) framework agreement. After the UK's withdrawal from the EU, pools of residential mortgages denominated in sterling ceased to be accepted.
Greece	Initially set up in 2012, the framework allowed the use of credit claims up to CQS 3 where the credit quality was by the rating tool ICAP, a non-ECAF-approved credit assessment source. In September 2014 the Governing Council approved an extension to CQS 4. As part of the collateral easing measures, in 2020 the framework was expanded to include the eligibility of individual ACCs up to CQS 5 as well as pools of loans to NFCs and pools of loans to NFCs subject to a guarantee issued under a pandemic guarantee scheme. An NCB- specific PD/LGD approach was employed to determine the minimum credit quality requirements and haircuts for pools of ACCs to NFC. Since 1 April 2023 the NCB has used its own ICAS approved under ECAF; the minimum credit quality requirements for both individual ACCs and pool ACCs are no longer established using the rating tool ICAP or the NCB-specific PD/LGD approach.
Spain	Approved by the Governing Council in February 2012, the framework initially extended eligibility to corporate and public-sector entity credit claims mobilised individually where the estimated credit risk by IRB systems (not ECAF-approved at the time) complied with CQS 4, i.e. an annual PD equal to or lower than 1%, although initially it only allowed credit claims with a minimum CQS 3. ACCs could also be denominated in certain foreign currencies. See press release and technical application. As part of the pandemic-related collateral easing measures the framework was expanded as follows in 2020 (see technical application): i) Individual credit claims with a PD of a minimum of CQS 5 and of pools of loans to NFCs (including SMEs) were accepted; ii) Loans to NFCs (including SMEs) and self-employed individuals and households under a pandemic guarantee scheme pledged as individual credit claims or under pools became eligible; iii) The credit quality of both individual credit claims and loans within pools could be assessed using IRB models temporarily approved via the simplified/light procedure introduced as a collateral easing measure, as well as by the NCB's S-ICAS. In June 2023 the eligibility of ACCs backed by a pandemic guarantee was phased out.

