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COLLATERAL TIGHTENING IN THE EURO AREA

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Bilous K. I. Collateral Tightening in the Euro Area

The article proposes a reproducible design for monitoring tightening collateral requirements in the Eurozone based on four data blocks from the European Central Bank (ECB): quarterly SESFOD results, MMSR indicators for the secured money market segment, collateral usage statistics in the Eurosystem, and the archive of assets eligible as collateral. Additionally, a time series of the ECB interest rate is used as a control indicator. The underlying assumption is that stress in the collateral market cannot be reduced to a single market indicator but manifests as a configuration of interrelated signals in the cost of secured funding, financing conditions, availability of eligible assets, and the extent of recourse to official refinancing channels. The empirical design covers 2018Q1–2025Q4 and combines descriptive statistics, correlation analysis, regressions with Newey–West (HAC) standard errors, and models with lags, specifications with a small-sample correction and panel models with fixed effects by collateral classes and quarters. The article tests four monitoring hypotheses regarding the joint movement of tighter financing conditions with weaker market activity, the role of the volume of eligible assets, the strengthening of these links during periods of stress, and differences between individual collateral classes. It is shown that the composite SESFOD indicator in basic aggregated equations weakly explains the dynamics of the secured market turnover, while its decomposition reveals divergent component signals that are lost when aggregated. The secured market rate predominantly reflects the ECB's interest rate cycle, whereas collateral usage in the Eurosystem and the ratio of utilized collateral to the pool of eligible assets provide a more stable signal for monitoring stress during periods of strain and changes in monetary policy. Panel analysis by collateral classes records higher sensitivity of ABS and covered bonds compared to the base public sector; however, these results should be interpreted as describing heterogeneity in a small panel rather than as a causal estimate of structural elasticities. The scientific novelty lies in the creation of a reproducible monitoring design that allows distinguishing indicators that consistently respond to stress in the collateral sphere from indicators with weak, unstable, or masked signals when aggregated. The practical value lies in the possibility of applying this approach by banks, regulators, and central banks for real-time monitoring of stress in the secured financing market without access to private dealer data.

Keywords: *collateral management; secured financing; SESFOD; MMSR; eligible assets; Eurosystem; euro area; collateral classes.*
Fig.: *3.* ***Tabl.:*** *9.* ***Formulae:*** *2.* ***Bibl.:*** *23.*

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Білоус К. І. Посилення заставних вимог у Єврозоні

У статті запропоновано відтворюваний дизайн моніторингу посилення вимог до забезпечення в Єврозоні на основі чотирьох блоків даних Європейського центрального банку (ЄЦБ): квартальних результатів SESFOD, показників MMSR для забезпеченого сегмента грошового ринку, статистики використання забезпечення в Євросистемі та архіву активів, прийнятних як забезпечення. Додатково використано часовий ряд процентної ставки ЄЦБ як контрольний індикатор. Вихідне припущення полягає в тому, що напруження у сфері забезпечення не зводиться до одного ринкового показника, а проявляється як конфігурація взаємопов'язаних сигналів у вартості забезпеченого фондування, умовах фінансування, доступності прийнятних активів і масштабах звернення до офіційних каналів рефінансування. Емпіричний дизайн охоплює 2018Q1–2025Q4 і поєднує описову статистику, кореляційний аналіз, регресії зі стандартними помилками Newey – West (HAC), моделі з лагами, специфікації з поправкою на малу вибірку та панельні моделі з фіксованими ефектами за класами забезпечення та кварталами. У роботі перевірено чотири моніторингові гіпотези щодо спільного руху жорсткіших умов фінансування зі слабшою ринковою активністю, ролі обсягу прийнятних активів, посилення цих зв'язків у стресові періоди та відмінностей між окремими класами забезпечення. Показано, що композитний індикатор SESFOD у базових агрегованих рівняннях слабко пояснює динаміку обороту забезпеченого ринку, тоді як його декомпозиція виявляє різноспрямовані складові сигнали, що втрачаються при агрегуванні. Ставка забезпеченого ринку переважно відображає цикл процентної політики ЄЦБ, тоді як використання забезпечення в Євросистемі та співвідношення використаного забезпечення до пулу прийнятних активів формують стабільніший сигнал для моніторингу напруження в періоди стресу та зміни монетарного курсу. Панельний аналіз за класами забезпечення фіксує вищу чутливість ABS і покритих облігацій порівняно з базовим публічним сектором, однак ці результати слід трактувати як опис неоднорідності в малій панелі, а не як причинну оцінку структурних еластичностей. Наукова новизна полягає у створенні відтворюваного дизайну моніторингу, який дає змогу відрізняти індикатори, що узгоджено реагують на стрес у сфері забезпечення, від індикаторів зі слабким, нестійким або замаскованим при агрегуванні сигналом. Практична цінність полягає в можливості застосування цього підходу банками, регуляторами та центральними банками для оперативного моніторингу напруження на ринку забезпеченого фінансування без доступу до приватних дилерських даних.

