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INTERCONNECTEDNESS IN THE ITALIAN FINANCIAL SECTOR: BANKS, INVESTMENT FUNDS AND INSURANCE COMPANIES

by Valentina Michelangeli*, Silvia Sacco*, Valentino Bado*, Valeria De Chiara*,
Ginette Eramo*, Francesco Ficarola*, Irene Mavilia*, Claudia Miani*, Ivan Quaglia*,
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Abstract

This paper examines interconnectedness across banks, investment funds, insurance companies and the real economy in Italy between 2019 and 2025. Using a unique and comprehensive granular dataset that maps loans and securities exposures across sectors, we document the main characteristics and evolution of financial linkages. Banks have limited direct exposures to investment funds and insurers and are closely connected to households and non-financial corporations (NFCs) through loans. Insurers hold the largest securities portfolios and are the main investors in fund shares. Investment funds hold significant portfolio shares in securities issued by NFCs, and to a lesser extent by banks and other funds. Not surprisingly, our analysis of overlapping portfolios shows that bond holdings—especially Italian government securities—constitute the largest common exposure. We also evaluate intragroup links, finding that they decrease the extent of interconnectedness, especially when it comes to banking groups. Overall, our results highlight the key channels through which shocks can propagate across institutions and provide insights for enhancing risk monitoring.

JEL Classification: G21, G23, G32, G18.

Keywords: banks, insurers, investment funds, interconnections, non-bank financial institutions.

DOI: 10.32057/0.QEF.2026.1050

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1. Introduction¹

The growing complexity of the global financial system has heightened concerns about the channels through which shocks can propagate across institutions and markets. Over the period 2019-2025, banks, investment funds, and insurance companies have become increasingly interconnected through direct exposures, common asset holdings, and intragroup structures. While this interconnectedness can enhance risk sharing and market liquidity, it can also amplify tensions through a rapid transmission of shocks within and across financial sectors. Episodes of market turmoil—including those triggered by abrupt shifts in interest rates, liquidity shortages, or sudden repricing of risky assets—have showed how vulnerabilities in one segment of the financial system can quickly spill over to others, challenging both microprudential oversight and system-wide stability.

Against this backdrop, policymakers and supervisors face the challenge of identifying where risks originate, understanding how they spread, and assessing which institutions or sectors may act as amplifiers or shock absorbers. This challenge has been underscored in recent policy analyses, which emphasize the need for comprehensive systemic risk monitoring frameworks capable of capturing both direct and indirect spillovers across banks and non-bank intermediaries (BIS, 2025; IMF, 2025; ECB, 2025; Bochmann et al., 2025; Acharya et al., 2024; Sydow et al., 2024a). Traditional metrics that consider only the balance sheets of individual sectors in isolation are insufficient to capture the complex dynamics of interconnected financial systems (Cortes et al., 2018). A system-wide perspective is required to identify the network of exposures that link financial institutions, reveal the extent of portfolio overlaps, and map the potential contagion pathways across the financial ecosystem.

This paper contributes to the analysis of interconnectedness by offering an integrated view of the links among Italian banks, investment funds, insurance companies and the real economy. The goal is to map the network of exposures involving Italian financial intermediaries, with a particular focus on overlapping portfolios and cross-sector dependencies. Our research addresses three key questions: (1) How significant are the interconnections within the Italian system? (2) How have these interconnections evolved over time? (3) In which assets and institutions are portfolio overlaps most pronounced?

To address these questions, we construct a unique dataset that captures all relevant financial linkages—through loans and securities—between financial institutions, as well as towards non-financial sectors of the Italian economy. Our focus is on the asset side of intermediaries' balance sheets: we rely on AnaCredit for data on banks' loans, on supervisory reporting for banks' and funds' securities holdings, while for insurance companies we incorporate data collected under the Solvency II framework. These sources enable a detailed mapping that links each financial institution to the counterparties—whether other financial institutions or real-sector entities—issuing the instruments it holds.

We begin by taking a system-wide view of how financial intermediaries connect to each other and to the real economy, including also interconnections among entities belonging to the same financial group or conglomerate. A Sankey chart visualizes these relationships, tracing the asset exposures across sectors and highlighting where linkages are most pronounced (Sydow et al., 2024b). Several patterns stand out. Not surprisingly, bank loans to households and non-financial corporations account for a substantial share

¹ We thank Alessio Anzuini, Giuseppa Bentivegna, Martina Bignami, Paolo Bisio, Marcello Bofondi, Emilia Bonaccorsi Di Patti, Francesco Cannata, Alessio de Vincenzo, Stefano Pasqualini, Anna Maria Rinaldi, Valerio Paolo Vacca for their useful comments.

of total bank assets² (roughly 23% and 18%, respectively³), while lending to insurers and investment funds remains comparatively small, though it has nearly doubled between 2019 and 2025. Securities issued by insurance companies and investment fund shares represent only a modest portion of banks' assets. By contrast, the insurance sector holds a considerably larger securities portfolio than either banks or investment funds. Insurers are the dominant holders of investment fund shares (about 30% of assets in 2025, up from 24% in 2019), while their direct exposure to banks remains limited (about 5%). Investment funds, for their part, hold a sizeable share of securities issued by NFCs, and to a lesser extent by banks and by other funds (around 26%, 12% and 13% of assets, respectively), with only minimal exposure to insurers.

Taken together, these patterns indicate that banks, insurers, and investment funds are deeply interconnected through cross-holdings of loans and securities. Italian government bonds form a significant component of the portfolios of all three sectors (11%, 21% and 17% of total assets for banks, insurers and funds respectively), which has however declined since 2019.

We then turn to the degree of overlapping portfolios across institutions, highlighting vulnerabilities arising from shared exposures and the potential for fire-sale externalities (Del Vecchio et al., 2022; Poledna et al., 2021). Cosine-similarity and Jaccard measures indicate that the greatest overlap lies in bond holdings, consistent with the large share of government securities held across all sectors. By contrast, equity positions and fund shares appear less correlated.

To further characterize overlap, we examine the distribution of bonds by the number of holders. At the system level, most bonds are held by a single institution; however, a substantial fraction of total investments is concentrated in a small set of securities widely held across the system. Not surprisingly, these widely held instruments are predominantly Italian government bonds.

Another granular analysis—grouping securities by issuer and maturity—reveals that banks and insurers hold a particularly large share of longer-dated bonds (especially those in the 36- to 120-month range). Taken at face value (indeed, the analysis does not take into account the use of derivatives, in particular interest rate swaps, to decrease the impact of interest rate changes), this composition renders the financial system potentially sensitive to interest-rate shocks: both sectors could face significant capital losses when yields rise. For banks, this risk is mitigated by the fact that approximately three-quarters of their bonds are valued at amortized cost. However, if liquidity pressures force sales before maturity, these unrealized losses could arise. Insurers, while better matched to long-term liabilities, can still experience solvency pressures under market-consistent valuation regimes. Investment funds, in contrast, display a more diversified maturity structure; this is intrinsic to the shorter lifespan which usually characterizes such entities, when compared with banks and insurers.

Finally, the paper examines intragroup positions, which can function as internal stabilizers within financial conglomerates but may also be channels through which shocks propagate across affiliated entities. To assess the relevance of intragroup exposures, we compare the full dataset including all intragroup exposures with a dataset excluding them. In particular, all intragroup exposures are removed, including those vis-à-vis asset management companies (SGRs). With regard to investment funds, exposures are not reassigned to the corresponding SGRs (and therefore fund transactions are not identified as intragroup exposures), as these positions are substantively exposures toward the clients subscribing the fund units. Excluding these intragroup exposures markedly alters the structure of the

² Please note that total assets exclude tangible and intangible assets and “other assets”. For further details see the paragraph 2 on Data description.

