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# SREP, P2R, and "slow-burning" risks to EU banks




Economic Governance and EMU Scrutiny Unit (EGOV)
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# SREP, P2R, and "slow-burning" risks to EU banks

**Abstract**

Pillar 2 requirements (P2R) for euro area banks are less responsive to risks that are still building and have yet to materialise. Between 2019 and 2025, P2R are positively associated with weak asset quality and vary by size and business model, but not with exposure to population ageing, geoeconomic fragmentation, the climate transition, or non-bank finance. The Supervisory Review and Evaluation Process (SREP) was not designed to price slow-burning risks. No capital instrument matches their long horizon and uneven incidence across banks.

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| **BMA** | Business model assessment |
| **BU** | Banking Union |
| **C&E** | Climate-related and environmental (risk) |
| **CCoB** | Capital conservation buffer |
| **CCyB** | Countercyclical capital buffer |
| **CET1** | Common Equity Tier 1 |
| **CRD IV** | Capital Requirements Directive (Directive 2013/36/EU) |
| **CRR** | Capital Requirements Regulation (Regulation (EU) No 575/2013) |
| **CSRBB** | Credit spread risk arising from non-trading book activities |
| **EBA** | European Banking Authority |
| **ECB** | European Central Bank |
| **ECON** | Committee on Economic and Monetary Affairs |
| **EGOV** | Economic Governance and EMU Scrutiny Unit |
| **EIOPA** | European Insurance and Occupational Pensions Authority |
| **ESG** | Environmental, social and governance |
| **ESMA** | European Securities and Markets Authority |
| **ESRB** | European Systemic Risk Board |
| **EU** | European Union |
| **GDP** | Gross domestic product |
| **G-SII** | Global systemically important institution |
| **ICAAP** | Internal capital adequacy assessment process |
| **IRRBB** | Interest rate risk in the banking book |
| **JST** | Joint Supervisory Team |

| | |
|---|---|
| **MYA** | Multi-year assessment |
| **NBFI** | Non-bank financial intermediary |
| **NCA** | National competent authority |
| **NPL** | Non-performing loan |
| **O-SII** | Other systemically important institution |
| **P2G** | Pillar 2 Guidance |
| **P2R** | Pillar 2 Requirement |
| **RTF** | Risk tolerance framework |
| **SI** | Significant institution |
| **SREP** | Supervisory Review and Evaluation Process |
| **SSM** | Single Supervisory Mechanism |
| **SyRB** | Systemic risk buffer |
| **UK** | United Kingdom |

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# EXECUTIVE SUMMARY

The Supervisory Review and Evaluation Process (SREP) is the main framework through which the ECB assesses the risks, resilience and viability of euro area banks. This paper asks whether it captures four slow-burning, structural risks: demographic change, geoeconomic fragmentation, the transition to a low-carbon economy, and the growing interlinkages between banks and non-bank financial intermediaries (NBFIs).

The question cannot be answered directly from the outside. The SREP is largely confidential, and only one of its outcomes, the Pillar 2 Requirement (P2R), is disclosed bank by bank. We therefore proceed in two steps: a conceptual assessment of what the SREP is built to do, and an empirical analysis of P2R decisions for around 110 significant institutions over the SREP cycles from 2019 to 2025.

**Findings**

Each of the four risks can be located somewhere in the four SREP building blocks, but none maps cleanly onto one. The same five tensions recur: an assessment horizon of two to three years against risks that play out over decades; a scoring system built for weaknesses in individual banks rather than sector-wide trends; risks that the methodology names but does not measure; risks originating outside the bank or outside the supervisory perimeter; and acknowledged gaps in data and models.

The P2R varies systematically with conventional, bank-specific risk. It is higher for banks with weaker asset quality, and it differs across business models, ownership types and bank size. It does not move with the business cycle, which is consistent with its microprudential design.

The P2R does not vary systematically with our proxies for the four structural risks. Where a relationship appears, it is small, of the wrong sign, or attributable to differences between countries: once country-fixed effects are included, none of the four measures is statistically significant. Exposure to carbon-intensive sectors is, if anything, associated with a lower P2R.

**Assessment**

This is not evidence of supervisory failure. The SREP reviews the arrangements a bank has put in place, and any additional own-funds requirement must be tied to a specific risk and a justified potential loss. Structural risks offer no measurable exposure and no loss distribution from which such an amount could be derived.

Nor is the difficulty that these risks are common to all banks. Exposure to them varies considerably across banks. The mismatch is one of horizon. A risk that materialises in a decade does not make any three-year plan implausible, and a requirement decided annually carries no commitment about the level in ten years.

These risks are also one-sided, which rules out instruments designed to be built up and released. Across the capital framework, no instrument combines the horizon these risks require with the differentiation across banks they display.

It remains to be seen whether the revised SREP methodology can really address these issues. While some revisions go in the right direction (a more direct link between SREP scores and P2R, sidestepping the link via banks' internal risk model), we doubt whether the underlying model-based scoring system can capture slow-burning, structural risks.

**Recommendations**

1. **Disclose more of the SREP outcome.** Publish the Pillar 2 Guidance bank by bank alongside the P2R, and report whether structural risks have given rise to supervisory measures. This would make supervisory action on these risks verifiable.
2. **Match the horizon of the instrument to the horizon of the risk.** Extend the logic of the multi-year assessment from the supervisory assessment to its outcome, by setting announced multi-year capital trajectories for identified structural exposures.
3. **Where losses cannot be sized, an exposure-based instrument is an option for further consideration.** The large-exposure regime of Pillar 1 limits concentration by reference to the size of an exposure rather than to a modelled loss. This could be a template for taking into account exposure to structural risks.

We see limited merit in adding a further bank-specific assessment of systemic resilience. Supervisors already assess these risks; what is missing is disclosure and an instrument matched to the horizon. Capital is in any case not the whole answer: where a structural trend erodes the viability of a business model, the relevant instrument is the business model assessment of the SREP.

# 1. INTRODUCTION

The Supervisory Review and Evaluation Process (SREP) is the main framework for assessing the risk profile, resilience, and viability of banks in the euro area. Its main goals are to identify key risks of banks, assess whether their capital, liquidity, governance, and risk controls are adequate, and determine whether targeted supervisory intervention is needed. The outcomes are both quantitative, such as Pillar 2 Requirements (P2R)[1], and qualitative, such as remedial measures addressing weaknesses in risk management. In Member States participating in the Banking Union (BU), the European Central Bank (ECB) oversees the SREP for significant institutions through the Single Supervisory Mechanism (SSM), which employs Joint Supervisory Teams (JSTs) for the evaluation process, comprising staff from the ECB and national competent authorities (NCAs); NCAs manage the SREP for less significant institutions.[2]

In 2023, the Chair of the ECB Supervisory Board asked an independent group of experts to assess the SREP (ECB, 2023a). The review was part of the ECB's effort to make supervision more efficient, risk-based, and better integrated across supervisory tools. The experts confirmed the value of the SREP as a harmonised framework for banking supervision. They emphasised its role in supporting bank resilience and ensuring consistent supervisory treatment across jurisdictions. At the same time, they suggested several improvements. In their view, the SREP had become too process-heavy and was not integrated well enough with other supervisory processes. To overcome these concerns, some changes were already introduced in the SREP 2025, including a streamlined communication strategy. Other changes, such as the revised P2R methodology, will only take effect with the SREP 2026.

Against this background, this paper examines whether the SREP adequately captures pivotal risks facing euro area banks. We are particularly interested in a set of slow-burning, structural risks. These include demographic change, geoeconomic fragmentation, the long-term transition to a low-carbon economy, and the growing interlinkages between banks and non-bank financial intermediaries (NBFIs).

The central question is whether such risks are adequately reflected in supervisory outcomes, or whether they are systematically under-weighted in a framework that is oriented towards annual cycles. Answering this question directly is difficult. The SREP is a largely confidential microprudential process that relies heavily on supervisory discretion. Supervisory scores, the underlying risk assessments, and the qualitative measures imposed on individual banks are not publicly disclosed. The supervisory dialogue through which these outcomes are formed is by design not observable to the public. A direct empirical evaluation of whether a particular risk enters the assessment is therefore not feasible from the outside.

In light of these challenges, we address the central question in two steps. In the first step, we provide a conceptual assessment. We situate the SREP within its legal and institutional mandate and ask whether and how slow-burning risks can be accommodated within a supervisory tool that is primarily microprudential and organised around an annual cycle.

The SREP methodology was designed as a harmonised framework to ensure the consistent supervision of banks across the Banking Union. It is structured around four main elements: business model analysis, internal governance and risk management, risks to capital, and risks to liquidity and funding. The

[1] Pillar 2 Requirements are bank-specific capital requirements imposed by supervisors to cover risks that are not fully captured by Pillar 1 requirements (the minimum capital requirements that apply equally to all banks). For more information, see Box 1.

[2] For the fundamental distinction between significant and less significant institutions see art. 6(4) of Council Regulation 1024/2013, of 15 October 2013, Conferring Specific Tasks on the European Central Bank Concerning Policies Relating to the Prudential Supervision of Credit Institutions, 2013 O.J. (L 287) 63; for a general overview of the division of labour between the ECB and NCAs within the SSM.

assessment of each element results in a supervisory score, complemented by a qualitative assessment that reflects institution-specific risks and supervisory judgement. These assessments, taken together, then feed into the determination of the P2R (see Box 1) and other outcomes.

In the second step, we bring the available evidence to bear on the question. The only SREP outcome that is disclosed bank by bank is the P2R. We therefore focus on this capital requirement and examine whether it varies systematically with bank characteristics such as size, ownership, business model, and with proxies for the structural risks identified above.

Since the results of the revised P2R methodology should only become available at the end of 2026, the paper cannot assess whether the expert group's recommendations were successfully implemented. It instead establishes a baseline and asks whether SREP quantitative outcomes convey relevant information about the health of the European banking sector. Throughout the analysis, we treat P2R as a partial and imperfect proxy for the full supervisory assessment and intervention, and we set out the resulting caveats in detail.

Our empirical findings can be summarised as follows. First, P2R varies systematically with conventional measures of bank risk and with bank characteristics. P2R is higher for banks with weaker asset quality, as measured by the ratio of non-performing loans (NPLs), and it differs across business models, ownership types, and bank size. This pattern suggests that the quantitative outcome of the SREP does convey relevant information about the conventional risk profile of a bank.

Second, the relationship between P2R and macroeconomic conditions over the cycle is weak. Changes in P2R show only a limited association with GDP growth and with changes in aggregate NPL ratios. This is consistent with a process that responds to conventional, bank-specific risks rather than to broader cyclical developments.

Third, we find no clear systematic relationship between P2R and our proxies for the slow-burning, structural risks. Banks that are more exposed to population ageing, to transition risk, to geopolitical risk, and to funding from NBFIs do not appear to receive systematically higher P2R. We are cautious in interpreting this last result. The evidence is descriptive, it is largely based on a single cross-section and on a small sample of large institutions for several of the risk measures, and P2R captures only one part of the supervisory assessment. With these caveats in mind, the absence of a visible relationship is at least consistent with the concern that slow-burning risks are not yet strongly reflected in the quantitative outcomes of the SREP.

# 2. THE SREP AND SLOW-BURNING RISKS: A CONCEPTUAL ASSESSMENT

## 2.1. Institutional Background and Methodology

Introduced as Pillar 2 in the Basel II framework[3] and refined in subsequent amendments to the Accords,[4] the SREP was transposed in the EU in the CRD IV[5] applicable to all banks in the 27 Member States.[6] Despite this legal basis in the common European prudential framework, the SREP became one of the core instruments of harmonised banking supervision in the BU. A common methodology was first applied in 2015 to the largest euro area banks (also known as Significant Institutions). This replaced a patchwork of national approaches, only partly integrated through European Banking Authority (EBA) Guidelines on common SREP procedures and methodologies, with a more uniform assessment of a bank's viability, performed annually. Through the SREP, the ECB was established as the dominant microprudential authority in the Member States participating in the BU, while macroprudential policy remained under the control of national authorities.

A key guiding principle has been to complement quantitative bank risk metrics (hard information) with supervisory judgement (soft information). In the ECB's current framework, the SREP remains the main process through which JSTs assess whether banks meet prudential expectations and whether their capital, liquidity, governance, and risk controls are adequate.