Ключові слова: *управління заставою; забезпечене фінансування; SESFOD; MMSR; прийнятні активи; Євросистема; єврозона; класи забезпечення.*
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In the euro area, collateral tightening is best treated as a cluster of related signals rather than as a single observable price. Pressure in secured funding shows up in survey answers on financing conditions, in public repo indicators, in the amount of assets that remain pledgeable, and in banks' use of central-bank channels. These signals are published in separate European Central Bank (ECB) blocks rather than in one ready-made analytical dataset. Survey on credit terms and conditions in euro-denominated (SESFOD) supplies quarterly balances on securities-financing terms [1]. Money Market Statistical Reporting (MMSR) reports public indicators of secured-market activity and pricing, although its coverage changes from 2025 onward [2]. Eurosystem collateral statistics record collateral use and outstanding credit [3], while the ECB eligible-assets archive measures the size and composition of the usable collateral pool [4]. The empirical challenge is therefore to combine these data blocks into a single monitoring design rather than to infer tightening from any one market series.

Analysis of recent research and publications. Most existing studies examine collateral stress through separate analytical channels. One strand treats collateral as a determinant of borrowing capacity and asset pricing, showing that tighter rollover conditions can rapidly reduce debt capacity and affect valuations [5; 6]. Another strand focuses on liquidity spirals, repo runs, and the way balance-sheet pressure spills over into broader secured-funding stress [7–10]. In the euro-area setting, S. Corradin and A. Maddaloni [11] show that sovereign-repo specialness widened in crisis periods, linking collateral quality directly to repo pricing.

The post-crisis debate also introduces a demand-side mechanism. Broader collateralisation, central clearing, and margin regulation increase the need for high-quality collateral and can transmit stress through margin calls [12], collateral reuse [13], and funding withdrawals [14–16]. Related euro-area research shows that official collateral rules are not neutral: haircut design, eligibility criteria, and the

collateral framework architecture affect which assets retain money-like properties under stress [17–20]. The safe-asset-shortage argument [21] adds a longer-run perspective by showing that the meaning of "acceptable collateral" becomes more consequential when demand for safe assets persistently exceeds supply.

Identification of previously unresolved aspects of the general problem. The main gap in this literature is not the absence of another single-channel explanation, but the lack of a public-data framework that links these mechanisms within one design. Repo pricing, official collateral policy, margin pressure, and collateral supply are typically analysed separately. This article instead combines survey tightening, public secured-market indicators, Eurosystem collateral recourse, and eligible-asset availability into one quarterly euro-area dataset.

Ukrainian studies on collateral management [22; 23] are set in a different institutional environment, where margin-call procedures, GMRA-style documentation, and central clearing are still being established rather than fully embedded. In that context, a public-data monitoring framework is especially valuable because reforming markets usually have even less access to dealer-level information than the euro area.

Formulation of research goals. The article develops a public-data monitoring framework for identifying which euro-area indicators move together under collateral stress, which remain weak or inconsistent, and where composite measures hide offsetting signals from their components. To do so, it combines four ECB market-and-collateral data blocks – SESFOD survey measures, public MMSR secured-market indicators, Eurosystem collateral statistics, and the eligible-assets archive – together with the ECB policy-rate series as a control input. The monitoring window covers 2018Q1–2025Q4.

The empirical structure is organised around four monitoring hypotheses, treated as descriptive benchmarks rather than causal tests:

1. H1 links survey-reported tightening to weaker market activity and higher official recourse.

2. H2 links a larger eligible-assets stock to easier funding terms.

3. H3 expects the H1 and H2 channels to amplify during stress windows.

4. H4 expects differential responses across collateral classes, with lower-liquidity classes (ABS, corporate debt) more sensitive than the sovereign-heavy public-sector baseline.

Accordingly, the article contributes a measurement-and-monitoring framework rather than a causal estimate. Its aim is to establish which public euro-area indicators align under collateral stress, which do not, and how disaggregated survey signals improve the interpretation of the aggregate composite.

Description of research methodology. The working sample spans 2018-Q1 to 2025-Q4, with calendar quarter used as the common merge key across all processed datasets. The aggregate sample, therefore, contains 32 quarterly observations. Interpretation is constrained by that short horizon, by the documented MMSR reporting break from 2025, and by the strong low-frequency movement shared by several stock and rate variables. The regressions are therefore used as descriptive monitoring equations that trace co-movement across indicator blocks rather than as causal identification exercises. A one-quarter lag is retained as the main dynamic sensitivity because quarterly adjustment is unlikely to be observed reliably at shorter horizons. In contrast, longer lag structures would absorb too much of the available sample. The collateral-class extension changes the unit of observation to collateral class × quarter, producing 128 rows (4 classes × 32 quarters).

Tbl. 1 groups the empirical inputs into four ECB data blocks and one policy-rate control series. SESFOD contributes survey evidence on financing terms; MMSR captures public secured-market pricing and activity; Eurosystem collateral statistics record official-sector recourse; and the eligible-assets archive measures the stock of collateral available for mobilisation. The ECB key-rate series anchors the policy cycle. Taken together, these inputs trace the path from reported tightening through market conditions to the actual use of central-bank collateral channels.

The aggregate quarterly master dataset combines the source blocks with three kinds of derived variables:

1. Funding-condition transforms – "MMSR secured turnover QoQ".

2. Collateral-stock transforms – log("eligible assets total"), "collateral use to eligible ratio".

3. Event controls – "Stress 2020", "Stress 2022", "MMSR break 2025" .

The panel extension adds class-specific versions for four broad classes: "public sector", "covered bonds", "corporate debt", and "ABS".

Tbl. 2 reports the operational rules used to construct the quarterly dataset and the collateral-class panel from the ECB source files. It documents the alignment of the source series, the transformations used to build the monitoring variables, the treatment of the 2025 MMSR reporting break, and the mapping of detailed security categories into four broad collateral classes.