³ We adopt the European sectoral classification (ESA 2010), whereby sole proprietorships, which are non-negligible in Italy, are included in the household sector.

financial network reducing the number and weight of interconnections. The most important adjustment concerns interbank loans, where a substantial portion of exposures is intragroup. For insurers, holdings of bank-issued securities decline slightly once intragroup exposures are removed, while exposures to other insurers fall more significantly, indicating that much of their cross-insurer exposure reflects internal group structures.

A closer look at intragroup banking activities, net of equity holdings⁴, underscores their relevance. Italian banks are characterized by a very high share of intragroup credit exposures to NBFI entities, highlighting that a large portion of loans to NBFIs reflects internal group financing rather than arm's-length market activity.

Taken together, these analyses offer a comprehensive view of the structural connections within the financial system and the real economy. The findings aim to support policymakers in designing targeted interventions and enhancing the resilience of the financial sector in the face of evolving systemic risks.

The paper is organized as follows. Section 2 describes the data. Section 3 shows the interconnections between financial sectors and common exposures. Section 4 presents aggregate evidence on overlapping portfolio. Section 5 focuses on intragroup positions. Section 6 concludes.

2. Data description

Our dataset covers three main categories of financial institutions: banks, insurance companies and investment funds.⁵ Although the sector plays a relevant role within the Italian financial system, granular exposures are not mapped for Other Financial Intermediaries (OFIs). The OFI sector encompasses a wide range of heterogeneous entities, including financial corporations engaged in lending activities such as leasing, factoring and consumer credit, as well as investment firms, captive financial institutions and special purpose vehicles involved in bank loan securitisations or covered bond issuances⁶. Not all OFI provide granular and comparable reports, such as insurers and investment funds. Due to the considerable heterogeneity and substantial intragroup exposures in the OFI sector, as well as data limitations, its inclusion in system-wide stress tests will be addressed in more detail in future exercises. Finally Central counterparties (CCPs), formally included among OFIs, are also excluded for the purposes of this work.

Our analysis focuses on the asset side of balance sheets —specifically banks' loans and securities— and relies on individual data. In June 2025, the banking sector comprises 388 individual entities, 250 of which belong to 48 banking groups; the investment fund sector includes roughly 1,200 open-ended funds; and the insurance sector consists of 83 undertakings⁷, all domiciled in Italy.

Table 1 presents the main aggregate variables from financial institutions' asset side of the balance sheets, including foreign exposures. For banks, insurance companies and investment funds we map the vast majority of assets (89%, 89% and 90% respectively, on average in 2019-2025). Other assets, such as exposures from derivatives, supranational bonds, structured notes, cash and deposits, property, tangible and intangible assets, tax assets, loans granted by foreign subsidiaries of Italian banking groups,

⁴ Banks' equity holdings in other banks and NBFIs are primarily aimed at enabling them to exert control over these entities.

⁵ Hedge funds, money market funds and other mutual funds are included; pension funds are currently excluded from the analysis.

⁶ This category is indirectly linked to banks, although it is not formally attributable to them.

⁷ Insurance undertakings subject to Solvency II reporting; five additional active entities in 2025 are excluded as analyses rely exclusively on such data.

technical provisions recoverable from reinsurers, insurers' technical credits and other residual items, are not included in our analysis.

Table 1: Asset side for Italian banks, insurance companies and open-ended investment funds
(billions of euros and percent)

	2019	2020	2021	2022	2023	2024	2025
a. Banks							
Loans	1865	2018	2157	2020	1841	1747	1767
Securities	661	694	727	694	698	725	763
Other assets	345	277	262	314	363	383	380
Total assets (1)	2871	2989	3145	3027	2902	2855	2910
Sample Coverage (% tot assets)	88.1%	90.7%	91.7%	89.6%	87.5%	86.6%	87.0%
b. Insurance companies							
Securities	921	985	1014	859	930	973	977
Other assets	98	103	107	113	121	126	140
Total assets	1019	1088	1121	972	1051	1099	1117
Sample Coverage (% tot assets)	90.5%	90.5%	90.5%	88.4%	88.5%	88.5%	87.3%
c. Investment Funds							
Securities	228	225	241	212	235	289	289
Other assets	26	24	28	25	25	27	27
Total assets	254	250	268	236	260	316	316
Sample Coverage (% tot assets)	90.0%	90.3%	89.6%	89.5%	90.4%	91.6%	91.3%

(1) 'Total assets' refer exclusively to banks included in our dataset and are obtained from Individual supervisory reports. Foreign subsidiaries of Italian banks are excluded.

2.1. Banking sector

Our dataset captures the network of relationships between banks and other entities within the financial system. Specifically, we construct bilateral links between individual banks and their financial counterparties, such as other banks, insurance companies and investment funds. For each bank, we identify its exposures through loans and security holdings, mapping the corresponding borrowers or issuing institutions. The dataset thus provides counterparty-level information on loans, securities, and shareholdings (e.g., from investment funds), as well as other equity⁸ positions held by banks.

More in detail we used AnaCredit⁹ for loans to construct banks' exposures and map them to the individual aforementioned financial institutions and, at an aggregate level, for non-financial

⁸ "Other equity" refers to ownership claims not represented by listed shares or investment fund shares, such as unlisted shares or participating interests.

⁹ https://www.ecb.europa.eu/stats/ecb_statistics/anacredit/html/index.en.html. Bank borrowers with a total loan amount below 25,000 euros are not included in AnaCredit. Banks granting loans, for a total amount below 2% of the Italian system, are excluded ([bancaditalia.it/statistiche/raccolta-dati/segnalazioni/rilevazione-dati-granulari/disposizioni-normative-nazionali/Circolare-297-Rilevazione-dati-granulari-sul-credito-3-aggiornamento.pdf](https://www.bancaditalia.it/statistiche/raccolta-dati/segnalazioni/rilevazione-dati-granulari/disposizioni-normative-nazionali/Circolare-297-Rilevazione-dati-granulari-sul-credito-3-aggiornamento.pdf)). Among the loans available in AnaCredit, only those recognized on the balance sheet are currently considered.

corporations, OFIs and public administrations¹⁰. Credit exposures include term loans, revolving credit, drawn credit lines, reverse repo, and other short-term deposits. We used supervisory individual bank data also to map each single bank to its aggregate loans to households. As shown in Panel (a) of Table 1, it is evident that loans dominate bank balance sheets.

Supervisory individual data were employed for mapping all securities in bank portfolios. Individual supervisory data include ISIN codes, allowing us to identify the main characteristics of the issuers; accounting portfolios—namely *Hold to Collect*, *Hold to Collect and Sell*, and *Held for Trading*—are mapped as well, which is crucial for quantifying potential losses under market shocks. We identified three main categories, characterized by different levels of risk: equities, bonds, and fund shares.