The SREP methodology rests on four elements or building blocks. The first evaluates the bank's business model and profitability, focusing on the credibility and sustainability of its strategy, earnings, and resilience to changes in the operating environment. The second assesses internal governance and risk management, including the effectiveness of the management body, internal controls, risk culture, compliance, and audit functions. The third examines the risks to capital (credit, market, operational and interest rate and credit spread risk in the banking book), as well as overall capital adequacy. The fourth focuses on risks to liquidity and funding, assessing the bank's funding structure, liquidity buffers, and ability to withstand stressed conditions.

The methodology laid out in the ECB's SREP Methodology Booklet[7] is designed to combine standardisation with supervisory discretion. Each element is assessed in stages. Supervisors first gather information. They then use an anchored or automated scoring phase. This is followed by a deeper supervisory assessment in which JSTs exercise constrained judgement. Scores range from 1 to 4, with

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3 Basel Comm. on Banking Supervision, International Convergence of Capital Measurement and Capital Standards: A Revised Framework — Comprehensive Version, pt. 3, paras. 719–763 (June 2006), https://www.bis.org/publ/bcbs128.htm. (introducing a supervisory review process).

4 See, for instance, Basel Comm. on Banking Supervision, Enhancements to the Basel II Framework (July 2009), https://www.bis.org/publ/bcbs157.htm. (strengthening Pillar 2 in response to the financial crisis, adding guidance on firm-wide governance, risk management, and stress testing); Basel Comm. on Banking Supervision, Principles for Enhancing Corporate Governance (Oct. 2010), https://www.bis.org/publ/bcbs176.htm. (feeding expectations into the supervisory review); Basel Comm. on Banking Supervision, Core Principles for Effective Banking Supervision, Core Principle 8 (Supervisory Approach), Core Principle 16 (Capital Adequacy) (Sept. 2012), https://www.bis.org/publ/bcbs230.htm. (reinforcing that supervisors should have a process to review capital adequacy relative to risk, echoing Pillar 2).

5 Directive 2013/36/EU, of the European Parliament and of the Council of 26 June 2013 on Access to the Activity of Credit Institutions and the Prudential Supervision of Credit Institutions and Investment Firms, Amending Directive 2002/87/EC and Repealing Directives 2006/48/EC and 2006/49/EC, 2013 O.J. (L 176) 338 [hereinafter CRD IV].

6 See in particular CRD IV, art. 97 (requiring competent authorities to review the arrangements, strategies, processes and mechanisms implemented by institutions to comply with CRD IV/CRR, and to evaluate risks to which the institution is or might be exposed, risks the institution poses to the financial system, and risks revealed by stress testing) and CRD IV, art. 104 (providing he power to impose the outcomes of SREP, including additional own funds requirements, i.e., P2R).

7 The SREP Methodology Booklet is an annual publication describing the methodology used to conduct the SREP, including the assessment of banks' risks and the determination of supervisory requirements. The latest version for 2025 can be found in https://www.bankingsupervision.europa.eu/activities/srep/2025/html/ssm.srep202511_supervisorymethodology2025.en.html.

qualifiers that add some granularity. The objective is that the SREP becomes neither a purely mechanical scoring exercise nor a fully open case-by-case judgement. It aims to ensure comparability across banks while still allowing supervisors to reflect institution-specific features, forward-looking vulnerabilities, and interactions across risks.

The SREP can lead to several outcomes. Quantitative outcomes include P2R (see Box 1), Pillar 2 Guidance (P2G), that is, the supervisory expectation for a bank to hold capital above and beyond its binding requirements, and, where relevant, liquidity measures. Other outcomes are qualitative, such as supervisory measures aimed at weaknesses in governance, internal controls, risk management, data systems, or remediation practices. The SREP also produces scores and written rationales for the different risk elements and for the overall assessment. These outcomes matter beyond the annual decision itself. They help shape the supervisory dialogue with the bank and feed into the planning of future supervisory activities. Out of all SREP outcomes, only the P2R is disclosed bank by bank. The remaining scores, measures and findings are only published in aggregate figures.

For the question this report asks, one feature of this process matters most. Slow-burning risks can enter the SREP scores, in particular through the business model and governance assessments, and they increasingly do. The scores – which themselves suggest quasi-scientific precision where significant supervisory judgement is present – have to be translated into a capital figure. This translation runs through the bank's ICAAP, which quantifies risks with a measurable exposure over a horizon of one to three years. A risk that has no ICAAP line item, because there is no exposure to size and no loss to project within that horizon, receives no add-on. The most significant gap therefore does not lie in the assessment that yields a score but in the step from score to capital. The 2026 methodology links the scores more directly to the P2R, so a risk that moves a score could in principle feed through. A score of 1 to 4 for bank-specific weaknesses is, however, unlikely to move in response to a trend that affects the whole sector. Section 2.2 shows for each risk where it can enter the assessment; Section 4 tests whether it reaches the capital figure.

**Box 1**: P2R methodology

P2R is a bank-specific additional own-funds requirement set through the SREP. Its purpose is to ensure that a bank holds enough capital for risks that are not covered, or not sufficiently covered, by Pillar 1. In particular, risks stemming from the bank's business model, internal governance, and interest rate risk in the banking book, as well as those parts of credit, market, and operational risk that Pillar 1 does not sufficiently capture.

$$Pillar\ 2\ Requirements\ (\%) = \frac{Additional\ total\ capital}{Total\ risk\ exposure\ amount} \times 100$$

The P2R is expressed as a percentage of risk-weighted assets (RWAs). The numerator is the amount of additional own funds that the bank must hold in total capital (i.e., the sum of Tier 1 and Tier 2 capital). The denominator is the bank's stock of risk-weighted assets. A P2R equal to 2% means the bank must hold additional regulatory capital equal to 2% of its risk-weighted assets on top of Pillar 1 requirements. A lower P2R would suggest that the bank's risks are seen as better covered by Pillar 1 and by its own controls and capital position.

Under the current P2R methodology, supervisors follow a four-step process. In Step 1, the JST derives an initial P2R based on the scores for business model, internal governance, and risks to capital. These scores range from 1 (low risk) to 4 (high risk) and summarise the JST's assessment of the bank's risk profile in each of these areas. In Step 2, this initial figure is broken down into risk-by-risk capital add-ons based on the bank's internal capital adequacy assessment process (ICAAP) information. In Step 3, supervisors challenge those add-ons using a broad set of data from the bank and relevant peers. In Step 4, they arrive at the final risk-by-risk P2R, though only the overall value is communicated to the bank and the industry. The process therefore starts from an overall supervisory view and then moves into a more detailed risk-by-risk calibration.

The 2023 expert group's report argued that this methodology needed improvement. In its view, the ECB was combining two approaches that do not naturally fit together: a holistic approach based on the overall risk profile of the bank versus a risk-by-risk approach heavily reliant on banks' ICAAPs. The expert group saw this combination as conceptually weak and operationally burdensome. They argued that it created complexity without clearly outperforming either a purely holistic method or a genuinely risk-by-risk method. They were especially critical of the strong reliance on ICAAPs, which are heterogeneous across banks and difficult to reconcile with a common supervisory methodology.

A new methodology will apply from SREP 2026 to respond to these concerns. It keeps the SREP scores as the starting point, but it creates a more direct link between those scores and the final P2R. The new approach also gives supervisors more explicit tools to identify and correct overlaps between Pillar 1 and Pillar 2 requirements. Overall, the reform aims to make P2R-setting simpler, more robust, and more directly tied to the specific Pillar 2 risks identified in supervision.

Source: Authors, based on ECB Banking Supervision.

## 2.2. Slow-Burning Risks in the SREP framework

The four SREP building blocks can each partially include every one of the four slow-burning structural risks this report focuses on, but none of the four risks maps cleanly onto a single element, and each shows a recurring set of tensions between a risk-based, entity-specific, point-in-time supervisory architecture and slow-burning, cross-cutting, systemic phenomena. In this subsection, we provide a conceptual discussion that shows, for each risk, where it can be captured in the SREP framework and where the relevant tensions lie.

### 2.2.1. Demographic change

Element 1 (business model and profitability) is the primary and most natural home to capture demographic change. Ageing populations affect loan demand (mortgages, consumer credit), deposit behaviour, pension and wealth-management revenue streams, and the long-term earnings sustainability that business model assessment (BMA) is explicitly designed to test within the SREP framework. The EBA/ECB BMA methodology's "materiality assessment" and forward-looking viability analysis are, in principle, the right tool.

Element 2 (Governance) captures a narrower but real dimension: succession planning and human-capital risk within the institution itself (an ageing workforce, skills gaps).

Element 3 (Risks to capital) picks up second-order effects: mortgage and real-estate credit risk in shrinking regional markets, and — for banks with material sovereign exposure — indirect credit/spread risk tied to pension and healthcare-driven fiscal pressure on sovereigns.

The first and foremost tension we identify is a time-horizon mismatch. BMA under the EBA Guidelines on SREP is generally anchored to a two-to-three year forward-looking business/financial plan. Demographic change plays out over multiple decades. A risk that only bites in year 15 is structurally invisible to a methodology built to test the credibility of a 3-year plan.

Furthermore, demographic change has no exposure that can be sized in the way that credit, market, operational or interest rate risk can be sized in Element 3. It manifests as a slow shift in revenue mix and volume, not a discrete risk position. In the bank's ICAAP it is at most subsumed in a general business or strategic risk figure, never quantified as a risk of its own. This makes it very hard to translate into a P2R add-on, which under Article 104 CRD requires the supervisor to identify a risk not covered, or not sufficiently covered, by Pillar 1 and to justify the amount imposed.

Finally, we see a risk of score dilution. As demographic effects are gradual and shared across the whole sector (not idiosyncratic to one bank), they tend to get absorbed into a generic "environment" narrative in BMA scoring rather than driving a distinct, actionable finding — the methodology's constrained-judgement scoring (1–4) is built for bank-specific vulnerabilities, not sector-wide secular drift.

### 2.2.2. Geoeconomic fragmentation

Element 1 (Business model) captures structural exposure via reliance on cross-border supply chains, trade finance, or geographic revenue concentration.

Element 2 (Governance) assesses whether the bank can even identify and respond to geopolitical shocks — this is where the ECB has placed much of its recent supervisory emphasis (geopolitical scenario integration into the internal capital adequacy assessment process (ICAAP), risk appetite, and the 2026 thematic reverse stress test on geopolitical risk (ECB, 2026)).

Element 3 (Risks to capital) is the most developed channel in current supervisory practice: credit risk (sanctions exposure, sovereign/counterparty concentration, sector vulnerability to tariffs), market risk

(repricing shocks from trade-policy surprises), and geoeconomic fragmentation is increasingly treated by the ECB as a cross-cutting driver embedded across credit, market, liquidity, operational and governance risk simultaneously, rather than confined to one box.

Element 4 (Liquidity and funding) captures acute manifestations: deposit flight, wholesale funding freezes, or foreign exchange funding stress triggered by a geopolitical shock.

The ECB's own practice implicitly concedes that the four-element structure does not have a natural home for this risk. By explicitly treating geopolitical risk as a "cross-cutting driver" assessed *across* all four elements simultaneously rather than scored within one, supervisors are effectively working around the architecture rather than through it — a workaround, not evidence the framework "adequately captures" the risk on its own terms and methodologies.

Geoeconomic fragmentation is exogenous from the perspective of an individual bank. Pillar 2 methodology is fundamentally about assessing whether a bank's *own* risk management, governance and capital are adequate. Geoeconomic fragmentation originates in sanctions regimes, tariff policy and geopolitical rupture — factors entirely outside bank control. Therefore, banks can only anticipate and respond to geoeconomic risks they cannot influence as such. While this is conceptually similar to other more traditional macro-risks, it may be more pronounced for geoeconomic risks. A bank's SREP score for a risk it can identify but only partially mitigate, following the "supervisory review of the institution's own arrangements" logic underpinning Art. 97 CRD IV, will by design address cross-cutting geopolitical macro risks only insufficiently.

Similarly, credit and market risk models (Element 3) are built around historically calibrated loss distributions, leading to a tension between regime uncertainty and modellable risk. Geoeconomic fragmentation is closer to true Knightian uncertainty — a sudden discontinuity (e.g., an unexpected tariff announcement) rather than a modellable tail. This is precisely why the ECB has resorted to bespoke, institution-specific reverse stress tests rather than trying to fold it into standard capital-risk metrics.