Two comparability limits are especially relevant. The public MMSR-secured series has a published coverage break in 2025 (24 new reporting banks), so the design keeps an explicit "MMSR break 2025" control

Table 1

Data sources and main variables for the quarterly framework

Source block	Frequency	Role	Main variables
SESFOD [1]	Quarterly	Survey-based tightening	"SESFOD overall terms", "SESFOD rates tightening", "SESFOD maturity tightening", "SESFOD amount tightening"
MMSR public secured [2]	Daily → quarterly	Secured funding conditions	"MMSR secured turnover", "MMSR secured turnover QoQ", "MMSR secured rate"
Eurosystem collateral [3]	Quarterly	System recourse	"ECB collateral use", "ECB outstanding credit"
ECB eligible-assets [4]	Quarterly	Collateral supply	"Eligible assets total", class-level series
ECB key interest rates	Event → quarter end	Policy-cycle control	"ECB policy rate"

Source: created by the author based on ECB data sources.

Table 2

Data construction and replication rules

Component	Construction rule
Quarterly alignment	All datasets are merged on the calendar quarter. The quarterly master dataset is restricted to "2018-Q1" through "2025-Q4" . SESFOD and the ECB collateral series are entered directly at the quarterly frequency; the public MMSR-secured series are aggregated from daily observations to the quarter level before merging.
Derived variables	"MMSR secured turnover QoQ" is the quarter-on-quarter percentage change in "MMSR secured turnover"; "collateral use to eligible ratio" equals "ECB collateral use"/"Eligible assets total"; "eligible assets class share" equals "eligible assets class total"/ "Eligible assets total"; log("eligible assets class total") is the natural log of class-level eligible assets
2025 MMSR break	"MMSR break 2025" equals 1 from "2025-Q1" onward to capture the published expansion in the public MMSR reporting perimeter. Sample-trimmed checks excluding "2025+" are used as a robustness test
Class mapping	The baseline panel uses four classes: "public sector", "covered bonds", "corporate debt", and "ABS". The harmonized mapping is "DG", "HQG", and "OG" → "public sector"; "CB" → "covered bonds"; "CS", "HQF", "HQN", and "HYC" → "corporate debt"; "ABS" → "ABS". The strict sensitivity profile excludes "CS" from the "corporate debt" bucket
Missing-data rule	Missing values are kept as missing; baseline regression inputs are not imputed. Derived fields remain missing whenever any required source field is unavailable

Source: created by the author based on ECB SESFOD [1], MMSR [2], Eurosystem collateral data [3], and eligible-assets archive [4].

and a sample-trimmed cross-check. In addition, the aggregate sample is short, and several stock and rate variables share pronounced low-frequency movement.

The aggregate stage estimates first-pass quarter-level conditional associations with Newey-West (HAC) standard errors:

$$Y_t = \alpha + \beta_1 \text{"Tightening"}_t + \beta_2 \text{"EligibleStock"}_t + \beta_3 \text{"Usage"}_t + \beta_4 \text{"Controls"}_t + \varepsilon_t, \quad (1)$$

where

– Y_t – secured funding condition indicator in quarter t (turnover growth, secured rate, or collateral-use ratio);

– "Tightening"_t – SESFOD tightening measure;

– "EligibleStock"_t – eligible collateral stock (log) or growth;

– "Usage"_t – Eurosystem collateral use or outstanding credit;

– "Controls"_t – policy rate, stress dummies, MMSR break dummy.

The aggregate outcome blocks are: 1) public secured turnover growth; 2) public secured rate; 3) collateral-use-to-eligible-assets ratio.

The panel addresses the main limitation of the aggregate design – aggregate collateral stocks can move even when composition changes matter more. The panel specification:

$$Y_{i,t} = \alpha_i + \gamma_t + \beta_1 \text{"EligibleStock"}_{i,t} + \beta_2 \text{"Stress"}_t + \beta_3 (\text{"EligibleStock"}_{i,t} \times \text{"Stress"}_t) + \varepsilon_{i,t}, \quad (2)$$

where i – collateral class; α_i – class fixed effects; γ_t – quarter fixed effects.

Two exposure measures are estimated: 1) log ("eligible assets class total") in the stock-level specification; 2) "eligible assets class share" as a robustness check.

Baseline panel tables use heteroskedasticity-robust covariance. The paper keeps four robustness layers:

1. Aggregate: lagged specifications, exclusion of 2025+, first differencing.

2. Panel inference: "clustered time" and kernel-based covariance sensitivity.

3. Panel mapping: strict profile excluding convertible securities from corporate debt.

4. Panel stress-window: pooled stress interaction replacing split 2020/2022 terms.

Presentation of main material and research results. The empirical analysis proceeds in four stages. First, summary statistics and pairwise correlations describe the quarterly dataset and reveal the collinearity patterns that constrain interpretation. Second, the turnover decomposition isolates the main substantive result by showing that the weak aggregate SESFOD signal arises from offsetting sub-components rather than from the absence of all informational content. Third, aggregate HAC equations are used more selectively to distinguish the collateral-use monitoring block from the secured-rate validation block, while lagged and sample-trimmed variants serve as robustness checks. Fourth, the collateral-class panel with entity and time fixed effects is used as supportive evidence of heterogeneity rather than as a stand-alone source of precise class-level elasticities.