Several identifiers—such as fiscal codes, LEIs, and RIAD codes—enable us to merge information from additional sources, including supervisory registers, thereby offering a more accurate picture of the underlying risks faced by each bank.¹¹

2.2. Insurance sector

We exploit highly granular supervisory data collected under the Solvency II framework to analyze the network of exposures among Italian insurance entities. The use of harmonized Solvency II reporting templates ensures consistency and comparability across insurers, facilitating the integration of insurance data into the broader system-wide framework. The dataset consists of a panel of individually supervised insurance companies and captures links between insurers and their counterparties exclusively through security holdings. These exposures are drawn from market-value information reported in the Solvency II asset-by-asset template, where each instrument is observed at the security level, mapped via ISIN codes, and classified into three main asset classes: bonds, equities, and fund shares. This granular structure allows us to reconstruct insurer-level portfolios on a security-by-security basis and to trace their market-value exposures to governments, other insurers, banks, investment funds, and non-financial corporations, enabling a high-resolution reconstruction of the insurance network and the analysis of contagion and market shocks transmission across the financial system.

Importantly, the analysis captures interconnectedness only through the asset side of insurers' balance sheets. The liability side—dominated by insurance policies, which may themselves create additional channels of interdependence (e.g., credit, cyber, or catastrophe coverages transfer the risk to insurers from banks, other financial and non-financial entities)—cannot be reconstructed at a comparable level of granularity and is therefore excluded.

2.3. Investment fund sector

We map the assets of open-ended investment funds, primarily consisting of securities, and we exclude deposits and residual assets.

Individual supervisory reports provide highly granular data on funds' assets, comparable with the quality of banks securities holdings. We consider holdings, on an ISIN-by-ISIN basis, in the portfolio of all Italian UCITS and non-UCITS open-ended investment funds. Funds are mapped relying on their national identifier and the ISIN(s) code(s) of their shares, which are used jointly to map interconnections while minimizing errors; funds' LEI codes, which are not legally required for every Italian investment fund, are tracked but not actually used in the present analysis.

¹⁰ Granular data allowing the mapping of individual entities to all counterparties are also available. However, these data are not used, as they are not required for the analysis conducted in this paper.

¹¹ For instance, to identify intragroup transactions.

As shown in Panel (c) of Table 1, open-ended funds do not have loans among their assets: this is due to regulatory constraints on UCITS, while loan origination from open-ended, non-UCITS funds is immaterial. The choice of reducing the scope of open-ended funds to Italian entities, while providing maximum homogeneity and quality of data, limits the coverage of our analysis excluding, for example, non-Italian EU funds which are distributed in Italy. As regards Italian closed-ended funds, we do not map their assets in our analysis, which focuses on those connections that might be contagion channels to the end of financial stability.¹² We remark that, although their assets are not mapped, non-Italian open-ended investment funds as well as any closed-ended investment funds are still part of our datasets, since their shares can be part of the assets of the considered Italian financial institutions, and they can also take on loans from Italian banks.

The links between investment funds and their asset managers are not explicitly mapped in the analysis, as these relationships do not arise from direct balance-sheet exposures. Asset managers are classified within the OFI sector and may belong to broader financial conglomerates, including banking groups. Investment funds, by contrast, are legally distinct entities with separate and autonomous balance sheets. As a result, the relationship between funds and asset managers is primarily organizational and operational, rather than financial, and therefore falls outside the scope of balance-sheet-based interconnection measures.

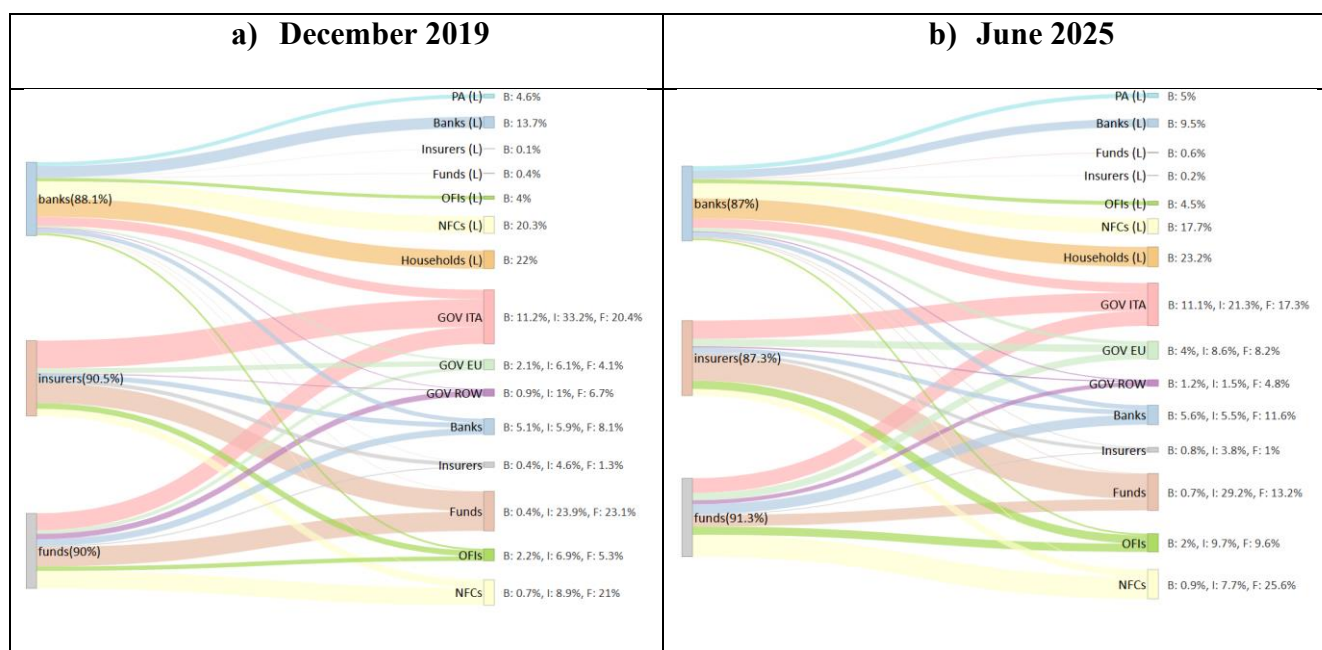
3. Interconnections between financial sectors and common exposures

This section provides an overview of the network of interconnections linking the main financial sectors in Italy. For each of the three categories of financial institutions discussed above— Italian banks, insurance companies, and investment funds—we decompose the asset side of their balance sheets into two macro-asset categories, loans and securities. These are further disaggregated into seven asset classes based on the identity of the borrower (for loans) or the issuer (for securities), which may be either domestic or foreign: households, general government, NFCs, banks, insurance companies, investment funds, and OFIs.

Figure 1 illustrates how the portfolios of Italian banks, insurance companies and investment funds are allocated across these asset classes—and therefore across sectors—for two reference periods (December 2019 and June 2025). A line connecting a financial institution to an asset class indicates that the asset class - whether domestic or foreign - is included in the portfolio of the Italian institution. For additional disaggregation between bonds and equities, where applicable, please refer to Figure 1A in the appendix.

¹² Closed-ended funds are a subset of alternative investment funds (AIF). In compliance with the Alternative Investment Funds Management Directive (AIFMD), Bank of Italy periodically analyze potential risks for financial stability linked to the investment activities of AIFs: as of June 2025, their aggregate assets under management totals approximately € 200 bln, 90% being managed by closed-ended funds; approximately € 120 bln are managed by real estate funds.