### 2.2.3. Long-term transition to a low-carbon economy

Climate transition risk is the risk with the most explicit, purpose-built integration into SREP.[8] The ECB's 2020 Guide on climate-related and environmental risks (ECB, 2020; see also EBA GL/2018/03, para. 100) explicitly requires integration of climate and environmental (C&E) risk into risk appetite, strategy and internal governance, assessed directly under this element, leading to the direct inclusion of transition risks into Element 2 (Governance).

The 2023 and 2025 updates to the BMA methodology (ECB, 2023b; ECB, 2025a) explicitly name climate- and nature-related risk as a driver relevant within Element 1, that is the business-model sustainability assessment (stranded-asset exposure, revenue-model shift in carbon-intensive financed sectors).

Transition risk is assessed within credit risk (carbon-intensive sector concentration) and, per the ECB's 2022 climate stress test (ECB, 2022a), market risk, and therefore plays a critical role in Element 3 (risk to capital).

Despite the most developed integration of any of the four risks, the ECB itself has confirmed that a qualitative-quantitative gap existed in supervisory interventions in response to the SREP. C&E findings

[8] ECB (2020) sets out 13 supervisory expectations and explicitly references their integration into governance (Element 2), business model (Element 1), and risk-to-capital (Element 3) assessments – including citations to para. 65 of the EBA Guidelines on SREP (EBA/GL/2014/13) and the ECB Guide to the internal capital adequacy assessment process (ICAAP).

drove qualitative SREP measures (binding qualitative requirements on 30+ banks in 2022) and only in a small number of cases affected SREP scores or P2R (ECB, 2022b)— the ECB explicitly signalled this would only "eventually" feed into Pillar 2 capital requirements (ECB, 2021). In other words: recognition in the methodology has run well ahead of translation into an actual capital number.

Climate stress tests (e.g., the 2022 exercise) do extend to 30-year horizons for some modules — better than the two-to-three year BMA horizon — but standard Pillar 1 credit risk models and most ICAAP capital-planning horizons remain short-to-medium term, creating an internal inconsistency between the long-run scenario work and the horizon over which capital is actually sized (ECB, 2022a). The observable time-horizon mismatch may be less severe than for demographic change, yet it remains relevant.

The ECB has itself acknowledged persistent data and methodological gaps (emissions data, granular sector pathways, scenario dependency) that make quantification unreliable. The observed deep model/data uncertainty entails that a risk can be *named* under Elements 2 and 3 of the SREP framework without being *sized* with any confidence, which weakens the credibility of any resulting capital add-on. It is unclear and impossible to assess from the outside which qualitative supervisory interventions respond to identified C&E risks on the level of individual banks and how effective they are.

### 2.2.4. Growing interlinkages between banks and NBFIs

Element 3 (Risks to capital) is well suited to incorporate counterparty credit risk (repo, prime brokerage, derivatives exposures to funds), concentration risk, and market risk from correlated fire-sale dynamics if NBFIs deleverage simultaneously into the SREP framework. Element 4 (Liquidity and funding) can capture the interconnection through funding markets: liquidity lines extended to NBFIs, reliance on repo/securities-lending markets in which NBFIs are large counterparties, and redemption-driven contagion channels. Reliance on NBFI-facing revenue lines (financing to private credit/private equity funds, custody, prime brokerage) as a growth driver enters through Element 1 (Business model) into the SREP framework. Finally, adequacy of look-through risk management and due diligence on opaque, leveraged counterparties (an area the ECB has flagged directly: "complex exposures to private equity and credit funds require sophisticated risk management") is relevant through Element 2 (Governance) for the SREP.

SREP is, by design, an entity-by-entity assessment of an individual bank's risk profile. NBFI interlinkages are fundamentally a system-wide, cross-sectoral risk — the danger is not any single bank's exposure to any single fund, but correlated, common exposures across many banks and many funds simultaneously (as seen in episodes like the 2022 UK Liability-Driven Investment stress or Archegos). A bank-by-bank Pillar 2 add-on is a poor substitute for macroprudential tools (large exposure limits, ESRB-level recommendations, or NBFI-side leverage limits) that actually address the systemic channel.

In this respect, a well-known supervisory perimeter gap exists. Banks fall under CRD/CRR and ECB/NCA supervision; the NBFIs on the other side of these exposures (funds, insurers) are supervised separately (ESMA, EIOPA, national securities regulators), often with far less granular leverage and liquidity data available to the bank supervisor. Element 3's counterparty credit risk assessment can only be as good as the look-through data the bank itself has — and opacity of underlying fund leverage is precisely the known weak point.

Standard capital metrics may understate the risk. Current large-exposure and counterparty-credit-risk frameworks were not built with today's scale of private credit/leveraged fund financing in mind; a technically "well-collateralised" repo or margin exposure can still transmit severe stress if the

counterparty faces a sudden, correlated redemption or margin-call shock — a dynamic risk-to-capital metrics under Element 3 may not be well designed to capture ex ante.

### 2.2.5. Cross-cutting assessment

Across all four risks, five recurring structural tensions emerge:

**Table 1:** Structural tensions across risks

| Tension | Manifestation |
|---|---|
| Time-horizon mismatch | BMA (~2–3 yrs) and most capital models (short/medium-term) vs. multi-decade risks (demographic change, climate transition). |
| Point-in-time score vs. secular drift | The 1–4 constrained-judgement scoring is built for identifiable, bank-specific vulnerabilities, not gradual sector-wide trends. |
| Qualitative recognition ≠ quantitative capital | All four risks are increasingly *named* in governance/business-model assessments but rarely translate into a sized P2R add-on — climate is furthest along this path, but even there, the ECB has been explicit that this remains a work in progress. |
| Exogeneity and system-level origin | Geoeconomic fragmentation and NBFI interlinkages originate largely outside any individual bank's control or even its regulatory perimeter, sitting uneasily with Pillar 2's core logic of reviewing *the institution's own* arrangements and leaving dimensions of these macro-risks not fully addressed. |
| Data and model gaps | Explicitly acknowledged by the ECB for climate transition risk, and structurally worse for NBFI look-through and demographic long-run projections. |

Source: Authors.

The ECB's own supervisory practice is, in effect, a tacit admission of these limits: rather than forcing these risks into one of the four elements, it increasingly treats geopolitical risk and climate and nature-related risk as "cross-cutting drivers" assessed across all four elements simultaneously, and supplements the standard four-element architecture with bespoke tools — thematic reverse stress tests, dedicated on-site inspection campaigns, and horizontal thematic reviews — precisely because the core methodology, built around bank-specific, quantifiable, medium-term risk-to-capital and risk-to-liquidity assessment, is not naturally suited to slow-burning, structural, and often systemic risks of this kind.

### 2.2.6. The 2024–2026 SREP reform: does it close the gaps?

The reform (announced in May 2024 by Chair Claudia Buch (Buch, 2024), based on a 2023 independent expert group report (ECB, 2023a), fully implemented by the 2026 cycle (Buch, 2025); for the actual implementation see ECB (2025b)) is genuinely relevant to addressing the four slow-burning, structural risks discussed. It is, however, best understood as an efficiency reform rather than as a redesign aimed at remedying the tensions we identify above. We next comment in more detail on elements of the reform.

The Risk Tolerance Framework (RTF, since 2023) and the Multi-Year Assessment (MYA) allow supervisors to deprioritise stable areas and concentrate depth-of-review on the highest-priority risks over a multi-year cycle rather than re-assessing everything annually. This is the one genuine structural improvement for slow-burning risks: it explicitly creates room to track a risk (e.g. climate transition, NBFI exposure) across several years rather than forcing it into a single annual snapshot, partially addressing the "time-horizon mismatch" tension.

The revised P2R methodology, to be implemented for the first time during the 2026 supervisory cycle, is explicitly intended to make P2R "more stable, simpler and more transparent," reduce reliance on ICAAP as the calibration anchor, and free up supervisory capacity for "new issues and emerging risks." This targets the "qualitative recognition ≠ quantitative capital" gap directly — but the stated goal is *procedural* stability, not a new quantification methodology for uncertain, non-loss-distribution risks like demographic change or geoeconomic fragmentation.

The tiered follow-up on findings (from July 2025) concentrates supervisory follow-up on the most severe findings (F3/F4 scores), which in principle lets JSTs sustain long-run thematic pressure (e.g. climate transition plans, geopolitical scenario integration) without diluting resources across minor issues.

Even as most ICAAP areas move to multi-year review, baseline/adverse capital-plan scenarios remain assessed *every year*, explicitly because of "long-term economic developments… including geopolitical risks". This exception for an annual assessment of capital plans is a direct, named acknowledgement that this risk needs continuous rather than cyclical attention.

In sum, the reform improves the *process* (fewer redundant annual reviews, sharper prioritisation, more stable P2R) but does not fundamentally re-architect the four elements to better *quantify megatrends or systemic* risks. Demographic change and NBFI interlinkages are not named as reform targets at all; geopolitical risk and climate and nature-related risk get explicit treatment as "cross-cutting" priorities layered on top of the four elements (via thematic stress tests, dedicated newsletters, annual capital-plan review) — reinforcing that the underlying four-element structure still needs external supplementation rather than being redesigned to absorb these risks natively.

# 3. DATA

## 3.1. Data sources

We obtain bank-level P2R data from the ECB Banking Supervision website[9]. P2Rs have been publicly disclosed since the SREP 2019 for all significant institutions (SIs) directly supervised by the ECB.

From Moody's Orbis[10], we obtain end-of-year balance sheet data on total assets, deposits, loans, and non-performing loans. We use these variables to classify banks by business model and study the relationship between P2R and bank characteristics.

We also use data from the EBA Transparency Exercise on global systemically important institutions (EBA G-SII).[11] These data are available since 2013 for the largest EU banks (defined as those with a leverage ratio exposure measure above EUR 200 billion), implying a more limited sample size. From this source, we retain indicators of interlinkages with the non-bank financial sector (deposits from non-banks).

In addition, we use ESG disclosure data published by the EBA (EBA ESG). These disclosures provide information on banks' exposures to sectors that are considered major contributors to climate change and allow us to construct measures of banks' exposure to climate-related transition risk.

We further complement our dataset with the bank-level geopolitical risk measure developed by Haselmann et al. (2025), which quantifies the CET1 capital depletion associated with geopolitical stress scenarios in the 2025 EBA stress test (EBA ST). This measure provides a forward-looking assessment of banks' vulnerability to adverse geopolitical shocks.

Finally, we use demographic statistics from Eurostat, including population counts by age group, to construct country-level measures of population ageing. These data allow us to capture banks' exposure to long-term demographic trends across European countries.

## 3.2. Risk indicators

To understand whether banks with greater exposure to certain financial and non-financial risks tend to face higher P2Rs, we construct a set of risk indicators based on common regulatory practices and the academic literature.

We focus on four "slow-burning" risks: interlinkages with NBFIs, geoeconomic fragmentation, the climate transition, and demographic change. Table 2 summarises the risk indicators used, while the Annex provides further details on their definition and construction.

[9] See https://www.bankingsupervision.europa.eu/activities/srep/pillar-2-requirement/html/index.en.html. As the ECB website retains only the P2R observations from the latest three years, earlier values are recovered from https://web.archive.org/.

[10] Orbis is a global firm-level database providing financial statements and other business information for public and private companies worldwide. For more information, see https://www.moodys.com/web/en/us/capabilities/company-reference-data/orbis.html.

[11] Significant institutions (SI) are the banks supervised directly by the ECB under the SSM, which is the population for which P2R decisions are published; there are around 110 in our sample. Global systemically important institutions (G-SII) are identified under an EBA framework that applies across the EU and captures the largest institutions by leverage exposure, of which around 25 appear here.

**Table 2:** Risk indicators

| Name of risk indicator | As a proxy for | Definition | Data source |
|---|---|---|---|
| NBFI | Interlinkages with non-bank financial institutions (NBFIs) | Share of deposits from NBFIs in total funding from financial institutions | EBA G-SII |
| Geopolitical | Exposure to geoeconomic fragmentation | CET1 capital depletion due to geopolitical risk drivers | Haselmann et al. (2025) |
| Transition | Exposure to sectors vulnerable to the climate transition | Share of loan exposures to sectors contributing to climate change | EBA ESG |
| Ageing | Exposure to demographic change | Reliance on deposit funding from countries with growing elderly populations | Eurostat, Orbis |

Source: Authors.