The baseline sample consists of 32 quarterly observations. On average, the SESFOD overall-terms indicator equals 5.749 net percentage points, while the MMSR secured rate averages 0.807%. The mean ECB deposit facility rate is 0.987%, eligible assets average 16,662 billion euros, and the collateral-use-to-eligible-assets ratio is 0.122, with a range of 0.077 to 0.175 (*Tbl. 3*).

Fig. 1 presents normalised indices (2018 Q1 = 100) for Eurosystem collateral use and the eligible-assets stock. Over the medium term, the two series move in the same direction, but they separate visibly during stress episodes. Collateral use jumps in 2020, reflecting pandemic-era liquidity operations, whereas the eligible-assets stock grows more gradually. A smaller divergence reappears in 2022, then narrows as ECB tightening proceeds and collateral use falls back toward earlier levels.

Fig. 2 places the SESFOD tightening indicator alongside the MMSR public secured rate, the ECB policy rate, and the collateral-use-to-eligible-assets ratio. Throughout the sample, the secured rate closely follows the ECB deposit facility rate, whereas the collateral-use ratio reacts more visibly in stress periods. Overall, SESFOD tightening, by contrast, moves in sharp episodic jumps, especially in 2020 Q2 and 2022 Q3–Q4, without matching the market-price block point for point. The figure, therefore, anticipates the later regression result: the aggregate SESFOD composite conceals offsetting sub-signals. At the same time, the steadier monitoring information comes from policy pass-through and official collateral recourse rather than from a direct turnover channel.

Fig. 3 breaks the eligible-assets stock into broad collateral classes. Public-sector instruments remain dominant across the sample, accounting for 56.8% of the total. Covered bonds and corporate debt each contribute around one-tenth, and ABS stays below 4%.

Table 3

Summary statistics (quarterly, 2018 Q1–2025 Q4)

Variable	N	Mean	Std	Min	Max
SESFOD overall terms (n. p. p.)	32	5.749	11.793	–17.391	45.455
SESFOD rates tightening (n. p. p.)	32	–1.596	16.392	–29.433	29.670
SESFOD maturity tightening (n. p. p.)	32	–2.631	7.194	–19.994	16.110
SESFOD amount tightening (n. p. p.)	32	–1.044	6.201	–15.030	14.389
SESFOD funding demand (n. p. p.)	32	0.807	11.312	–22.222	20.000
MMSR secured rate (%)	32	0.807	1.771	–0.695	3.825
ECB deposit facility rate (%)	32	0.987	1.797	–0.500	4.000
MMSR secured turnover (€ mn)	32	441,156	123,816	318,591	737,448
ECB collateral use (€ bn)	32	2,002.2	525.9	1,521.3	2,841.2
ECB outstanding credit (€ bn)	32	999.1	776.9	20.5	2,214.4
Eligible assets total (€ bn)	32	16,662	2,096	13,866	20,297
Collateral use / eligible assets	32	0.122	0.035	0.077	0.175

Source: calculated by the author based on ECB SESFOD [1], MMSR [2], Eurosystem collateral data [3], and eligible-assets archive [4].

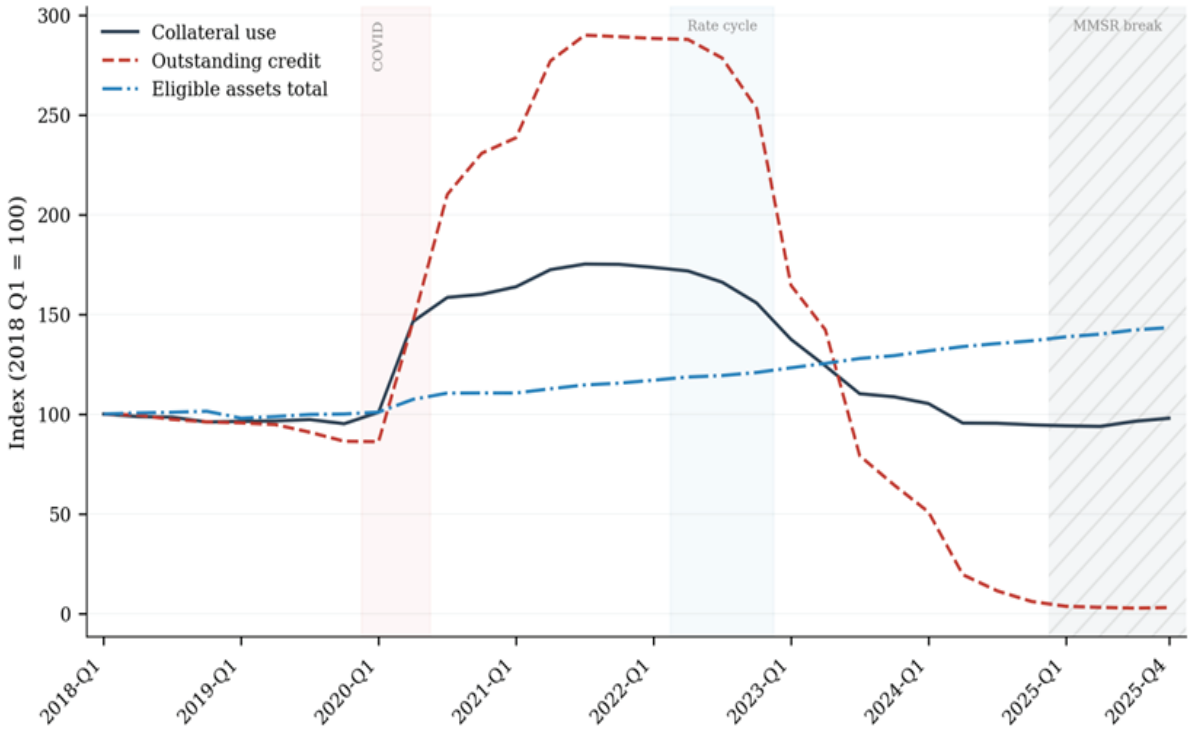

Fig. 1. Eurosystem collateral and eligible assets stock indices (2018 Q1 = 100)

Source: created by the author based on Eurosystem collateral data [3] and eligible-assets archive [4].