Figure 1: Sankey chart of asset exposures for banks, insurers, and investment funds



Note: The entities shown on the left side of each chart represent the Italian financial institutions whose assets are analysed in this study, namely banks, insurers and open-ended investment funds, while the categories on the right side of each chart indicate the counterparties or asset classes in which these entities have exposures. The percentages on the left side represents the share of assets into consideration over total assets for each sector; the percentages on the right indicate the share of specific exposures in the sector's total assets. The width of each band reflects the percentage of the sector's exposure in a specific asset. When the label includes "(L)", it refers to loans; when no specification is provided, it refers to investments. The different asset categories are not disaggregated on a geographical basis or based on any other feature, except for government bonds. As an example, the category "Funds" contains all fund' shares found among the mapped assets, regardless of whether they are issued by open-ended, closed-ended, Italian or foreign investment funds. "GOV" refers to the central government, while "PA" also includes entities belonging to the 'other general government' (i.e. local government and social security funds).

Focusing on 2025, bank loans to households and non-financial corporations constitute a substantial share of total bank assets, amounting to approximately 23% and 18%, respectively. Interbank loans¹³ represent 10% of total bank assets, largely reflecting the significant degree of interconnectedness among institutions belonging to the same banking group. By contrast, loans to insurance corporations are negligible (0.2% of total assets), but have almost doubled in size since 2019. Loans to investment funds have also grown markedly since 2019 and account for around 0.6% of total bank assets; the bulk of such credit is extended to closed-ended alternative investment funds, as UCITS and other open-ended funds are subject to considerably stricter leverage constraints. Due to their regulatory structure, closed-ended funds are less susceptible to common contagion channels such as fire sales and redemption shocks. Securities issued by insurance companies and investment funds represent a modest portion of total bank assets, accounting together for less than 2%. Although this share is relatively small, banks' exposure to these sectors has roughly doubled since 2019. Bank securities in portfolio have also risen, exceeding 5% of total bank assets. Finally, both bank loans to the OFIs, as well as securities issued by the OFIs in bank assets account for a non-negligible portion of total assets (4.5% and 2%, respectively).

The insurance sector holds a significantly larger securities portfolio than the banking sector or investment funds. In particular, insurers emerge as the primary holders of investment fund shares (around 30% of total assets in 2025, up from 24% in 2019¹⁴) and have a smaller direct exposure to banks (around 5% of total assets), indicating overall strong interconnections within the financial sector from the asset

¹³ For further details see the paragraph 5.4.1 Intragroup banks exposure towards other banks.

¹⁴ The increase is primarily driven by the expansion of unit-linked business (over 80 per cent invested in funds), while risk-bearing investments have remained broadly stable at market values, reflecting valuation effects on fixed-income securities.

side. It is important to clarify, however, that more than two thirds of investment fund shares relate to unit-linked or index-linked contracts, where the investment risk is borne by policyholders. As a result, their management approach resembles that of investment funds more than that of traditional insurance portfolios.

Italian open-ended investment funds hold a significant share of securities issued by NFCs, banks and other funds, accounting for 26%, 12% and 13% of their total assets, respectively. The declining share of holdings of fund shares over time has been associated to an increase in the share of securities issued by OFIs. Exposure to insurance companies is minimal.

This evidence reveals a notable degree of interconnectedness among banks, insurance companies and investment funds through their holdings of loans and securities issued within the financial sector.

Government bonds represent a significant component of total assets across all three sectors, banks, insurance companies and investment funds. Banks hold a relatively smaller share of government bonds (14% of their total assets in 2019, 16% in 2025), though this share shows a gradual increase, mostly in the foreign part, in recent years. Insurance companies exhibit the largest relative exposure although it has declined from 40% in 2019 to 31% in 2025; mainly due to pronounced revaluation effects on fixed-income securities, with a sharp adjustment occurring between end-2021 and end-2022¹⁵. Investment funds maintain an allocation of approximately 30%. This pattern implies that while banks are less directly exposed to sovereign securities, investment funds and insurers are more heavily concentrated in government bonds.

Table 2 provides detailed information on the evolution over time of asset exposures for banks, insurers, and investment funds.

¹⁵ The reduction mainly stems from valuation losses on domestic government bonds following the 2022 interest rate shock, compounded by a gradual portfolio rebalancing towards other euro-area sovereigns and corporate securities; the overall increase in securities is driven by the expansion of unit-linked business, mainly invested in funds, while risk-bearing investments remain broadly stable.

Table 2: Evolution over time of asset exposures for banks, insurers, and investment funds
(percentage of total assets of each sector)

Source	Target	2019	2020	2021	2022	2023	2024	2025
banks	Households (L)	22%	21%	21%	23%	23%	23%	23%
banks	NFCs (L)	20%	20%	19%	19%	18%	18%	18%
banks	GOV ITA	11%	12%	12%	11%	11%	11%	11%
banks	Banks (L)	14%	11%	10%	11%	10%	9%	10%
banks	Banks	5%	5%	5%	5%	5%	5%	6%
banks	PA (L)	5%	10%	13%	9%	8%	5%	5%
banks	OFIs (L)	4%	4%	4%	5%	4%	5%	5%
banks	GOV EU	2%	2%	2%	3%	3%	4%	4%
banks	OFIs	2%	2%	2%	2%	2%	2%	2%
banks	GOV ROW	1%	1%	1%	1%	1%	2%	1%
banks	NFCs	1%	1%	1%	1%	1%	1%	1%
banks	Insurers	0%	0%	0%	0%	1%	1%	1%
banks	Funds	0%	1%	1%	1%	1%	1%	1%
banks	Funds (L)	0%	0%	1%	1%	1%	1%	1%
banks	Insurers (L)	0%	0%	0%	0%	0%	0%	0%
funds	NFCs	21%	23%	27%	27%	26%	26%	26%
funds	GOV ITA	20%	18%	15%	15%	17%	16%	17%
funds	Funds	23%	24%	23%	20%	17%	14%	13%
funds	Banks	8%	9%	8%	8%	10%	11%	12%
funds	OFIs	5%	6%	6%	7%	7%	10%	10%
funds	GOV EU	4%	4%	5%	6%	7%	8%	8%
funds	GOV ROW	7%	6%	5%	6%	5%	6%	5%
funds	Insurers	1%	1%	1%	1%	1%	1%	1%
insurers	Funds	24%	24%	27%	28%	30%	30%	29%
insurers	GOV ITA	33%	32%	29%	25%	23%	22%	21%
insurers	OFIs	7%	8%	8%	9%	9%	10%	10%
insurers	GOV EU	6%	7%	7%	8%	8%	8%	9%
insurers	NFCs	9%	8%	8%	8%	8%	8%	8%
insurers	Banks	6%	6%	6%	5%	5%	5%	6%
insurers	Insurers	5%	4%	4%	5%	4%	4%	4%
insurers	GOV ROW	1%	1%	1%	1%	1%	2%	2%

3.1 Focus on non-domestic exposures

Evaluating the magnitude of non-domestic exposures sheds light on the global integration of the sectors under analysis. Table 3 reports the distribution of exposures, included in Figure 1 – June 2025, across domestic and foreign counterparties for banks, insurers, and investment funds, expressed both in absolute terms (billions of euros) and as a percentage of total assets. Foreign exposures are further disaggregated into European Union (EU) and rest-of-world (ROW) components.

The data reveal that insurance companies and investment funds allocate a substantial share of their balance sheets to foreign entities, whereas this pattern is considerably less pronounced for banks. Specifically, insurers exhibit a strong concentration toward European counterparties, while funds maintain significant exposures both within Europe and to the rest of the world. Banks, by contrast, display relatively limited foreign exposures.