## 3.3. Bank classification

In our analysis, we group banks according to three different dimensions: business model, ownership and listing status.

Business model classification follows the approach defined in Table 3. We rely on two variables: the ratio of customer deposits to total assets (as a proxy for bank funding composition), and the ratio of bank lending to total assets (as a proxy for asset-side activities). Each bank is assigned to a cluster depending on whether they report values below/above median.

The SSM has its own classification of business models and proposes nine clusters for SIs. However, they do not publicly disclose the methodology used nor the list of banks belonging to each cluster. We therefore rely on this simplified approach that can still be broadly linked to academic literature (e.g. Roengpitya et al., 2017; Farnè and Vouldis, 2021).

**Table 3:** Business model classification

| **Deposits-to-assets** | **Loans-to-assets** | |
|---|---|---|
| | Low | High |
| Low | Trading-oriented | Wholesale |
| High | Securities-holding | Traditional commercial |

Source: Authors.

Bank ownership is defined according to the list of institutions provided by Véron (2017). We are primarily interested in the comparison of public-sector banks against all others (which include cooperative, dispersed, minority influence, nationalised and private control). The banks not mentioned

by Véron (2017) but captured in our P2R sample are pragmatically categorised as having "other forms of ownership" (that is, in the non-public sector).

Lastly, listing status is taken from Orbis. "Unlisted" institutions have never been listed on a stock exchange, while "listed" institutions are those that have been listed since the beginning of the sample period. The last category – "delisted" – is not shown for difficulties in reconciling delisting dates with the timing of SREP decisions.

# 4. EMPIRICAL RESULTS

P2R is the only output of the SREP that is disclosed bank by bank. We use it to ask whether a given risk enters the supervisory assessment. The logic is simple. If supervisors assess a risk and judge it material, it should, all else equal, raise the capital they require. We therefore test whether P2R is associated with each "slow-burning" risk after accounting for the risks the P2R methodology intends to capture, namely size, asset quality, funding structure, and business model. A null result is informative. It means either that the risk is not assessed, or that it is assessed but not translated into a capital add-on. Under both readings, the risk does not reach the one supervisory price that banks and markets can observe. We read the evidence below in this light.

## 4.1. P2R does not track the business cycle

The data show little evidence of a relationship between aggregate P2Rs and the business cycle. Changes in the average P2R do not closely track the evolution of GDP growth (Figure A3). P2Rs are relatively sticky, with average changes of no more than 7 basis points over the sample period, whereas GDP growth fluctuates by as much as 6 percentage points. While the figure may visually suggest some co-movement, this impression partly reflects the different scales on which the two variables are expressed.

Moreover, despite the recovery in GDP growth since 2023, changes in average P2Rs have continued to decline, turning negative in 2025. This pattern is consistent with the role of the P2R as a bank-specific supervisory requirement, which is not intended to reflect aggregate macroeconomic conditions. This matters for what follows. A requirement that does not move with the cycle, and that we show later does not move with slow-burning structural risks either, is left pricing mainly realised, bank-specific risk.

## 4.2. P2R captures conventional risk

While P2Rs do not appear to reflect macroeconomic trends, they do vary systematically with bank characteristics, which is in line with their intended purpose of adjusting to individual bank risk. One relevant dimension of heterogeneity is banks' business models. As a matter of fact, securities-holding banks consistently report higher P2Rs than other groups (Figure A5). These banks typically have large depositor bases but do not engage much in lending. Their higher P2Rs may therefore reflect exposures to risks not fully captured by Pillar 1 requirements, such as interest rate risk in the banking book. They also pose bigger threats to the real economy in case of distress via their heavy deposit business.

Trading-oriented banks have experienced a marked increase in average P2Rs since 2019, rising from 1.75% to 2.06%. In 2019, these banks reported the lowest P2Rs among all business-model groups; by 2025, they had moved to the second-highest position. As with securities-holding banks, this increase may reflect growing exposure to risks that are not fully captured by Pillar 1 in an environment of positive interest rates.

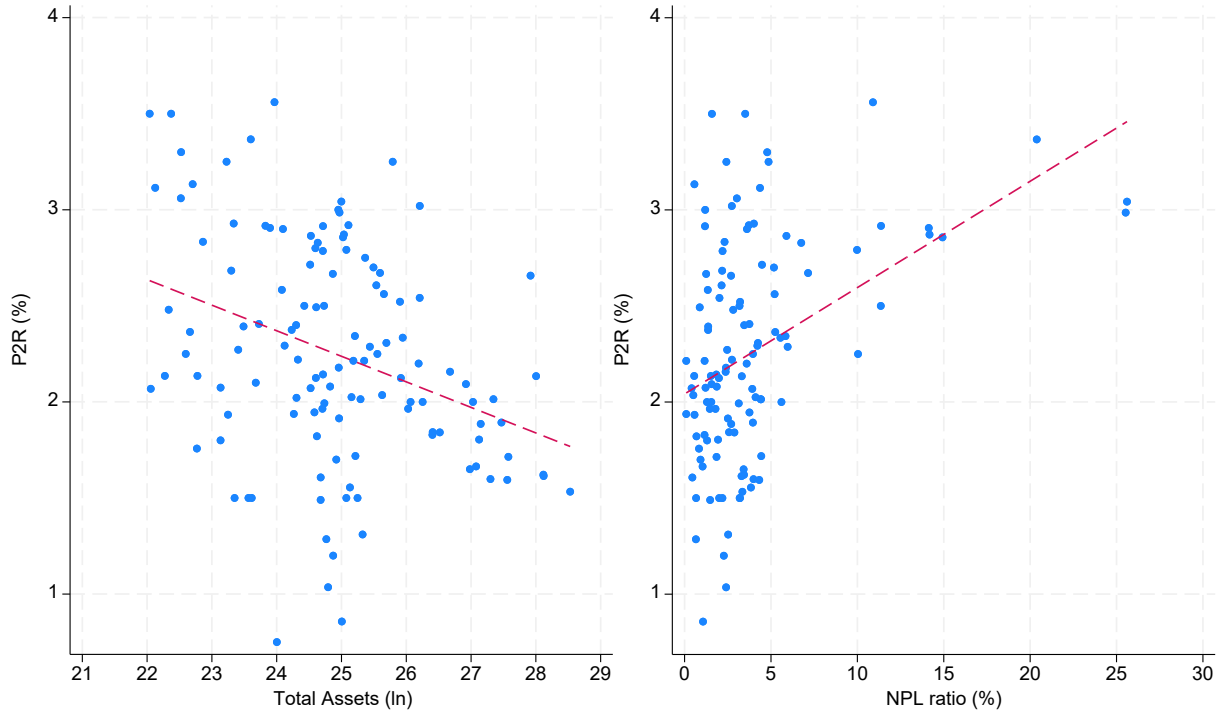
Finally, wholesale banks typically have lower P2Rs than traditional commercial banks. These two groups are similar in that both engage actively in lending, but they differ in their funding structures. Banks with greater reliance on retail deposits tend to face higher average P2Rs, consistent with the view that such institutions warrant closer protection through more stringent capital requirements because of the special role of deposits for financial stability.

Average P2Rs also vary with bank size. As shown in Figure 1, there is a clear negative relationship between bank-level P2Rs and total assets, with larger banks generally reporting lower P2Rs. This

pattern is consistent with the notion that larger institutions benefit from greater diversification across their activities and therefore require less additional capital. At the same time, P2Rs display considerable dispersion among medium-sized banks, suggesting that bank size alone explains only part of the cross-sectional variation and that other bank-specific characteristics also play an important role.

Figure 1 further shows a positive relationship between P2Rs and non-performing loan (NPL) ratios, a standard measure of credit risk. Banks with higher NPL ratios tend to face higher P2Rs, consistent with supervisors assigning additional capital requirements to institutions with elevated credit risk. This relationship becomes particularly pronounced once NPL ratios exceed 5%. Below that threshold, however, P2Rs exhibit substantial variation, indicating that factors beyond NPL ratios are likely to influence supervisory capital requirements.

**Figure 1:** Average P2R by Bank Size and NPL Ratio




Source: Authors' calculations, based on ECB Banking Supervision and Orbis. *Notes: P2R (%) is the bank-by-bank average P2R. Panel 1: Total assets (ln) is the logarithm of bank-by-bank average assets in 2019-2025. Panel 2: NPL ratio (%) is the bank-by-bank average ratio of non-performing loans over gross loans in 2019-2025. Each dot represents one bank with average values over the sample period (2019-2025).*

## 4.3. P2R does not track slow-burning risks

In contrast to characteristics such as business model, size, and credit risk exposure, there is little evidence of a systematic relationship between P2Rs and slow-burning risks. As shown in Figure 2, none of the selected risk indicators exhibit a strong association with P2R levels.[12] Considerable heterogeneity

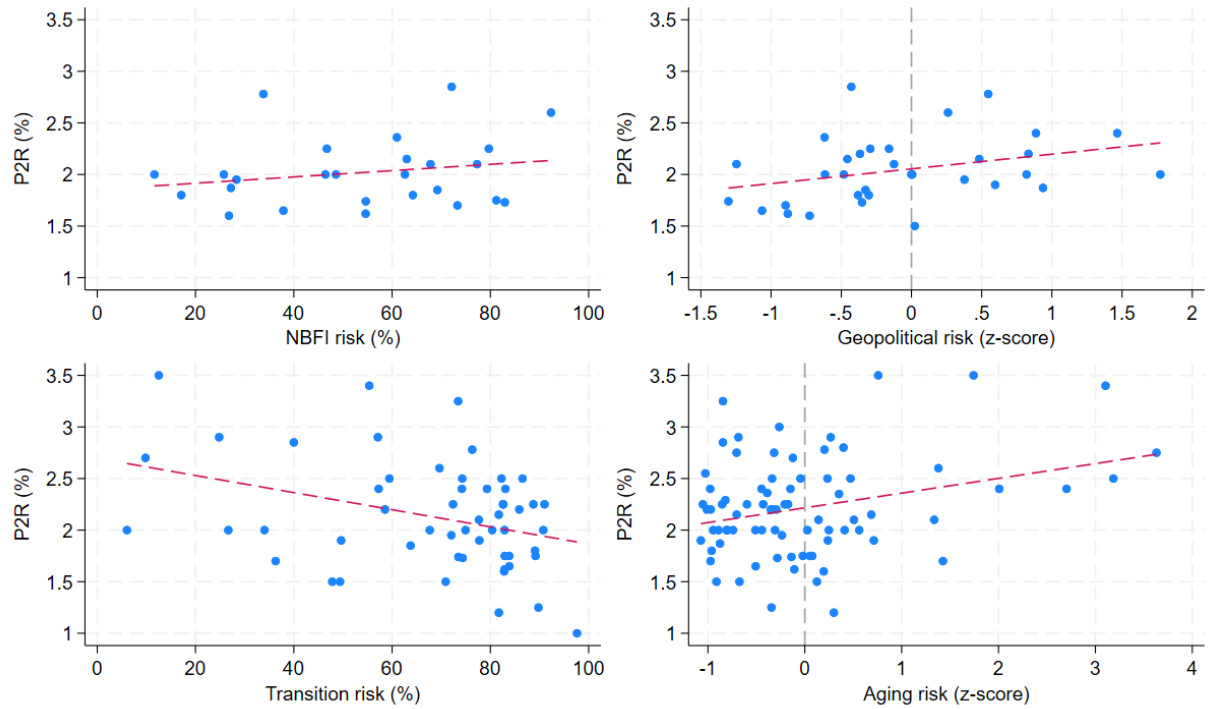
[12] In the Annex we show the scatterplots without the regression line. In this way, the reader is not primed to recognise an association between slow-burning risks and the P2Rs. Just seeing the scatterplot indicates that these associations are weak, except maybe for demographic change.

remains, with banks that have similar P2Rs nevertheless displaying markedly different profiles along dimensions of slow-burning risks.

This weak relationship is particularly evident for exposure to NBFI funding (Panel 1). At a given level of P2R, banks exhibit substantial variation in their reliance on NBFI funding. For example, in 2025, banks with a P2R of around 2% had NBFI funding ratios ranging from just below 20% to nearly 80%. This dispersion is reflected in the relatively flat slope of the fitted trend line. Similarly, geopolitical risk shows a weak relationship with P2R in the raw data (Panel 2).