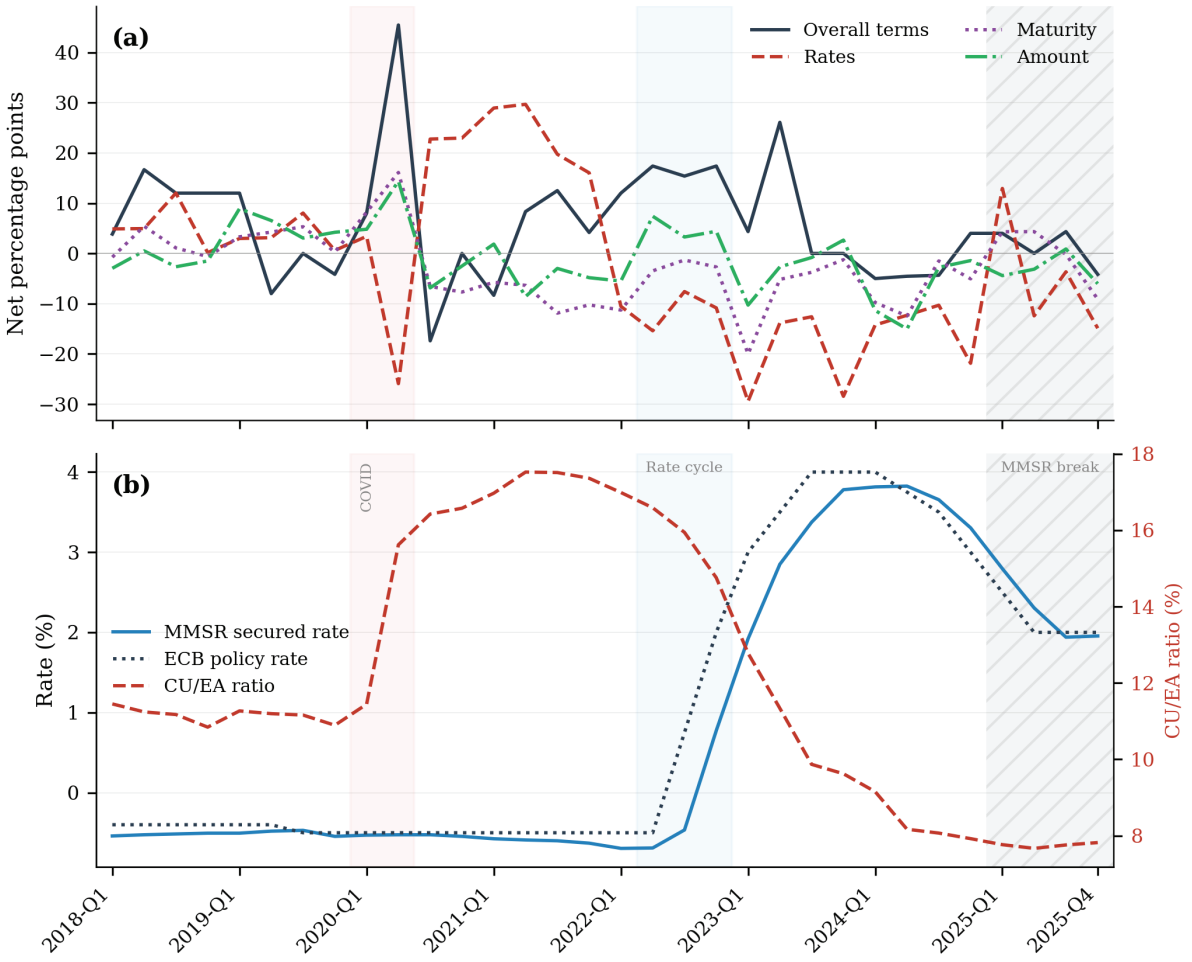

Fig. 2. Funding conditions and collateral pressure

Source: created by the author based on ECB SESFOD [1] and MMSR [2].