Table 3: Distribution of non-domestic exposures by sector in June 2025 (1)

	Billions of euro				Percentage of total assets			
	non domestic				non domestic			
	EU	ROW	(overall)	total	EU	ROW	(overall)	total
banks	319	106	425	2529	11	4	15	87
insurers	479	87	566	977	43	8	51	87,3
funds	115	75	190	289	36	24	60	91,3

(1) The 'total' column on the right only includes loans and securities.

These figures are particularly relevant for interpreting the scope of the analysis, which accounts for exposures within the domestic perimeter while limiting the set of counterparties to the three sectors under consideration.

Restricting the analysis to loans and securities towards banks, insurers, and funds only (Table 4), overall exposures vary considerably: banks show the lowest share at 17.4% of total assets, compared with 38.5% for insurers and 25.8% for funds. A substantial part of these exposures is directed abroad - 28.7% for insurers and 17.8% for funds - whereas banks remain more domestically oriented, with only 6.5% linked to foreign entities. Consequently, domestic exposures within the Italian financial system are relatively limited: approximately 10.9% of total assets for banks (17.4% minus 6.5%), 9.8% for insurers, and 8% for funds. This pattern underscores that insurers and funds maintain a significant proportion of their connections with foreign financial institutions, which are excluded from any representation of the domestic network. These differences largely reflect structural features of their business models and regulatory frameworks, as insurers and funds typically pursue portfolio diversification and access to international markets, while banks remain more focused on domestic intermediation.

Table 4: Distribution of non-domestic financial exposures by sector in June 2025
(only loans and securities towards banks, insurers, and funds)

	Billions of euro				Percentage of total assets			
	non domestic				non domestic			
	EU	ROW	(overall)	total	EU	ROW	(overall)	total
banks	159	33	192	505	5.4	1.1	6.5	17.4
insurers	303	17	320	429	27.1	1.6	28.7	38.5
funds	52	5	57	81	16.3	1.5	17.8	25.8

4. Aggregate evidence on common exposures

In financial systems, overlapping portfolios refer to situations where different investors or financial institutions hold common assets in their portfolios. When multiple institutions are exposed to the same securities, their balance sheets become interconnected through asset price co-movements. A drop in the market value of one widely held asset can therefore propagate across institutions, creating indirect contagion channels even in the absence of direct counterparty exposures. As a matter of fact, considering the somewhat limited magnitude of direct exposures within the Italian financial system, in comparison with the amount of total assets, we deem likely that contagion through overlapping portfolios could have a critical role in any insightful system-wide stress exercise.

The phenomenon plays a central role in systemic risk analysis, as it can amplify market stress: a price drop, which might be triggered by external market events or, for examples, by massive sales by a financial institutions facing liquidity distress, may cause fire-sale externalities that can depress the

asset's price further, leading to valuation losses for other holders. The larger the overlap in portfolios, the greater the potential for such price-mediated contagion.

To assess the relevance of risks associated with common exposures, we carried out several exploratory analyses.

We begin by examining the *cosine similarity* across the financial sectors under scrutiny. Using *cosine similarity* to study overlapping portfolios is natural and informative because it provides a single number that captures the degree of alignment in portfolio composition between financial institutions or sectors, independently of the absolute size of their holdings. Indeed, two sectors may hold vastly different amounts of assets, but if their portfolios are proportionally similar (i.e., they invest in the same assets in similar relative weights), they are exposed to the same market risks. Cosine similarity allows consistent comparisons of portfolio overlap across sectors or across time, helping monitor systemic vulnerabilities.

Let x, y be the aggregate vector holdings of the banking sector and insurance sector, where x_i ($i = 1, \dots, N$) is the total holdings of ISIN i for the banking sector, and y_i is the corresponding holdings by the insurance sector.

The cosine similarity is defined as follows:

$$\text{Cosine similarity}(x, y) = \frac{x \cdot y}{\|x\| \|y\|}$$

where the numerator is the dot product ($x \cdot y = \sum_{i=1}^N x_i y_i$) and measures how much the vectors point in the same direction, while the denominator (Euclidean norm, e.g. $\|x\| = \sqrt{\sum_{i=1}^N x_i^2}$) rescales by vector length, so the result depends only on the angle, not on the scale. Banks-funds similarity and insurance-funds similarity are defined analogously.

Such index, which is geometrically interpreted as the cosine of the angle between the two vectors, has the property of reaching its maximum of 1 when the holdings are exactly proportional and its minimum of 0 when there are no common holdings (no overlap). High cosine similarity indicates that losses in certain assets are likely to affect multiple institutions simultaneously, even if direct exposures are small. The cosine similarity shows that the main source of concern lies within bond holdings, coherently with the significant amount of government bonds held by all entities (Figure 2, panel a). Equity and fund shares portfolios appear to be largely uncorrelated.¹⁶

We also consider the Jaccard index, i.e. the ratio of the number of common instruments across sectors, regardless of their magnitude. More formally, the Jaccard similarity index between two sets A and B is defined as:

$$J(A, B) = \frac{|A \cap B|}{|A \cup B|}$$

Where the numerator $|A \cap B|$ is the number of elements common to both sets, the denominator $|A \cup B|$ is the total number of distinct elements present in at least one of the two sets. If $J(A, B) = 1$, the two sets are identical; if $J(A, B) = 0$ they have no elements in common.

Jaccard similarity (Figure 2, panel b) is moderate in both equity and bond portfolios, the latter showing a slight increase over time for all sectors: this may be due to a growing tendency of banks, insurance

¹⁶ These results are coherent with recent aggregated analyses published by the FSB (2025).