Transition risk enters with a negative sign. Banks more exposed to carbon-intensive sectors tend, if anything, to have lower P2Rs. The likely reason is that these exposures were profitable over the sample period. This raised realised profits and asset quality. If P2R tracks realised performance rather than forward-looking risk, a negative sign is what we should expect. The result suggests that P2R may be less responsive to risks that are still building and whose financial effects are expected to emerge only over a longer horizon. Climate transition risk has been part of the SREP assessment since 2021, yet this has not translated into a capital signal.

**Figure 2:** P2R by exposure to slow-burning risks in SREP cycle 2025




Source: Authors' calculations, based on ECB Banking Supervision, EBA G-SII, Haselmann et al. (2025), EBA-ESG, Orbis and Eurostat. *Notes: P2R (%) is the bank-by-bank P2R determined in SREP cycle 2025. Panel 1: NBFI risk (%) is the bank-by-bank ratio of deposits from non-depository financial institutions to overall funding from financial institutions in end-2024. Panel 2: Geopolitical risk (z-score) is the bank-by-bank standardised CET1 depletion attributable to geopolitical risk in EBA Stress Test 2025 (higher z-scores represent higher bank exposure to geopolitical risk). Panel 3: Transition risk (%) is the bank-by-bank ratio of exposures to sectors highly contributing to climate change over all corporate exposures in 2025-Q2 (higher values represent higher bank exposure to transition risk). Panel 4: Ageing risk (z-score) is the bank-by-bank standardised exposure to ageing countries, defined as the product of the deposits-to-assets ratio and the growth rate of population aged 75 years and above between 2015-2025 in the country where the bank is based (higher z-scores represent higher bank exposure to ageing depositor bases). Z-scores are calculated by subtracting the sample mean from each observed value and dividing by the sample standard deviation; they facilitate interpretation since geopolitical and ageing risk exposure measures are not bounded between 0-100%. Each dot represents one bank in SREP cycle 2025.*

Exposure to population ageing is positively related to P2R. Although the trend line in Panel 4 is steeper than, for example, those in Panels 1 and 2, there is still considerable heterogeneity around the origin. This suggests that the positive relationship may be driven primarily by outlier banks with particularly high exposure to ageing risk. These highly exposed banks tend to exhibit higher P2R levels, whereas the relationship is much less apparent among banks with low levels of ageing risk exposure.

To check whether the patterns shown in Figure 2 simply reflect differences in banks' size, business models, funding structures, or credit risk, we carry out an additional analysis in Annex E (Table E1) that accounts for these characteristics. The results provide evidence that the four slow-burning risks are not reflected in P2Rs. The estimated coefficients are mostly weak, or insignificant, and disappear once differences across countries are considered. This suggests that part of the observed relationship between P2Rs and these structural risks reflects broader country-level factors rather than differences between banks themselves.

# 5. ASSESSMENT AND POLICY IMPLICATIONS

The conceptual assessment in Section 2 shows that each of the four slow-burning risks can be located somewhere in the four elements of the SREP. None of them maps onto a single element, and each runs into the same five tensions:

- the assessment horizon is two to three years, while the risks play out over decades;
- the 1 to 4 scoring is built to identify weaknesses in a particular bank, not gradual trends across the sector;
- the methodology names these risks but does not measure them, so recognition does not translate into a number for bank capital;
- the risks originate outside an individual bank, and for non-bank interlinkages outside the supervisory perimeter altogether;
- the data and models needed to quantify them are, on the ECB's own account, incomplete.

The empirical analysis in Section 4 examines the one outcome of the SREP that is disclosed bank by bank. Three findings stand out. First, the P2R varies systematically with conventional, bank-specific risk: it is higher for banks with weaker asset quality, it differs across business models and ownership types, and it declines with bank size. Second, it does not move with the business cycle, which is consistent with its design as a microprudential requirement. Third, it does not vary in a consistent and statistically significant way with our proxies for the four structural risks.

Three limitations need to be stated plainly, because they bound what can be concluded. First, we observe the outcome, not the assessment. The P2R is one output of the SREP. Supervisory scores, the qualitative measures imposed on individual banks, and the Pillar 2 Guidance are not disclosed bank by bank. The absence of a relationship in the P2R is therefore consistent with three quite different situations: the risk is not assessed; it is assessed but not translated into a capital requirement; or it is assessed and addressed through instruments we cannot observe. We cannot distinguish between them from the outside. Second, the evidence is drawn from a single cross-section and from a small number of large institutions. It cannot support a causal claim, and it has limited power to detect a modest relationship. Third, our proxies for slow-burning risks are likely to be noisy and thus bias against finding a robust relationship between those risks and P2R outcomes.

Nevertheless, our finding is that structural risks do not reach the one supervisory outcome that banks, investors and other outsiders can observe. What reaches observable outcomes are traditional measures of individual bank risk.

Our results should not be read as evidence that the SREP is failing to address risks it ought to address. These risks sit outside what the process was built to do. The basis of the SREP is a review of the arrangements, strategies, processes and mechanisms that an institution has itself put in place, together with an evaluation of the risks to which it is exposed. The power to impose an additional own-funds requirement is conditional: the supervisor must identify a specific risk that is not covered, or not adequately covered, by the Pillar 1 minimum, and must justify the amount imposed (Article 104 CRD IV). Both conditions are demanding when applied to a slow-moving structural trend. There is no exposure to measure in the way that a credit portfolio can be measured, no ICAAP quantification from which an add-on could be derived, and no counterfactual against which a supervisory judgement could be defended if challenged.

Our findings also highlight the conceptual shortcomings of the current SREP methodology: it suggests a high degree of quasi-scientific precision despite involving significant supervisory judgement in

scoring; moreover, it faces built-in restrictions in translating SREP scores into capital add-ons which require an anchor at an ICAAP line-item, not always available for slow-burning risks.

One should not, however, rush to the conclusion that because these slow-burning risks are common to the whole sector, a bank-specific instrument like the P2R is not suitable. Even though these are structural risks, individual banks' exposure to them varies. A bank funded largely by deposits in a rapidly ageing region is more exposed to demographic change; a bank that has built a financing franchise for leveraged non-bank vehicles is differentially exposed to the movement of credit outside the banking system.

The key factor in our view is the mismatch between the horizon of slow-burning risks and the horizon of the SREP. The supervisor's business model assessment tests the credibility of a business and financial plan over roughly two to three years. A risk that materialises in year fifteen does not make a three-year plan implausible. In any given cycle, deferring the question is a defensible judgement. Moreover, a bank cannot be asked to hold capital against a multi-decade trend on the basis of a P2R whose commitment horizon is short, typically twelve months. And a supervisor cannot credibly promise that the requirement will still be there when the risk arrives in the future.

Inaction by the supervisor is therefore a rational course. One possibility is that the supervisor waits until the structural trend becomes visible in realised performance, at which point it is no longer a structural risk but a conventional one: weaker margins, weaker asset quality, a less credible plan. It then leads to higher capital requirements because of credit or profitability risk. A cross-section such as ours will then show the P2R loading on realised risk and not on the underlying structural exposure, which is consistent with what our evidence shows.

The question then is: what is the right instrument to instruct banks to hold capital against such structural risks? One further feature of these risks narrows the field. They are one-sided. Demographic change does not reverse over a supervisory horizon; the migration of credit intermediation to non-banks is not expected to unwind; the energy transition has a direction. This distinguishes them from cyclical risk, where a build-up phase is followed by a release phase. We examine each instrument in the capital framework in turn. The exercise is instructive because the instruments that match the horizon of structural risks do not allow for differentiation between banks, and the instrument that allows for differentiation does not match the horizon.

The P2R is bank-specific and differentiated but it is an annual and discretionary instrument, conditional on a quantified, Pillar 1-uncovered risk. Its short horizon cannot, as explained above, address these slow-burning, structural risks.

The P2G may seem a natural place for these risks because it is a forward-looking, stress-based output of the SREP. Several features, however, make it unsuitable. It is not binding, so falling below it triggers no consequence. It is also not disclosed bank by bank, so neither markets nor other outsiders can observe whether it responds to structural risk. And it is re-set annually, so it inherits the same commitment problem as the P2R. A supervisory expectation that carries no enforcement and no disclosure is a weak instrument against real risks.

The CCyB is designed to be built up in good times and released in bad ones. The slow-burning risks we consider instead are one-sided. They will most likely not reduce in the future, so that the CCyB would never be released for those risks. Moreover, using the countercyclical buffer for a structural trend would consume the one instrument reserved for the cycle and send a misleading signal about what the buffer measures.

The CCoB would lead to a permanent increase in the level of required capital, which is more in line with the long-term horizon of structural risks. But two considerations weigh against it. The buffer is uniform across banks at 2.5% of risk-weighted assets, so raising it would charge exposed and unexposed banks alike. And its function is to make capital usable: the point of the buffer is the ladder of distribution restrictions that applies when a bank operates within it. Raising it produces a releasable buffer where structural risks call for a more permanent, but bank-specific, floor on capital.

Buffers for global and other systemically important institutions (G-SII and O-SII buffers) cannot, at this stage, address slow-burning, structural risks either, because these risks are different from the systemic importance of a particular institution (e.g., a bank is systemically important if it occupies a central role in the payment system, is connected through its business with many other banks, or simply is very large in size). Moreover, O-SII buffers are decided by national designated authorities for all relevant banks. They do not take into account the exposure of individual banks to common risks. Set at the national level, and with the ECB able to require a higher buffer than a national authority has set, these buffers have been applied unevenly across countries in the Banking Union (Greco et al., 2025).

The SyRB is the closest fit in legal terms. The CRD provides for the systemic risk buffer to address macroprudential or systemic risks of a long-term, non-cyclical nature that are not covered by the CRR or by the other buffers. That matches the nature of the structural risks we consider. But there are two problems that in our view limit the suitability of the SyRB to address these slow-burning risks. First, as with the O-SII buffers, the SyRB is decided by national authorities. It does not reflect a common framework across the Banking Union to address individual bank exposures. Second, the SyRB is a macroprudential instrument aimed at the banking system or at a particular sector of the economy (e.g., real estate), whereas we are concerned about bank-specific exposure to common structural risks.

The pattern across all existing capital buffers is as follows: Instruments with the right horizon — the conservation buffer, the buffers for systemically important institutions, the systemic risk buffer — are uniform, or directed at systemic importance rather than at structural risks, or set at national instead of the SSM level. The instrument with the right differentiation — the P2R — is annual and discretionary. Neither combination fits a risk that is common in origin, differentiated in exposure across banks, permanent in one direction, and with a long-term horizon.

Finally, even though the SREP rests on an EU directive, which normally leaves room for national divergence, it has become one of the more harmonised parts of the Banking Union through the common SSM methodology. In contrast, the macroprudential toolkit, which is where the instruments potentially have the right horizon, remains largely national, notwithstanding the ECB's top-up power. As structural risks are common across Member States, but banks are differentially exposed to them, the harmonised SREP layer is where they belong, provided the horizon problem is addressed.

In the following sections, we set out two recommendations and one option for further consideration, ordered from the least to the most demanding in terms of the ease with which they could be implemented.

## 5.1. More disclosure of SREP outcomes

Whether and how the SREP captures structural risks cannot be settled from outside, because only the P2R, a limited part of the overall supervisory outcome, is public information. This is a constraint on our analysis, and it is a constraint on all public scrutiny of the SSM.

We recommend that the ECB publishes, bank by bank, the Pillar 2 Guidance alongside the Pillar 2 Requirement, and that it reports, at least in aggregate and by risk category, whether the four structural

risks discussed here have given rise to qualitative measures, to changes in element scores, or to capital consequences.

This recommendation allows the analysis in this paper to be repeated on the forward-looking part of the supervisory outcome rather than only on the backward-looking part and therefore makes it possible to assess supervisory action on structural risks more directly instead of inferring it.

## 5.2. Match the horizon of the bank-specific instrument to the horizon of structural risks

The reform introduced with the 2026 SREP cycle moves parts of the supervisory assessment onto a multi-year setting through the risk tolerance framework and the multi-year assessment. As Section 2.2.6 sets out, this is the element of the reform with the clearest relevance to slow-burning risks, because it creates room to follow a risk across several cycles rather than compressing it into one annual snapshot.