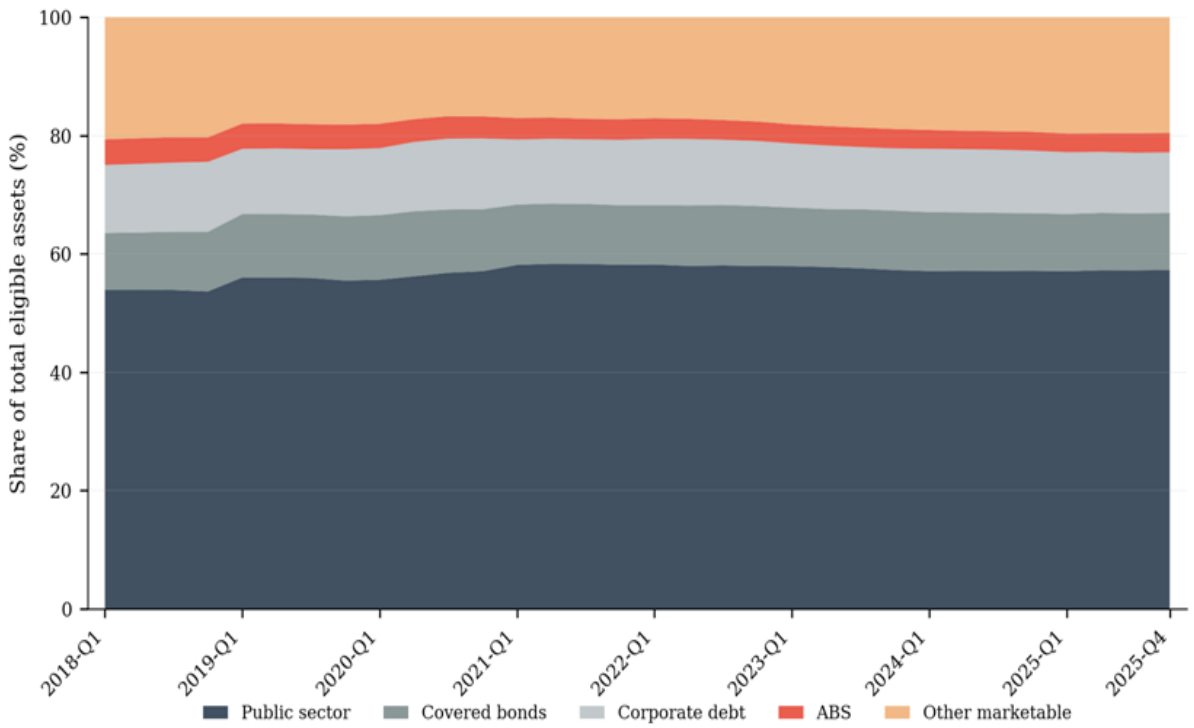

Fig. 3. Eligible assets composition by broad class

Source: created by the author based on ECB eligible-assets archive [4].

The composition changes only gradually, with a modest increase in the corporate-debt share and a steady decline in ABS, which motivates the panel extension and its comparison of sensitivity across structurally unequal classes.

Tbl. 4 highlights two features that matter for the regression design. First, the secured rate and the ECB policy rate are almost collinear (r = 0.98), indicating that the public secured rate is largely a policy-rate pass-through and that the two variables should not be interpreted as separate signals in the same equation. Second, the eligible assets total and secured turnover are strongly positively correlated (r = 0.93), which is more consistent with system-capacity co-movement than with a simple supply-drives-activity mechanism. The SESFOD overall-terms indicator, by contrast, has only weak correlations with the market variables ($|r| \leq$ 0.28), foreshadowing the null aggregate result that the decomposition later explains.

Tbl. 5 provides the paper's key empirical result. The zero coefficient on SESFOD overall terms in the turnover equations does not imply that the survey block carries no information; rather, it indicates that opposing sub-signals offset one another in the aggregate composite. After decomposition, the rates-tightening component enters the contemporaneous turnover equation with a negative sign (–0.001, p = 0.094), whereas the amount-tightening component enters the log-level equation positively at the two-quarter lag (0.003, p = 0.013). Using the dispersion reported in Tbl. 3, a one-standard-deviation increase in SESFOD rates tightening (16.392 net percentage points) is associated with an approximate 0.016 decline in quarterly turnover growth in the contemporaneous specification. The core contribution is therefore interpretive: the paper explains why the composite is weak in aggregate form.

Tbl. 6 and *Tbl. 7* place that decomposition result within the broader aggregate monitoring architecture. Their role is more limited: they show which indicator blocks still convey useful information after accounting for the short sample, shared trends, and policy-cycle dominance.

Tbl. 6 shows why the paper is more persuasive as a monitoring exercise than as a strong design for aggregate identification. The turnover-growth equations do not reveal a clear quarter-level relation between the SESFOD composite and secured-market activity. The secured-rate equation is useful mainly as a validation block: the ECB deposit facility rate coefficient equals 0.565 (p < 0.001) and remains stable across alternative specifications, which confirms that the dataset captures policy-rate pass-through rather than a distinct collateral-tightening channel. The collateral-use block is more informative for monitoring purposes. In the collateral-use-ratio equation, the coefficient on log("eligible assets total") is 0.358 (p < 0.001), while the coefficient on the MMSR secured rate is –0.045

Table 4

Pairwise correlation matrix

	SESFOD	Rates	Demand	SecRate	Policy	Turnover	CollUse	Eligible	CU/EA
SESFOD	1.00	–0.28	0.01	–0.25	–0.18	–0.24	0.24	–0.19	0.28
Rates	–0.28	1.00	0.71	–0.58	–0.63	–0.41	0.29	–0.46	0.44
Demand	0.01	0.71	1.00	–0.68	–0.69	–0.61	0.32	–0.63	0.52
SecRate	–0.25	–0.58	–0.68	1.00	0.98	0.74	–0.46	0.82	–0.71
Policy	–0.18	–0.63	–0.69	0.98	1.00	0.69	–0.37	0.80	–0.63
Turnover	–0.24	–0.41	–0.61	0.74	0.69	1.00	–0.34	0.93	–0.63
CollUse	0.24	0.29	0.32	–0.46	–0.37	–0.34	1.00	–0.12	0.94
Eligible	–0.19	–0.46	–0.63	0.82	0.80	0.93	–0.12	1.00	–0.46
CU/EA	0.28	0.44	0.52	–0.71	–0.63	–0.63	0.94	–0.46	1.00

Source: calculated by the author based on ECB data [1–4].