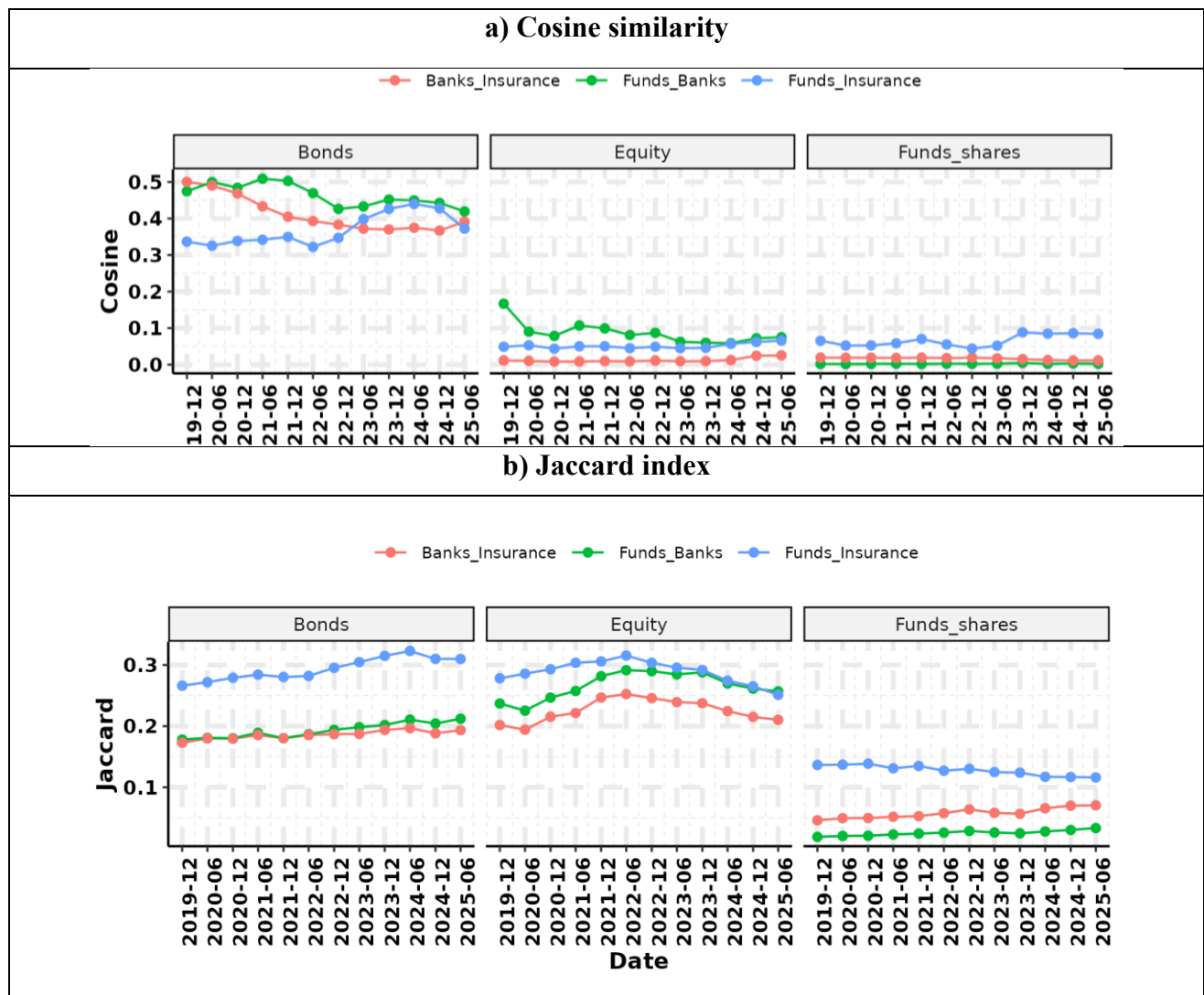
companies and investment funds to hold common bond instruments, but also to an overall decrease in the total number of bonds.

The joint examination of the two indexes again suggests that bonds are the main source of overlapping across sectors, in terms of amount and number of instruments.

As regards equity, the difference between the two similarities (low for cosine, moderate for Jaccard) indicates that many entities hold the same equity security, but the share in their portfolios is different reflecting the specific strategies of the entities.

With respect to fund shares, both the cosine similarity and the Jaccard index are on low levels, indicating limited overlaps.¹⁷

Figure 2: Similarity for ISIN-by-ISIN holdings among financial sectors



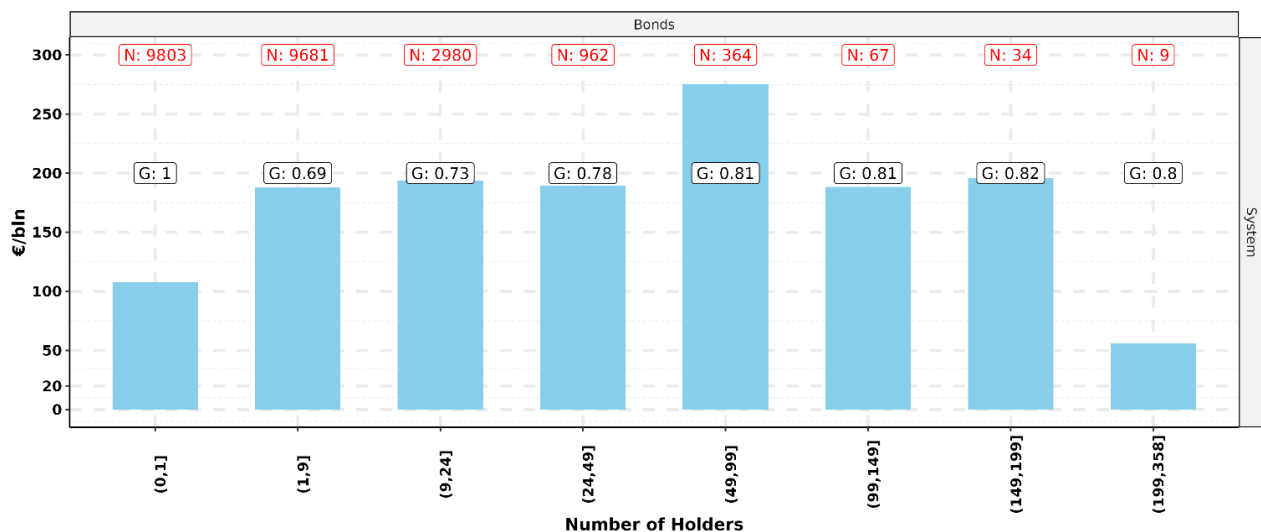
Note: *cosine similarity* and *Jaccard index* across financial sectors, by type of held security, in the period H2-2019 to H1-2025

¹⁷ We remark that no look-through exercises have been performed on funds' shares holdings at this stage.

A closer look at individual portfolios (as of end of June 2025) paints a picture consistent with the results discussed above: we examine the distribution of bonds by bucketed number of holders¹⁸ and we analyse their concentration profile across holders using the Gini index. For the entire portfolio, the Gini index is around 0.9, indicating an overall high level of concentration.

We firstly focus on bonds' distribution because it is the asset class with more overlapping portfolios. The horizontal axis of Figure 3 reports the number of holders per security, while the vertical axis shows the aggregate euro value of holdings.¹⁹ The figure also reports, in red, the number of securities within each holder-count bucket and, in black, the corresponding Gini coefficient. As an example, the first bar includes 9803 securities that are held by only one institution, for a total value of €108 billion. At the other end of the distribution, i.e. considering the last three bars, we find that 110 bonds, accounting for approximately €441 billion, are held by at least 100 entities. For these latter securities, there is thus evidence indicating a significant degree of portfolio overlap, and therefore potential for contagion. However, this risk may be substantially mitigated by the relatively high concentrated nature of these holdings: the steep concentration profile, as reflected in an average Gini coefficient of about 0.8, implies that exposures are predominantly held by a relatively small subset of institutions, limiting the breadth of spillovers and reducing the likelihood of widespread transmission across the system. For the securities in the middle of the spectrum, contagion risk could arise because these instruments are held by a relatively large number of investors and are characterized by a somewhat lower Gini coefficient (around 0.7), reflecting a less concentrated ownership structure.

Figure 3: Bonds in the financial system, distribution and concentration (June 2025)
(amounts and units)



Note: Each bar shows the aggregated exposure by number of holders (x-axis). For each bar, the black labels indicate the corresponding average Gini index, computed for each security across its holders, weighted against the exposure corresponding to each security, and the red labels indicate the number of securities (i.e., different ISINs) in each class.

We repeat the analysis across different types of securities and institutions (Figure 4). Figure 3 corresponds to the bottom-left panel of Figure 4 and is presented separately to provide an initial intuition for the broader results shown in Figure 4.

¹⁸ We chose as classes for the number of holders of a single security 1, 2-9, 10-24, 25-49, 50-99, 100-149, 150-199, >200.