France	The framework was approved by the Governing Council in February 2012. Between 2012 and 2014 it consisted of individual credit claims, including loans to NFCs and retail loans backed by real estate. These required a minimum CQS 4 assessed by ECAF sources in the case of the former, and applied an NCB-specific approach for the latter. See related decision. From 2014 onwards the framework was redesigned in line with the minimum eligibility and risk control framework to include the following (see decisions at end-2013 and in 2016): i) Individual credit claims on NFCs with a credit quality equal to a minimum of CQS 4 according to an ECAF-approved IRB or the NCB's ICAS. Individual credit claims could also be denominated in USD; ii) Pools of residential mortgage loans and pools of auto loans where credit quality was assessed based on PDs and LGDs provided by ECAF-approved IRBs. As part of the collateral easing measures taken in response to the COVID-19 crisis, the framework was expanded as follows in 2020 (see Article): i) IRBs approved under a simplified/light procedure as credit assessment sources were accepted; ii) Individual credit claims with a minimum CQS 5 became eligible; iii) Loans with government/public-sector guarantees under the French pandemic scheme pledged as individual credit claims became eligible; iii) Valuation haircuts applied to portfolios of ACCs included a haircut add-on of 10% to the haircut implied by the minimum risk control framework approved by the Governing Council and reduced by 20% as part of the collateral easing measures. In October 2022 France decided to phase out the eligibility of pools of residential mortgage loans and pools of auto loans from the ACC framework as of 30 June 2023 (see decision). It also decided to phase out individual ACCs in CQS 4 and 5 as of November 2024.
Italy	The framework was approved by the Governing Council in February 2012. Between 2012 and 2014 it consisted of individual credit claims on domestic NFC debtors with a minimum CQS 4, assessed, in addition to ECAF sources, either by Italy's internal system (ValCre), until its recognition as an ECAF-approved NCB ICAS, or by the rating tool Cerved for an interim period during which it did not meet ECAF requirements. From 2014 onwards the framework was redesigned in line with the minimum eligibility and risk control framework to include the following (see press release): i) Individual credit claims on eligible debtors under the general framework with a minimum CQS 5 from ECAF-approved sources. Following the phasing-out of rating tools from ECAF in May 2019, the rating tool Cerved also continued to be used for an interim period as a non-ECAF-approved credit assessment source for individual credit claims; ii) Homogenous pools of residential mortgages loans and pools of loans to NFCs. For each loan in the pool, the PD of the debtor could not exceed 10% over a one year-horizon. The PDs and LGDs from ECAF-approved IRB models were used to assess the creditworthiness of these debtors. Loans to NFC debtors from portfolios pledged by banks without an ECAF-approved IRB system could use the NCB's ICAS, either the full component approved for ECAF purposes or, from 2015, its statistical component (i.e. the NCB's statistical approach). The LGD of such debtors was estimated conservatively by the NCB. Similarly, the PD and LGD of residential mortgages pledged by banks without an ECAF-approved IRB were estimated by the NCB based on conservative assumptions, i.e. using an NCB-specific PD/LGD determination approach. As part of the collateral easing measures taken in response to the pandemic crisis, the framework was expanded in 2020 as follows (see also the Note by NCB staff): i) The credit quality of individual credit claims could also be assessed by the NCB's S-ICAS. The credit quality of both individual credit claims and loans within pools could be assessed using banks' IRB models temporarily approved via the simplified/light procedure introduced as a collateral easing measure; ii) The scope of eligible loans under pools of loans to NFC debtors was extended to smaller businesses (partnerships, producer families and artisans). The NCB developed new methods to assessing the creditworthiness of these newly eligible debtor types, i.e. additional conservative approaches were introduced. In addition, the PD restriction of 10% for loans pledged under pools was removed; iii) Loans with public-sector guarantees under two Italian pandemic schemes pledged either as individual credit claims or within pools were made eligible; iv) Homogeneous pools of consumer loans were permitted; the PD and LGD of loans pledged by banks without an ECAF-approved IRB were estimated by the NCB based on conservative assumptions, i.e. using an NCB-specific PD/LGD determination approach.
Cyprus	Initially approved by the Governing Council in February 2012, the framework consisted of i) individual (unsecured) credit claims of all debtor/guarantor types (including private individuals) established in the euro area or EEA, as well as ii) individual retail and corporate credit claims backed by real estate assets from euro area debtors. These ACCs could have a PD of a maximum of 1.5% over a one-year horizon (CQS 5) provided by non-ECAF-approved sources such as IRBs. These claims could also be accepted in foreign currencies such as USD, GBP, CHF or JPY. As no relevant credit assessment system had received ECAF approval by September 2012, the initial ACC framework ceased to exist. It was reactivated in March 2016 to include pools of residential mortgages using an internal credit assessment approach developed by the NCB (an "NCB- specific PD/LGD approach"). In addition to the minimum requirements stipulated in the ACC minimum framework, a maximum PD of 1.5% at the loan level also applied. No further changes to the framework were introduced as part of the collateral easing measures in 2020.
Latvia	Initially approved by the Governing Council in November 2020 as part of the collateral easing measures, the framework consisted of individual credit claims on domestic NFCs and government and public-sector entities with a minimum of CQS 3. Besides ECAF-accepted sources, the framework also accepted IRBs approved under a simplified/light procedure as credit assessment sources. The framework was phased out as of July 2022.
Lithuania	Initially approved by the Governing Council in May 2020 as part of the collateral easing measures, the framework consisted of: i) Individual credit claims and pools of credit claims on domestic NFCs, both unsecured and secured on real estate, with a minimum CQS 5 according to ECAF sources and no minimum size loan;