Table 5

Turnover decomposition – selected SESFOD sub-component specifications

	Sub-comp. growth (0Q)	Sub-comp. level (2Q lag)	Overall level (0Q)
Intercept	–1.197	–6.982***	–5.295***
	(1.066)	(1.783)	(1.737)
SESFOD overall	–	–	0.000
			(0.001)
SESFOD rates	–0.001*	0.000	–
	(0.001)	(0.000)	
SESFOD maturity	0.003	–0.002	–
	(0.002)	(0.002)	
SESFOD amount	–0.004	0.003**	–
	(0.003)	(0.001)	
Log eligible assets	0.120	2.088***	1.908***
	(0.111)	(0.188)	(0.184)
CU/EA ratio	0.559*	–2.320***	–1.977***
	(0.307)	(0.335)	(0.390)
ECB policy rate	–0.002	–0.049***	–0.032**
	(0.009)	(0.012)	(0.014)
Stress 2020	–0.023	–0.043***	–0.031***
	(0.019)	(0.016)	(0.009)
Stress 2022	–0.030**	–0.033***	–0.010
	(0.012)	(0.009)	(0.011)
Break 2025+	0.010	0.053	0.080*
	(0.024)	(0.048)	(0.046)
N	31	30	32
R^2	0.300	0.983	0.982
Adj. R^2	–0.000	0.975	0.976

Note: HAC standard errors in parentheses (maxlags = 4). * p < 0.1, ** p < 0.05, *** p < 0.01.
Source: calculated by the author based on ECB SESFOD [1] and MMSR [2].

Table 6

Baseline HAC regressions

	Turnover growth	Secured rate	CU/EA ratio
Intercept	–1.436	–48.008***	–3.326***
	(1.271)	(10.374)	(0.677)
SESFOD overall terms	0.000	–0.001	0.000
	(0.001)	(0.002)	(0.000)
Log eligible assets	0.149	5.132***	0.358***
	(0.134)	(1.108)	(0.070)
CU/EA ratio	0.143	–11.592***	–
	(0.254)	(2.417)	
MMSR secured rate	–	–	–0.045***
			(0.008)
ECB policy rate	0.001	0.565***	0.015**
	(0.008)	(0.090)	(0.007)
Stress 2020	–0.010	0.101***	0.009**
	(0.012)	(0.032)	(0.005)
Stress 2022	–0.020	–0.565***	–0.019**
	(0.013)	(0.091)	(0.009)
Break 2025+	0.004	–0.861***	–0.074***
	(0.027)	(0.283)	(0.017)
N	31	32	32
R^2	0.211	0.989	0.893
Adj. R^2	–0.029	0.986	0.862

Note: HAC standard errors in parentheses (maxlags = 4). * p < 0.1, ** p < 0.05, *** p < 0.01.
Source: calculated by the author based on ECB data [1–4].

($p < 0.001$). The positive coefficient on eligible assets should not be interpreted as evidence of easier collateral conditions; it is better understood as a scale effect, where a larger eligible collateral base permits greater mobilisation even when stress remains present.

Tbl. 7 largely preserves the main interpretation. Excluding 2025 does not materially change the weak turnover result, suggesting that the null composite signal is not driven solely by the MMSR coverage break. The lagged secured-rate equation again primarily serves as a validation of policy-cycle transmission, rather than as evidence of a separate collateral channel. The lagged collateral-use equation remains the more useful stress-monitoring block. High correlations with time (eligible assets: 0.985; secured turnover: 0.906; secured rate: 0.798 with the quarter index) and VIF values above 47 for the policy-rate versus secured-rate block therefore remain central limits on interpretation. The lagged and first-difference checks are best viewed as robustness and trend-reduction exercises rather than as alternative headline estimates.

In *Tbl. 8* the rates-tightening equation displays the clearest heterogeneity. Relative to the public-sector baseline, the slope difference is positive for covered bonds (23.598, $p = 0.043$) and substantially larger for ABS (79.316, $p = 0.007$). In the maturity equation, the ABS slope difference reaches 52.755 ($p = 0.025$), while the 2022 stress interaction is negative (–4.158, $p = 0.004$).

The pooled stress-window check points in the same direction: the pooled stress interaction remains negative and significant in the maturity equation (–4.469, $p = 0.003$), and the main ABS-related signals remain visible under strict mapping and covariance-sensitivity checks.

The panel is best interpreted as a map of heterogeneity rather than as a high-powered identification design. The dependent variables labelled "Rates", "Maturity", and "Amount" are SESFOD sub-components observed at the quarter level. At the same time, the cross-sectional variation comes from

Table 7

Lagged HAC regressions (1-quarter lag)

	Turnover growth	Secured rate	CU/EA ratio
Intercept	0.092	–2.774	–3.299***
	(1.409)	(2.358)	(0.799)
SESFOD overall terms	0.000	0.001	0.000
	(0.001)	(0.001)	(0.000)
Log eligible assets	–0.013	0.286	0.356***
	(0.149)	(0.250)	(0.083)
CU/EA ratio	0.413	–0.618	–
	(0.251)	(0.471)	
MMSR secured rate	–	–	–0.019***
			(0.006)
ECB policy rate	0.013	0.965***	–0.011
	(0.009)	(0.018)	(0.007)
Stress 2020	–0.002	0.059***	0.015***
	(0.012)	(0.011)	(0.006)
Stress 2022	–0.008	0.002	–0.015
	(0.011)	(0.043)	(0.010)
Break 2025+	0.035	–0.049	–0.069***
	(0.031)	(0.047)	(0.019)
N	31	31	31
R^2	0.221	0.999	0.872
Adj. R^2	–0.016	0.999	0.833