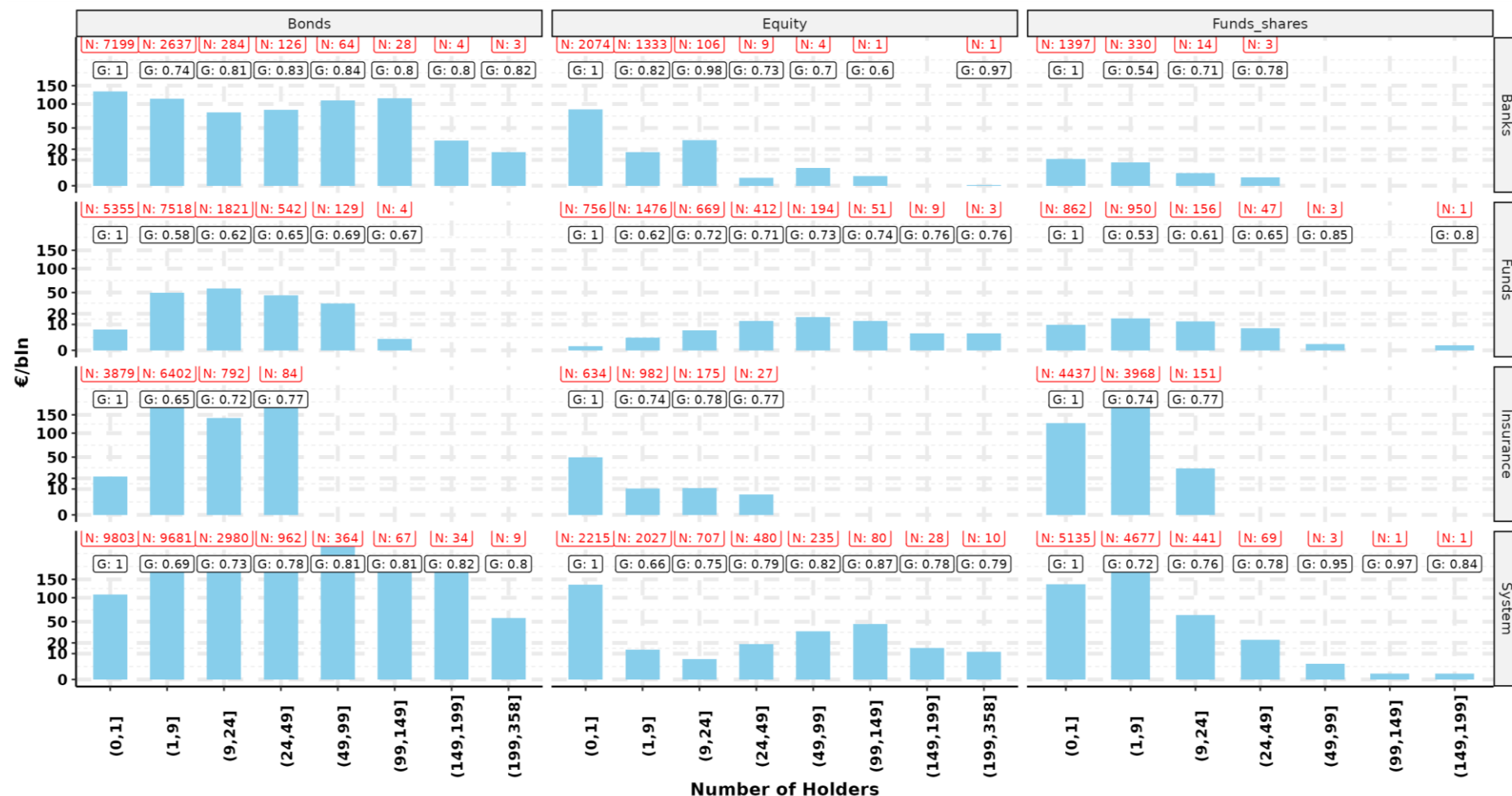
¹⁹ See Fig. 2A and 3A in the Appendix for more details on loan amounts.

As expected, the allocation patterns observed for bond holdings within each type of financial institutions mirror those at the system level: substantial investments are concentrated in a small number of bonds, each held by many entities. For banks, these holdings tend to be highly concentrated (Gini index around 0.8), in contrast to the more dispersed distribution observed for funds and insurers. These holdings are predominantly Italian government bonds, which account for roughly 32 percent of the securities analysed.

The vast majority of banks' and insurance companies' equity portfolios are concentrated in securities held by a single entity (€87 billion for banks and €50 billion for insurance companies). Equities held by more than 49 entities within each sector exhibit less concentrated distributions; for instance, in banks, €5 billion of equity is held by 49–99 institutions, with an average Gini index of 0.7 (top line, *Equity–Banks*). For investment funds, equity holdings are lower in value and distributed more uniformly across entities.

Regarding fund shares, the largest portion of holdings is held by insurance companies, with €126 billion corresponding to securities held by a single company and €179 billion held by 2–9 institutions (third line, *Fund shares–Insurers*), with a steep concentration profile. In contrast, for banks and investment funds, fund share holdings are distributed more uniformly across entities.

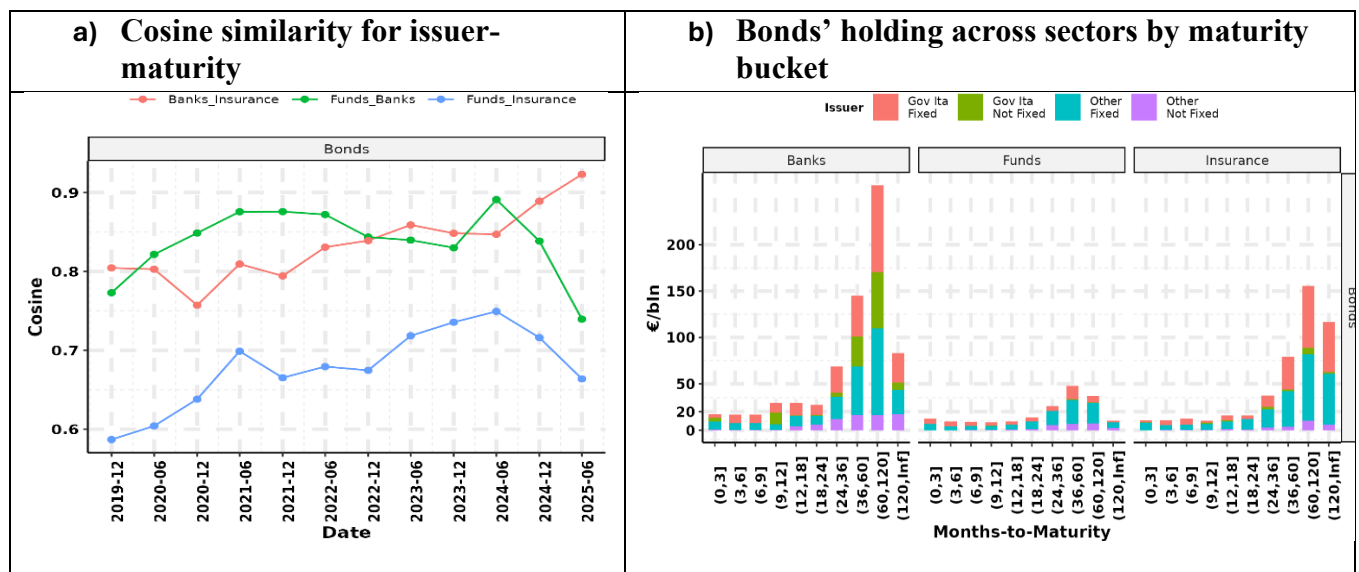
Figure 4: Securities across financial sectors, distribution and concentration (June 2025)



Note: Each bar equals the aggregated exposure in the corresponding class (x-axis) and financial sector. For each bar, we also show with black labels the corresponding average Gini index, weighted against the exposure corresponding to each security, and with red labels the number of securities (i.e., different ISINs) in each class. For instance, In the Bonds–Banks chart, there are N = 2,637 securities held by between 2 and 9 banks, representing a total value of €113.6 bn, with a weighted-average Gini index of 0.74.