	ii) Individual credit claims and pools of credit claims on domestic private individuals, both unsecured and secured (by real estate), with a minimum CQS 5 and no minimum loan size. In addition to ECAF-accepted sources, the framework included acceptance of IRBs approved under a simplified/light procedure as credit assessment sources. In July 2020 the framework was expanded to accept credit claims in which set-off rights were not contractually waived. In November 2020 the framework was further expanded to include credit claims on domestic public-sector entities with a minimum of CQS 5 assessed by ECAF sources or CRR-approved IRBs.
Malta	Initially approved by the Governing Council in November 2020 as part of the collateral easing measures, the framework consisted of individual credit claims on domestic NFCs benefitting from a pandemic-related public-sector guarantee scheme. Accepted loans had to have a minimum of CQS 5 solely on the basis of the guarantor's credit quality, using ECAF-approved sources. The framework also accepted credit claims in which set-off rights were not contractually waived. This framework was phased out as of February 2024.
Austria	Initially approved by the Governing Council in February 2012, the framework consisted of credit claims on NFCs with a minimum CQS 4 according to ECAF sources, while maintaining all other eligibility requirements under the general framework unchanged. As part of the collateral easing measures implemented in 2020 the framework was expanded by: i) Broadening the universe of additional credit assessment systems with the addition of an S-ICAS, and thus widening the number of eligible debtors; ii) Accepting loans to SMEs with a public-sector guarantee issued under a pandemic guarantee scheme pledged as individual credit claims (see NCB website). Austria decided to phase out the measure as of June 2025.
Portugal	Approved by the Governing Council in February 2012, the framework initially consisted of: i) Individual credit claims on domestic NFC debtors with a minimum of CQS 5, assessed, in addition to ECAF sources, by the rating tool Coface (subsequently renamed Ignios, then Iberinform) for an interim period during which it did not fulfil the ECAF criteria; ii) Pools of mortgage loans, pools of consumer credit loans, and pools of corporate loans NFCs where the credit quality requirements were assessed on the basis of ECAF sources. From 2014 onwards the framework became subject to the minimum risk control framework for pools of ACCs. It also expanded to include certain short-term debt instruments (STDIs) as individual ACCs. As part of pandemic-related collateral easing measures the NCB expanded the framework in 2020 to also accept: i) Additional credit assessment systems, with the addition of the NCB's S-ICAS and IRBs approved under a simplified/light procedure; ii) Loans granted to NFCs and self-employed individuals with a public-sector guarantee issued under a pandemic guarantee scheme pledged as individual credit claims; iii) Additional STDIs as individual ACCs. In June 2022 the additional STDIs accepted during the pandemic were phased out from the framework
Slovenia	Set up in 2012, the framework consisted of acceptance of individual loans to NFCs and the public-sector with a minimum of CQS 5, derived either from ECAIs or the NCB's recently developed ICAS (which at the time was in the process of being approved as an ECAF source). The use of ACCs by an individual counterparty was conditional on a shortage of regular eligible collateral for monetary operations from the counterparty concerned. As part of the pandemic-related collateral easing measures the NCB expanded its framework in 2020 to also accept: i) Additional credit assessment systems, with the addition of the NCB's S-ICAS; ii) Individual ACCs granted to NFCs with a public-sector guarantee issued under a pandemic guarantee scheme.
Slovakia	Initially approved by the Governing Council in June 2020 as part of the collateral easing measures, the framework consisted of individual credit claims on eligible debtors under the general framework with a minimum of CQS 5. In addition to ECAF-approved sources, the framework also accepted IRBs approved under a simplified/light procedure as credit assessment sources. In July 2020 the framework was extended to accept credit claims in which set-off rights were not contractually waived. In October 2020 the framework was further expanded to accept credit claims on NFCs benefitting from a public-sector pandemic guarantee scheme.
Finland	Initially approved by the Governing Council in July 2020 as part of the collateral easing measures, the framework consisted of credit claims on NFCs and public-sector entities with a minimum of CQS 4 according to ECAF sources, while maintaining all other eligibility requirements under the general framework unchanged. The framework included acceptance of loans with public-sector guarantee issued under a pandemic guarantee scheme pledged as individual credit claims. Acceptance of loans benefitting from a pandemic guarantee scheme was phased out in July 2022.

Source: ECB and NCBs.
Notes: 1) This Annex reflects the status of the respective NCB's ACC frameworks as of 31 January 2025. NCBs are referred to by country name. Changes to the ACC framework approved by the ECB Governing Council on 29 November 2024 (see press release) for implementation no earlier than the fourth quarter of 2025 are not reflected.
2) The simplified procedure for CRR-approved IRBs as part of the pandemic-related collateral easing measures was discontinued in June 2022 for all ACC frameworks.
3) The Eurosystem phased out the use of rating tools from its general framework for monetary policy operations on cost-benefit grounds in May 2019, but NCBs could continue to use rating tools in their ACC frameworks (see the related press release).
4) This Annex includes some information on NCBs' publications on their frameworks. More details can be found on NCB websites.

Table 3

Schematic overview of ACC frameworks

(selected features only; since the establishment of the common minimum eligibility criteria and risk control measures in 2014)