We recommend extending that logic from the assessment to the outcome of the SREP. Where a supervisor identifies a material structural exposure, it should set out a multi-year, announced capital trajectory for that exposure rather than a requirement that is re-decided each year.

However, the quantification problem remains. A supervisor who cannot assess the size of a risk this year cannot quantify a trajectory for it either. It does, however, change the discipline of the supervisory process, because it closes the option to defer an assessment of structural risks into the future. Additionally, it raises the burden of justification on the supervisor as banks are likely to contest such requirements. This is the cost of enhanced supervision but not a fundamental argument against it.

## 5.3. An exposure-based instrument where losses cannot be assessed

The main difficulty when adding capital under the Pillar 2 framework is that the supervisor must attach a concrete amount of capital to a specific risk (Article 104 CRD), which in practice is anchored on the bank's own ICAAP quantification. This is difficult, and certainly has not happened yet, for slow-burning, structural risks. But this need not stop the quest for more capital to address these risks. The large-exposure regime of Pillar 1 provides a harmonised approach across the Banking Union to limit exposure to risks without being able to calculate expected losses.

One possible way forward is to treat an exposure to structural risks in the same way as large exposures in Pillar 1: as an exposure class with harmonised limits rather than as losses that require a capital add-on. Possible candidates for such exposure classes are the concentration in sectors exposed to the energy transition, and funding and counterparty exposure to leveraged NBFIs.

Such a change, however, would require better definitions of the exposure classes. Our own transition-risk indicator, built on the current EBA taxonomy, classifies two thirds of the aggregate average corporate book of banks as exposed, which is too broad for an effective limit. Similarly, it may be difficult to assess the full extent of the exposure of a bank to leveraged NBFIs as the real risks are likely to be hidden further down the intermediation chain and outside the strict regulatory perimeter.

## 5.4. On complementing the SREP with a bank-specific systemic assessment

Our original question was whether there is merit in complementing the SREP, a primarily microprudential tool, with a bank-specific assessment of systemic resilience or interconnectedness.

We see limited merit in adding a further bank-specific assessment. Supervisors already assess these risks through business model analysis, thematic reviews, reverse stress tests and the climate exercises.

The constraint is that the outcome of these assessments is not observable and that no capital-buffer instrument matches the horizon of the risk at the moment. A new assessment layered on top of existing elements would add process without addressing either constraint, and the 2023 external review concluded that the SREP was already too process-heavy.

Importantly, our results do not establish that the supervisory process is deficient. Once conventional risk, bank size and country are held constant, exposure to the four structural risks is unrelated to the P2R (Table E1), and one admissible reading is that supervisors have assessed these risks and judged that they do not yet warrant a capital add-on. The gaps we identify come from the framework itself, as set out in Section 2: the two-to-three year horizon of the business model assessment, and the requirement under Article 104 CRD IV to justify a specific amount for a specific risk. Our evidence on P2R is consistent with such limitations of this instrument.

Finally, it should be noted that more bank capital is not the whole answer to structural risk. Where a slow-burning risk erodes the viability of an entire business model, the relevant supervisory instrument is the assessment of the business model. Capital buys time; it does not repair an unviable franchise. Assessment of business models is a key element of the SREP.

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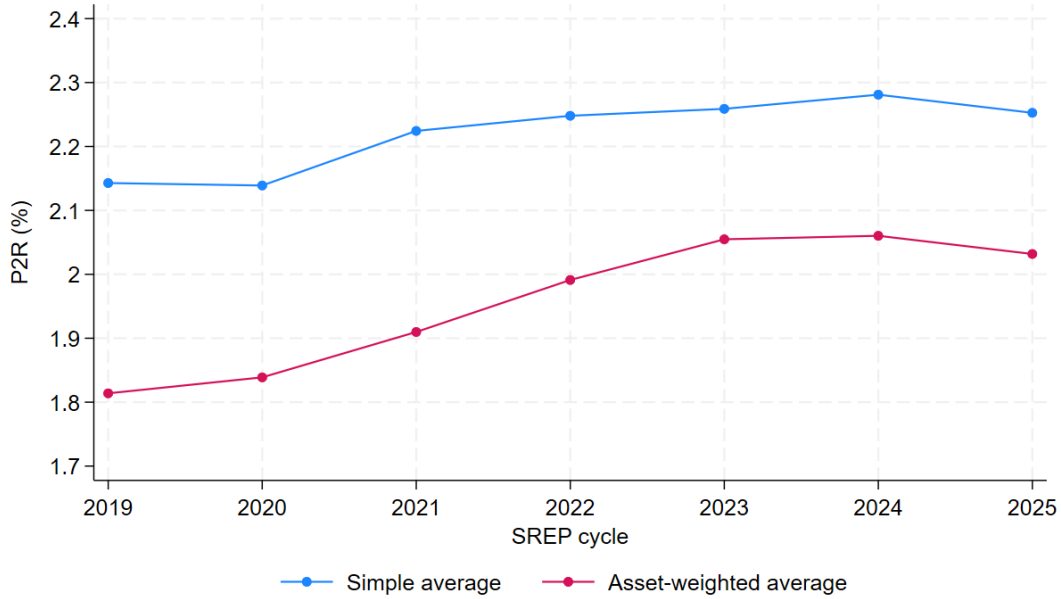
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# ANNEX

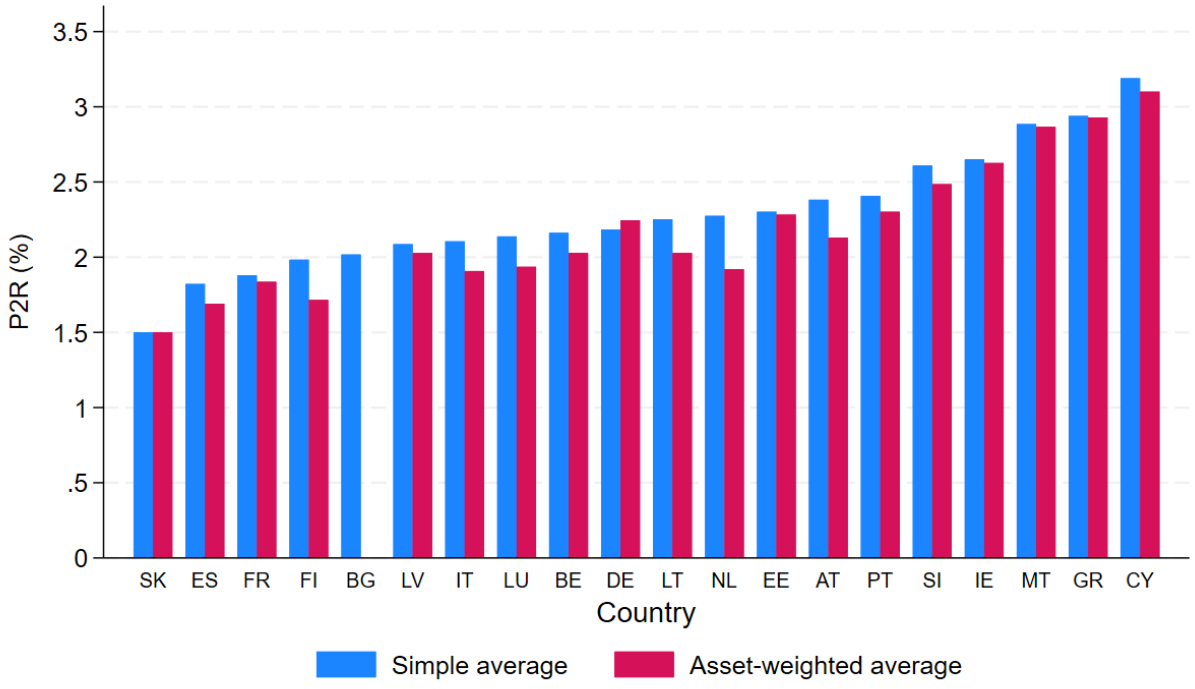
## A. Additional figures

**Figure A1**: Average P2R over the years



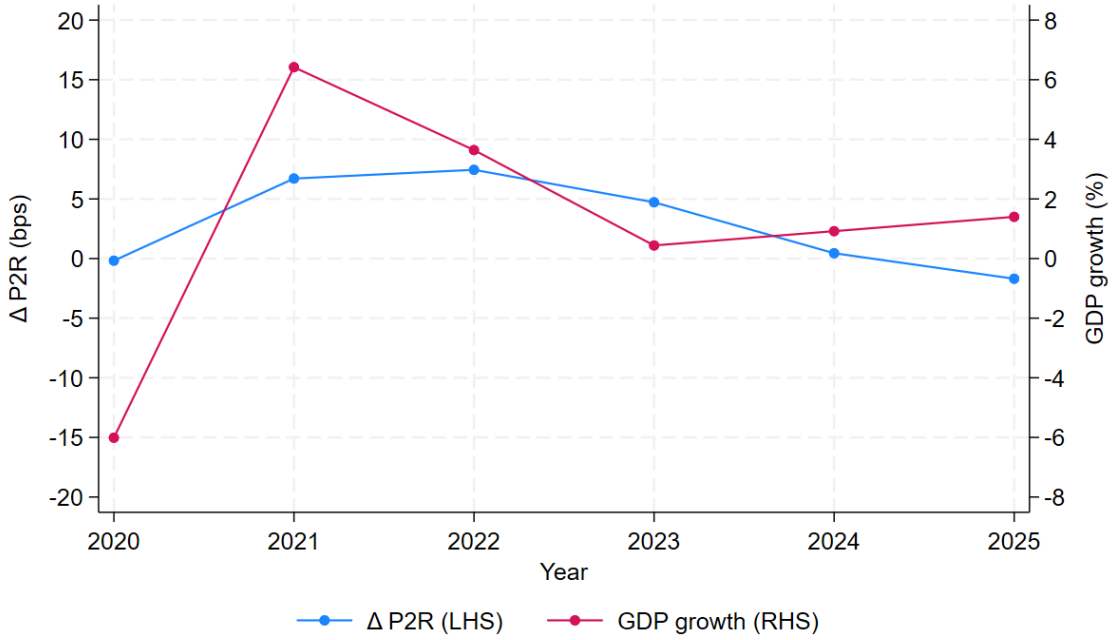

Source: Authors' calculations, based on ECB Banking Supervision and Orbis. *Notes: simple averages are calculated using the full P2R sample. Weighted averages are calculated using total assets (when available).*

**Figure A2**: Average P2R across countries



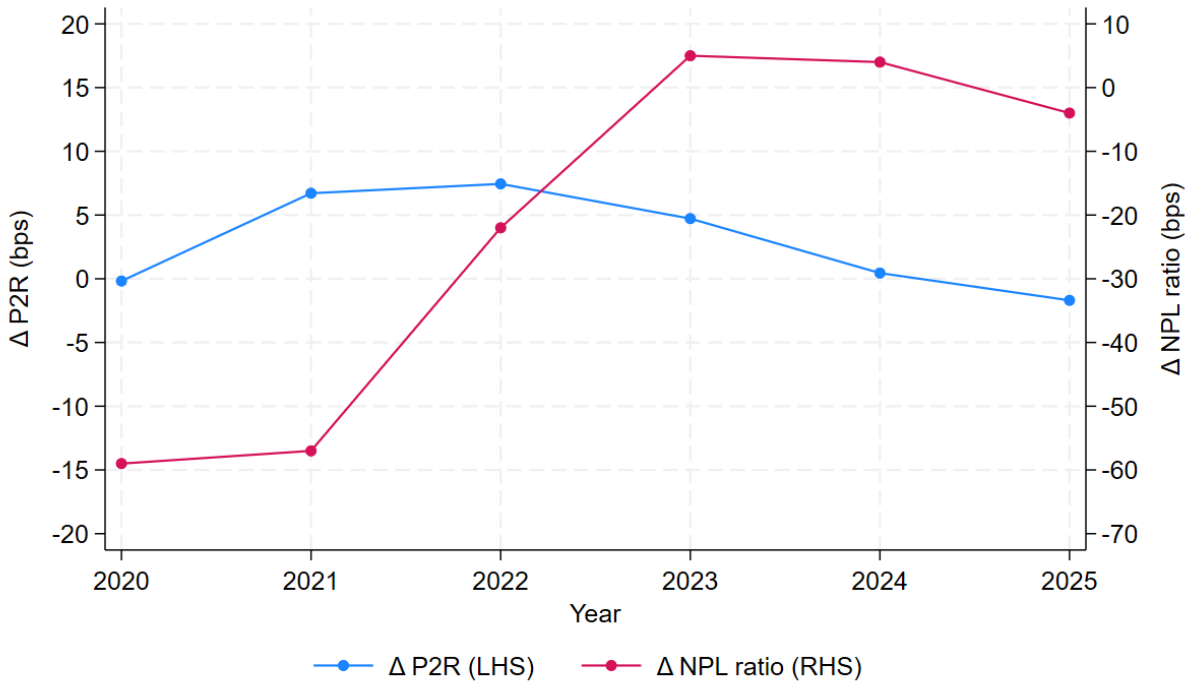

Source: Authors' calculations, based on ECB Banking Supervision and Orbis. *Notes: simple averages are calculated with the full P2R sample. Weighted averages are calculated using total assets (when available).*