Note: HAC standard errors in parentheses (maxlags = 4). * p < 0.1, ** p < 0.05, *** p < 0.01.
Source: calculated by the author based on ECB data [1–4].

class-specific eligible-assets exposure after harmonized class mapping ("DG", "HQG", "OG" → "public sector"; "CB" → "covered bonds"; "CS", "HQF", "HQN", "HYC" → "corporate debt"; "ABS" → "ABS"). The strict-mapping sensitivity excludes "CS" from the "corporate debt" bucket. Negative *within-*R^2 values do not imply impossible fitted values; in this two-way fixed-effects setting they simply indicate weak explanatory gain relative to the demeaned benchmark in a very small panel dominated by common shocks. Tbl. 8 is therefore used to rank relative class sensitivity and to compare mapping robustness, not to claim precise structural elasticities.

According to *Tbl. 9*, three interpretation limits remain central:

1. The quarterly sample is short (32 observations), and the panel has only four classes.

2. The policy-rate and public secured-rate series are difficult to separate cleanly (VIF > 47).

3. The positive coefficient on eligible-assets stock in collateral-use-ratio equations should be interpreted as system-capacity co-movement, not a clean stand-alone mechanism.

If collateral stress is concentrated in the more sensitive asset classes rather than spread uniformly across the collateral universe, the combined SES-FOD-MMSR-Eurosystem framework can operate as an early-warning tool. For banks, its practical value lies in class-sensitive monitoring: the decomposition and panel results indicate whether pressure is building in segments such as ABS or covered bonds rather than spreading evenly across all collateral types. For supervisors, the key warning sign is a divergence between market pricing and official recourse. When collateral-use ratios rise more clearly than public secured-market indicators, stress may be moving through balance-sheet channels that market prices do not fully reveal. For the central bank, the most informative indicator is collateral use relative to eligible stock capacity, because it shows when official recourse is rising relative to the collateral base available for mobilisation and

Table 8

Collateral-class panel fixed-effects regressions

	Rates	Maturity	Amount
Log eligible (baseline)	1.267	–17.563*	–1.999
	(10.555)	(9.427)	(11.191)
Δ Slope: covered bonds	23.598**	–0.031	1.792
	(11.481)	(11.223)	(11.416)
Δ Slope: corporate debt	–0.880	–2.595	17.247
	(12.060)	(11.156)	(15.566)
Δ Slope: ABS	79.316***	52.755**	37.495
	(28.656)	(23.132)	(30.265)
Log eligible × Stress 2020	3.523	–4.803*	–3.298
	(2.473)	(2.585)	(2.009)
Log eligible × Stress 2022	1.154	–4.158***	–0.835
	(1.740)	(1.388)	(1.218)
N	128	128	128
R^2 within	–0.164	–3.156	–1.636
Entity FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes

Note: Robust standard errors in parentheses. Entity and time fixed effects included. * p < 0.1, ** p < 0.05, *** p < 0.01.
Source: calculated by the author based on ECB SESFOD [1] and eligible-assets archive [4].

Table 9

Monitoring interpretation of the hypotheses

Hypothesis	Evidence in the paper	Monitoring interpretation
H1	Weak in aggregate Tables 6–7; more visible in Tbl. 5 decomposition	Partial support: the composite masks offsetting survey sub-signals
H2	Mixed in aggregate equations; constrained by shared trends and policy dominance	Inconclusive as a stand-alone mechanism; better read as system-capacity co-movement
H3	Stronger in collateral-use equations than in turnover equations	Supported more clearly in the official-recourse block than in market-activity measures
H4	Table 8 shows stronger ABS sensitivity than the public-sector baseline	Partial and supportive evidence: useful for class ranking, not precise elasticities

Source: developed by the author based on Tables 5–8.

therefore has more direct relevance for collateral policy calibration.

The Ukrainian studies on collateral management [22; 23] focus on firm-level mechanics and legal framework that do not appear directly in aggregate euro-area data. A useful next step would be to connect that micro-level evidence with market-wide indicators in order to compare institutional design with system-level stress signals.

CONCLUSIONS

This study develops a reproducible public-data framework for monitoring collateral tightening in the euro area. Its main contribution is to show which public indicators move together under collateral stress, which remain weak or inconsistent, and why the aggregate SESFOD composite may appear uninformative even when some of its components still carry useful information. The strongest empirical result comes from the turnover decomposition. Once the survey composite is unpacked, the aggregate null shows that offsetting rate and amount signals mask survey information rather than indicate its complete absence.

The remainder of the empirical architecture should be read in support of that monitoring contribution. The secured-rate block primarily serves to

validate policy-cycle pass-through, whereas the collateral-use block provides more stable monitoring evidence through official recourse and system capacity. The collateral-class panel adds supportive evidence on heterogeneity, but its role is to rank sensitivity across classes rather than to estimate precise structural elasticities in a small panel.

The paper therefore makes one applied claim: public ECB data can be organised into a usable monitoring architecture for collateral stress even when they do not support strong causal inference. Future work can extend this design with richer dynamic tools, including vector autoregression or local-projection specifications, once longer samples or more granular public collateral data become available. ■

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