	Individual ACCs not backed by real estate			Pools of ACCs		
NCB	Minimum CQS	Non-ECAF credit assessment sources1)	Pandemic guarantee (plus additional debtor types)	Pool type(s)	Non-ECAF credit assessment sources1)	Pandemic guarantee (plus additional debtor types)
Belgium	5 (2020-2024)	CRR-approved IRBs (2020-2022)	Yes (No) (2020-2024)	-	-	-
Germany	5 (2020-2022)	-	-	-	-	-
Estonia	5 (from 2020)	CRR-approved IRBs (2020-2022)	-	-	-	-
Ireland	5	-	-	Residential mortgages	-	-
Greece	4 (2014-2020) 5 (from 2020)	Rating tool (2014-2023)	-	Loans to NFCs (from 2020)	NCB approach (2020-2023)	Yes (No) (since 2020)
Spain	4 (2014-2020) 5 (from 2020)	CRR-approved IRBs (2020-2022) S-ICAS (from 2020)	Yes (Yes) 2020-2023)	Loans to NFCs (from 2020)	S-ICAS (from 2020)	Yes (Yes) (2020-2023)
France	4 (2014-2020) 5 (2020-2024)	CRR-approved IRBs (2020-2022)	Yes (No) (from 2020)	Residential mortgages (2014- 2023) Auto loans (2014-2023)	-	-
Italy	5	Rating tool (when not approved under ECAF, until 2021) S-ICAS (from 2020) CRR-approved IRBs (2020-2022)	Yes (No) (from 2020)	Loans to NFCs (and smaller businesses from 2020) Residential mortgages Consumer loans (from 2020)	S-ICAS (from 2015) NCB approaches (additional ones from 2020) CRR-approved IRBs (2020-2022)	Yes (Yes) (since 2020)
Cyprus	5	NCB internal credit assessment approach (since 2016)	-	Residential mortgages (from 2016)	-	-
Latvia	3 (2020-2022)	CRR-approved IRBs (2020-2022)	-	-	-	-
Lithuania	5 (from 2020)	CRR-approved IRBs (2020-2022)	-	Loans to NFCs (from 2020) Residential mortgages (from 2020) Commercial mortgages (2020-2023)	CRR-approved IRBs (2020-2022)	-
Malta	5 (2020-2024)	-	Yes (No) (2020-2024)	-	-	-
Austria	4	S-ICAS (from 2020)	Yes (No) (2020 - 2025)	-	-	-
Portugal	5	Rating tool (when not approved under	Yes (Yes) (from 2020)	Loans to NFCs Residential mortgages	S-ICAS (from 2020)	-

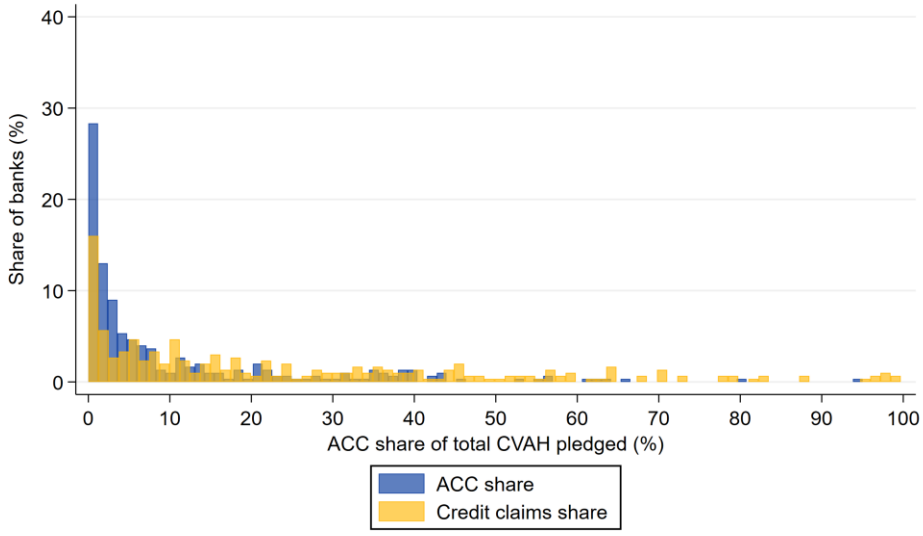
		ECAF, until 2019) S-ICAS (from 2020) CRR-approved IRBs (2020-2022)		Consumer loans	CRR-approved IRBs (2020-2022)	
Slovenia	5	S-ICAS (from 2020)	Yes (No) (from 2020)	-	-	-
Slovakia	5 (from 2020)	CRR-approved IRBs (2020-2022)	Yes (No) (from 2020)	-	-	-
Finland	4 (since 2020)	-	Yes (No) (2020-2022)	-	-	-

Sources: ECB and NCBs.
Note: 1) ECAF-accepted credit assessment systems were automatically eligible for the credit assessment of ACCs.