**Figure A3**: Average change in P2R and GDP growth



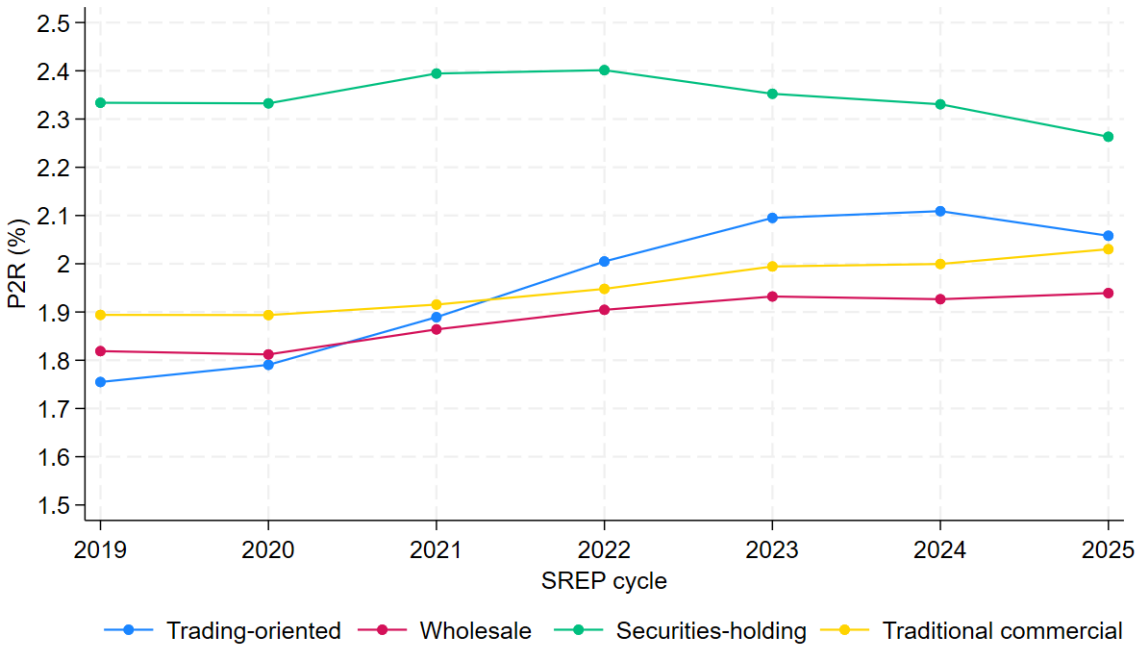

Source: Authors' calculations, based on ECB Banking Supervision and ECB Data Portal. *Notes: ΔP2R is the asset-weighted average change of bank-level P2Rs from SREP cycles t-1 to t. GDP growth is the growth rate from years t-1 to t.*

**Figure A4**: Average change in P2R and NPL ratios



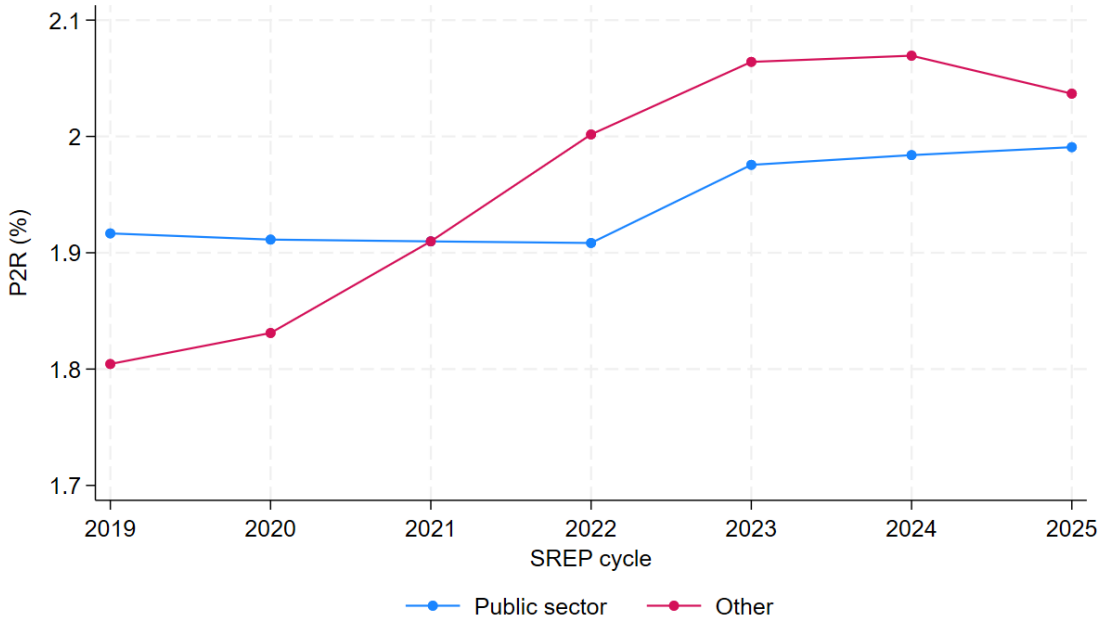

Source: Authors' calculations, based on ECB Banking Supervision and ECB Data Portal. *Notes: ΔP2R is the asset-weighted average change of bank-level P2Rs from SREP cycles t-1 to t. ΔNPL ratio is the change in the aggregate NPL ratio from years t-1 to t.*

**Figure A5**: Evolution of P2R by Business Model




Source: Authors' calculations, based on ECB Banking Supervision and Orbis. *Notes: P2R (%) gives the cross-sectional asset-weighted average P2R of each SREP cycle. Business models are defined using the median values of deposits-to-assets and loans-to-assets ratios.*

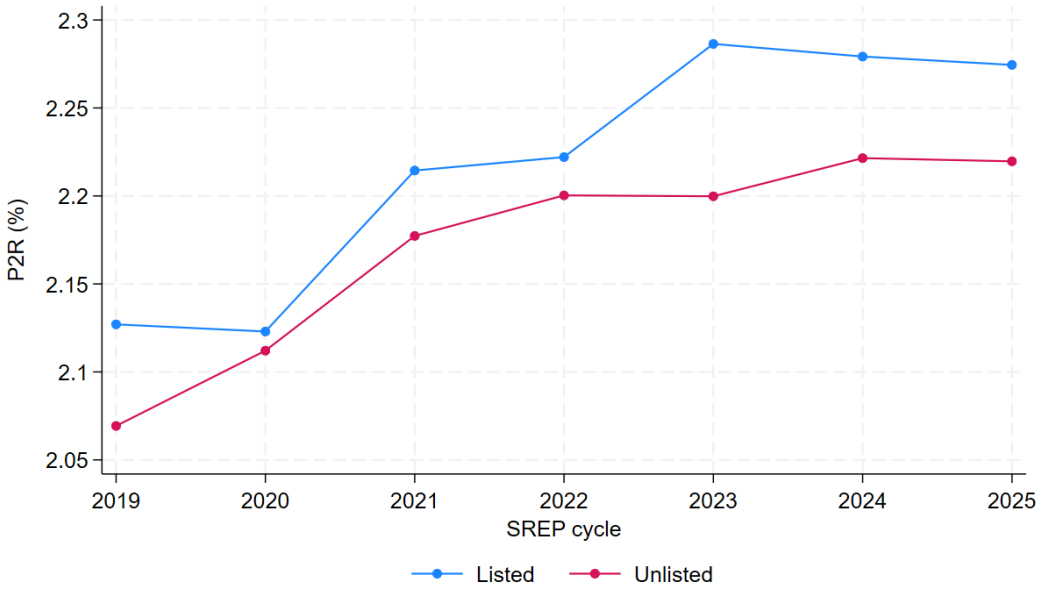
**Figure A6**: Evolution of P2R by Bank Ownership




Source: Authors' calculations, based on ECB Banking Supervision, Orbis and Véron (2017). *Notes: P2R (%) gives the cross-sectional asset-weighted average P2R of each SREP cycle. Bank ownership is defined according to the list of institutions provided by Véron (2017). "Public sector" includes: LBBW, La Banque Postale, BayernLB, NORD/LB, Landesbank Helaba,*

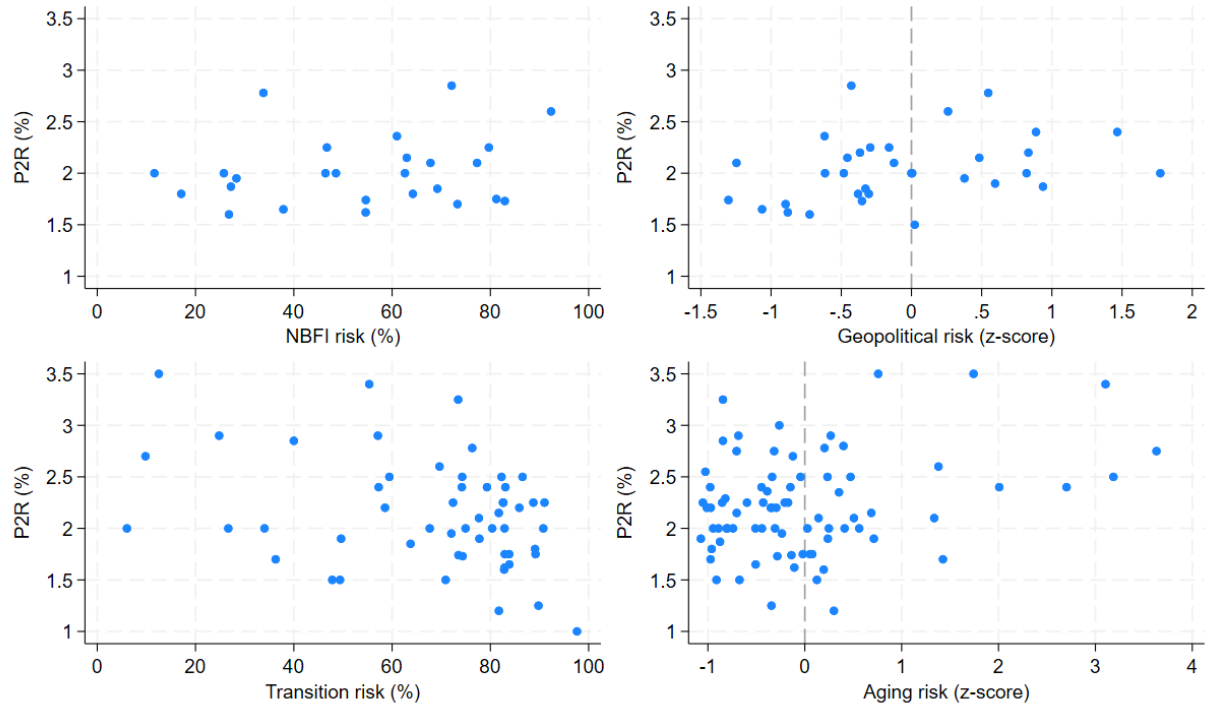
*BNG Bank, HSH Nordbank, Caixa Geral de Depósitos, Nederlandse Waterschapsbank, Erwerbsgesellschaft der S-Finanzgruppe, SFIL, HASPA, Bpifrance, Banque et Caisse d'Epargne de l'Etat, Kuntarahoitus (MuniFin) and Nova Ljubljanska Banka. All remaining banks are included under "Other" forms of ownership (cooperative, dispersed, minority influence, nationalised and private control).*