6.3 Additional charts

Chart 10
Distribution of credit claims and ACC shares

(Percentages)

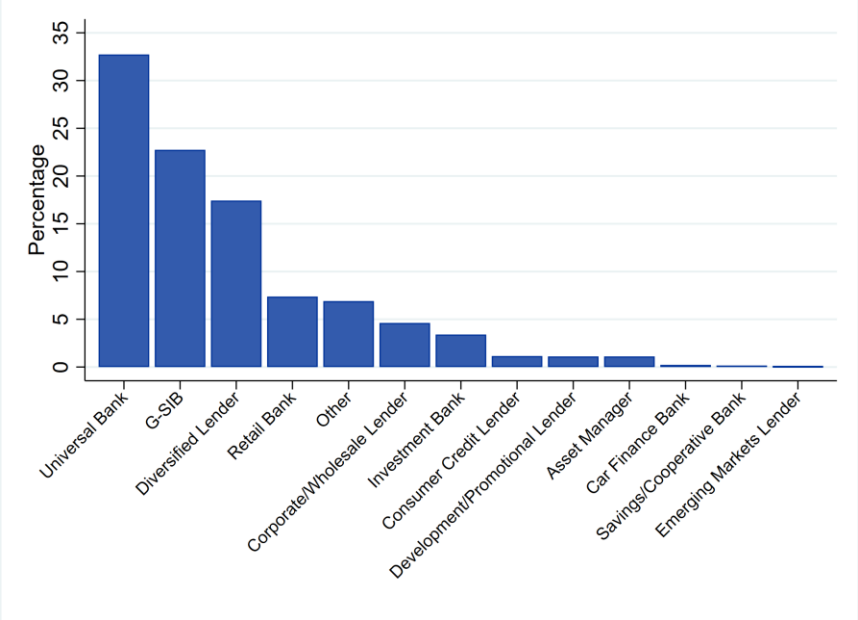


Source: ECB computations based on C2D/UC data.
Notes: The chart shows a histogram of banks' average share of ACCs and credit claims pledged between January 2012 and December 2024. Zero shares not included.

Chart 11

Distribution of total assets by business model within sample

(Percentage)

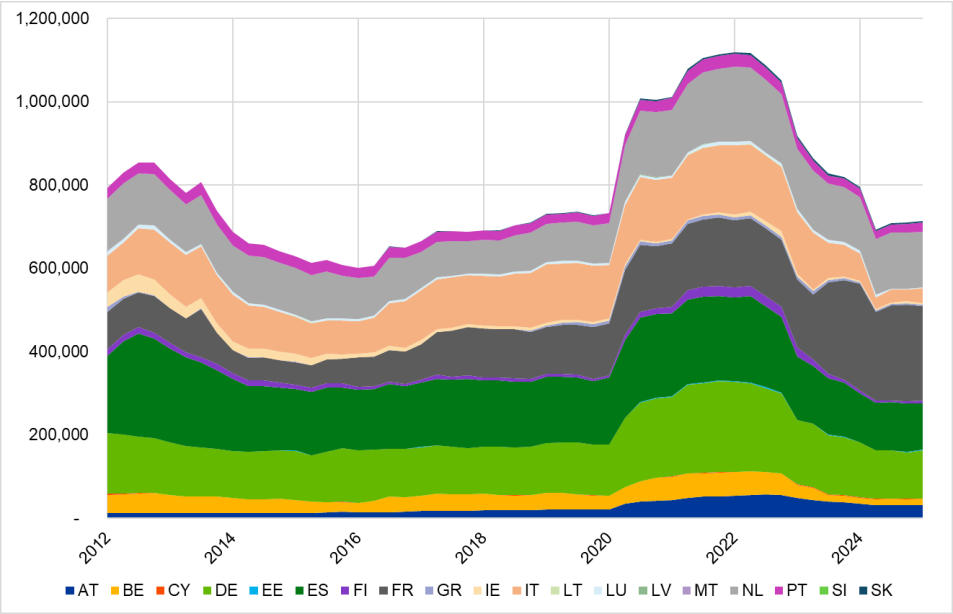


Source: ECB computations based on C2D/UC and FINREP data.
Note: The chart shows distribution of total assets by business model.

Chart 12

Own-use covered bonds and retained ABSs used as collateral across countries

(Collateral value after haircuts in EUR million; end of quarter data)



Source: ECB computations based on C2D/UC data.
Note: The chart shows the distribution of own-use covered bonds and retained ABSs used as collateral across countries.

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The views expressed in this paper are those of the authors and do not necessarily reflect those of the ECB and the Eurosystem.

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