**Figure A7**: Evolution of P2R by listing status




Source: Authors' calculations, based on Orbis. *Notes: P2R (%) is the bank-by-bank (simple) average P2R. Listing status can either be "Unlisted" if the institution was never listed in a stock exchange or "Listed" if the institution has been listed since the beginning of the sample period. "Delisted" institutions are not included.*

**Figure A8**: P2R and slow-burning risks (without regression line)




Source: Authors' calculations, based on ECB Banking Supervision, EBA G-SII, Haselmann et al. (2025), EBA-ESG, Orbis and Eurostat. *Notes: P2R (%) is the bank-by-bank P2R determined in SREP cycle 2025. Panel 1: NBFI risk (%) is the bank-by-bank ratio of deposits from non-depository financial institutions to overall funding from financial institutions in end-2024. Panel 2: Geopolitical risk (z-score) is the bank-by-bank standardised CET1 depletion attributable to geopolitical risk in EBA Stress Test 2025 (higher z-scores represent higher bank exposure to geopolitical risk). Panel 3: Transition risk (%) is the bank-by-bank ratio of exposures to sectors highly contributing to climate change over all corporate exposures in 2025-Q2 (higher values represent higher bank exposure to transition risk). Panel 4: Ageing risk (z-score) is the bank-by-bank standardised exposure to ageing countries, defined as the product of the deposits-to-assets ratio and the growth rate of population aged 75 years and above between 2015-2025 in the country where the bank is based (higher z-scores represent higher bank exposure to ageing depositor bases). Z-scores are calculated by subtracting the sample mean from each observed value and dividing by the sample standard deviation; they facilitate interpretation since geopolitical and ageing risk exposure measures are not bounded between 0-100%. Each dot represents one bank in SREP cycle 2025.*

## B. Panel construction

In the bank-level P2R data from the ECB Banking Supervision website, banks are identified by name only. We recover Legal Entity Identifier (LEI) codes from the ECB's annual Pillar 3 publication.

This enables us to construct a panel of banks and SREP cycles. A SREP cycle is the year in which the P2R decision is taken, becoming applicable only in the following year. For example, the outcome of the SREP 2021 cycle is the P2R applicable from January 2022.

We merge P2R data with Orbis using bank LEI codes and year. Each SREP outcome is matched to balance-sheet information from the previous year, reflecting the fact that SREP assessments are largely based on regulatory data available at that time. For example, when calculating the weighted average P2R for SREP 2021, we use the P2Rs decided in SREP 2021 weighted by total assets at end-2020.

## C. Definition of risk indicators

To capture interlinkages between banks and non-bank financial institutions (NBFIs), we rely on EBA G-SII data. We measure NBFI funding dependence at the bank-level as the share of deposits from non-depository financial institutions in total funding obtained from financial institutions. Higher values of this measure indicate a greater reliance on funding provided by NBFIs and, consequently, stronger funding linkages between banks and the non-bank financial sector.

$$NBFI\ risk\ indicator_i = \frac{Deposits\ from\ NBFIs_i}{Total\ funding\ from\ FIs_i}$$

To proxy for exposure to geoeconomic fragmentation, we use the geopolitical risk measure developed by Haselmann et al. (2025), which quantifies the CET1 depletion attributable to geopolitical risk drivers in the 2025 EBA stress test relative to earlier stress-testing exercises. Higher values indicate greater exposure to geopolitical risk.

$$Geopolitical\ risk\ indicator_i = \Delta CET1\ depletion_i$$

Our climate transition risk indicator follows the EBA approach and is defined as the ratio of exposures towards sectors considered major contributors to climate change (e.g., coal mining, manufacturing of motor vehicles) over total exposures. Higher values of this measure indicate greater vulnerability to losses arising from the transition to a low-carbon economy.

$$Transition\ risk\ indicator_i = \frac{Exposure\ to\ climate\text{-}change\text{-}intensive\ sectors_i}{Total\ exposures_i}$$

To capture banks' exposure to demographic change, we use a measure of exposure to population ageing adapted from Doerr et al. (2024). We define it as the product of a bank's deposit-to-assets ratio and the 10-year population growth of individuals aged over 75 in the country where the bank is headquartered13. Higher values of the measure indicate that a bank is more exposed to population ageing, either because it relies more heavily on deposit funding or because it is mainly operating in a country experiencing faster growth in its elderly population.

$$Ageing\ risk\ indicator_i = \frac{Customer\ Deposits_i}{Assets_i} \times \Delta\%\ Pop75^{+}_{c(i)}$$

Not all risk indicators are available throughout the sample period covered by our P2R dataset. The geopolitical risk indicator is available only for the 2025 SREP cycle, as it is based on the results of the 2025 EBA stress test. Likewise, the transition risk indicator can only be constructed for the 2025 SREP cycle because the relevant EBA ESG disclosures became available through the EBA Data Hub only from Q2 2025 onward. On the other hand, the NBFI and ageing risk indicators can be computed annually for the matched subset of banks.

To ensure a consistent analysis across all risk dimensions, our main focus is on the 2025 SREP cycle snapshot. Given the slow-moving nature of these risks, we believe that cross-sectional analysis still deserves merit as we would not expect the measures to vary significantly over time.

[13] Note that Doerr et al. (2024) present a more granular measure based on regional data on deposits and demographics. Owing to data limitations on the geographical distribution of deposits, we are unable to fully replicate their approach. This alternative bank-country measure has the limitation that larger banks are typically more internationally diversified and may therefore depend less on the deposit base of their home country.

## D. Descriptive statistics

Table D1 reports the sample coverage over time for the various datasets. On average, the P2R dataset includes around 110 institutions in the euro area. A large subset of these institutions can be matched to accounting data from Orbis (roughly 90% of the P2R sample). Coverage is more limited in the EBA G-SII dataset, which includes only about 25 institutions per year. The EBA-ST and EBA-ESG datasets are only available in 2025. Given these data limitations, in our analysis we can only provide descriptive evidence of generic trends.

The average P2R in our sample is 2.22%, as reported in Table D2. The relatively low standard deviation of 60 basis points suggests that P2Rs are fairly stable within the panel. Over the sample period, however, there seems to be a modest upward trend in the simple average P2R, increasing from 2.14% to 2.25% (Figure A1). Asset-weighted average P2Rs are consistently lower but exhibit a more pronounced increase, rising from 1.81% to 2.03%. This pattern suggests that larger banks tend to have lower P2Rs, although their requirements appear to be less persistent over time.

The panel shows substantial cross-country variation in P2Rs (Figure A2). Banks in Cyprus and Greece exhibit the highest average P2Rs, whereas those in Slovakia and Spain report the lowest. The four countries with the largest number of banks in our sample – Germany, Italy, France, and Spain – are all located towards the lower end of the distribution of simple average P2Rs.

**Table D1:** Number of sampled institutions by SREP cycle and dataset

| SREP cycle | P2R | Orbis | EBA G-SII | EBA ST | EBA ESG |
|---|---|---|---|---|---|
| 2019 | 111 | 105 | 22 | - | - |
| 2020 | 113 | 106 | 25 | - | - |
| 2021 | 111 | 101 | 24 | - | - |
| 2022 | 106 | 97 | 24 | - | - |
| 2023 | 107 | 97 | 27 | - | - |
| 2024 | 109 | 97 | 27 | - | - |
| 2025 | 109 | 85 | 26 | 33 | 54 |

Source: Authors' calculations, based on ECB Banking Supervision, Orbis, EBA Transparency Exercise on Global and Systemically Important Institutions (EBA G-SII), EBA Stress Test exercise (EBA ST), and EBA Pillar 3 Disclosure on ESG risks (EBA ESG)

**Table D2**: Summary statistics

| | Mean | Std. Dev. | 5th | 50th | 95th | Observations |
|---|---|---|---|---|---|---|
| P2R (%) | 2.22 | 0.58 | 1.28 | 2.20 | 3.25 | 766 |
| Assets (EUR bn) | 216.02 | 389.63 | 5.84 | 68.67 | 967.82 | 688 |
| Assets (ln) | 4.33 | 1.46 | 1.77 | 4.23 | 6.88 | 688 |
| Deposits-to-assets (% assets) | 55.63 | 23.53 | 5.94 | 62.96 | 83.93 | 667 |
| Loans-to-assets (% assets) | 54.36 | 18.32 | 15.77 | 57.21 | 79.94 | 675 |
| NPL ratio (% gross loans) | 4.03 | 6.31 | 0.38 | 2.59 | 11.29 | 646 |
| NBFI risk indicator | 54.09 | 22.42 | 17.10 | 57.82 | 82.94 | 26 |
| Geopolitical risk indicator | -0.49 | 0.62 | -1.76 | -0.30 | 0.50 | 33 |
| Transition risk indicator | 68.14 | 22.28 | 12.53 | 74.65 | 90.78 | 54 |
| Ageing risk indicator | 0.11 | 0.10 | 0.01 | 0.09 | 0.39 | 78 |

Source: Authors' calculations, based on ECB Banking Supervision, Orbis and EBA G-SII.

## E. Regression analysis

Table E1 reports cross-sectional regressions of the P2R set in the 2025 SREP cycle on each of the four slow-burning risk indicators in turn. All columns control for bank size, funding and asset structure, and asset quality. Columns (1) to (4) include bank controls only; columns (5) to (8) add country fixed effects, so that the coefficients are identified from variation across banks within the same country. The number of observations differs across columns because the four indicators come from different sources and cover different sets of banks (see Annex C and Table D1). With bank controls only, three of the four indicators are significant at the 10% level or better. Once country fixed effects are included, none of the four is statistically significant, which suggests that the associations visible in Figure 2 reflect differences between countries rather than between banks.

**Table E1:** P2R and slow-burning risks

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| NBFI (%) | 0.007* | | | | -0.003 | | | |
| | (0.004) | | | | (0.004) | | | |
| Geopolitical (z) | | 0.151 | | | | -0.279 | | |
| | | (0.127) | | | | (0.164) | | |
| Transition (%) | | | -0.006* | | | | -0.001 | |
| | | | (0.003) | | | | (0.004) | |
| Ageing (z) | | | | 0.145*** | | | | -0.209 |
| | | | | (0.054) | | | | (0.207) |
| Controls | | | | | | | | |
| Assets (ln) | -0.325** | 0.012 | -0.129** | -0.138*** | -0.314*** | -0.226 | -0.121* | -0.132*** |
| | (0.118) | (0.106) | (0.050) | (0.033) | (0.092) | (0.129) | (0.069) | (0.048) |
| Deposits-to-assets (%) | 0.000 | 0.002 | 0.004 | -0.002 | 0.031** | 0.018* | 0.010 | 0.013** |
| | (0.009) | (0.005) | (0.004) | (0.003) | (0.012) | (0.010) | (0.008) | (0.006) |
| Loans-to-assets (%) | -0.013 | -0.003 | -0.002 | 0.001 | -0.023** | -0.022* | -0.002 | -0.001 |
| | (0.009) | (0.007) | (0.005) | (0.003) | (0.009) | (0.011) | (0.007) | (0.003) |
| NPL ratio (%) | 0.135 | 0.146* | 0.096* | 0.083** | 0.673*** | 0.276** | 0.162* | 0.119** |
| | (0.114) | (0.083) | (0.056) | (0.040) | (0.164) | (0.097) | (0.086) | (0.048) |
| Country FE | | | | | Yes | Yes | Yes | Yes |
| Observations | 22 | 29 | 46 | 76 | 20 | 28 | 42 | 75 |
| R-squared | 0.453 | 0.252 | 0.317 | 0.318 | 0.839 | 0.614 | 0.501 | 0.516 |

Source: Authors' calculations, based on ECB Banking Supervision, EBA G-SII, Haselmann et al. (2025), EBA-ESG, Orbis and Eurostat. *Notes: The dependent variable is the P2R (%) set in the 2025 SREP cycle. Standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.*

Pillar 2 requirements (P2R) for euro area banks are less responsive to risks that are still building and have yet to materialise. Between 2019 and 2025, P2R are positively associated with weak asset quality and vary by size and business model, but not with exposure to population ageing, geoeconomic fragmentation, the climate transition, or non-bank finance. The Supervisory Review and Evaluation Process (SREP) was not designed to price slow-burning risks. No capital instrument matches their long horizon and uneven incidence across banks.

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