Driven by such evidence, we performed a supplementary analysis on bonds' holdings, aggregating them on an issuer-maturity basis, rather than based on their ISIN. Figure 5, panel (a), measures how similar the bond portfolios are across financial sectors (e.g., banks, insurance companies, mutual funds) when grouped by issuer and maturity bucket. It shows quite large cosine similarity values (e.g. above 0.85), in particular between banks and insurances, indicating that these sectors are investing in similar issuers with similar maturity profiles, and thus are characterized by common risk exposures. The similarity between funds and banks, and between funds and insurers, albeit significant, shows a steady decrease since H2-2024, concurrently with interest rates reduction in the EU. Figure 5, panel b, shows that banks and insurers retain a large share of longer-dated bonds (in particular, with residual maturity above 36 months), and government bonds accounts for a large share of these holdings.

Figure 5: Sectoral Similarity and Maturity Structure of Bond Holdings



Note: Panel a) cosine similarity across financial sectors for bonds' holdings, bucketed by issuer and time to maturity. Panel (b) shows the magnitude of holdings by bucketed maturity, highlighting Italian Government Bonds, and distinguishing between fixed and non-fixed rates.

5. Focus on intragroup exposures

In this section, we focus on intragroup exposures. The analysis is conducted on a non-consolidated basis: total assets are measured as the sum of individual balance sheets of Italian entities only, i.e. foreign entities belonging to the same group are not included (on the left-hand side of the Sankey chart; Fig. 6). On the other hand, exposures of Italian banks and insurances to foreign affiliates within the same group²⁰ are retained and classified as exposures towards foreign counterparties (on the right-hand side of the Sankey chart; Fig. 6). To assess the relevance of intragroup exposures, we compare the full dataset including all intra-group exposures with a dataset excluding them. In particular, all intragroup exposures are removed, including those vis-à-vis asset management companies (SGRs). With regard to investment funds, exposures are not reassigned to the corresponding SGRs (and therefore fund transactions are not identified as intragroup exposures), as these positions are substantively exposures toward the clients subscribing the fund units. More in detail, we consider the same amount of total assets of each sector for analyses with and without intragroup exposures to evaluate the importance of intragroup positions and their evolution over time. We also carried out a deep dive analysis on banking exposures to banks and NBFIs (net of equity holdings), both excluding intragroup positions and considering intragroup positions only.

5.1 Interconnections across financial sectors without intragroup

Excluding intragroup exposures significantly reshapes the network of financial interconnections (Figure 6, panels a and b for the Sankey diagrams). The banking sector is the one most affected by the removal of intragroup positions: in the second quarter of 2025, their share of total assets in scope falls to 75%, compared to 87% when intragroup positions are included, implying that around 12% of total assets are intragroup positions. For banks, the most striking adjustment concerns interbank loans²¹: their share drops from about 9.5% of total assets with intragroup to 4% without, revealing that nearly half of these exposures are internal to banking groups.²² Similarly, holdings of securities issued by other banks decline as well as exposures to OFIs, underscoring the strong role of group structures in amplifying apparent interconnectedness. As expected, exposures to households, NFCs and Public Administration remain unchanged, confirming that these positions are external and unaffected by consolidation adjustments. Moreover, investment funds' exposures are not affected by intragroup eliminations, irrespective of whether the fund is managed by a group-owned asset management company, is entirely subscribed by a single group entity, or is involved in significant economic transactions with the group. Conversely, the asset management companies that manage such funds may belong to a banking or insurance group; these companies are classified as OFIs.²³

Insurance companies show significant changes in direct exposures to financial counterparties. Their holdings of bank-issued securities slightly decline, while exposures to other insurers drop sharply, highlighting that a significant portion of these positions (around 2.5% of total assets) was intragroup. By contrast, their large allocation to investment fund shares remains stable.

²⁰ In this note the scope of groups primarily derives from the supervision rules. Moreover, we extend the scope to financial conglomerates. A financial conglomerate refers to a group of companies operating in multiple financial sectors, such as banking and insurance.

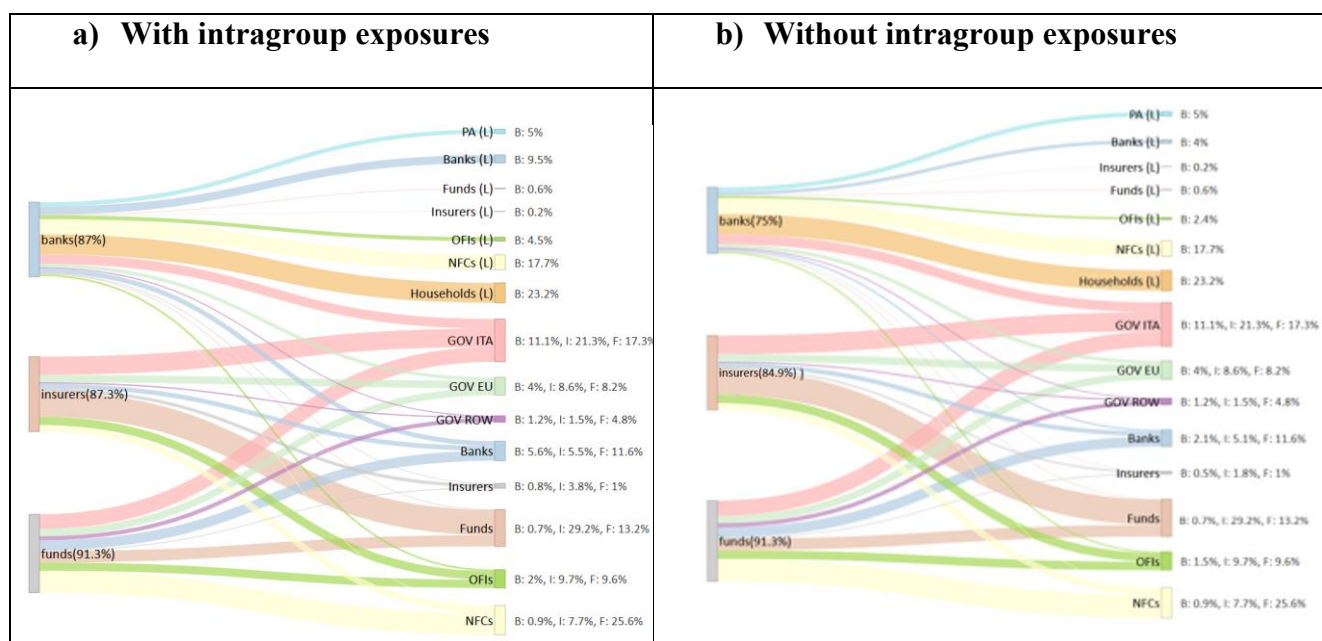
²¹ It should be noted that our analysis considers only loans recognised on the balance sheet. This is particularly relevant for loans to non-domestic entities that are part of Italian groups, which are therefore excluded in accordance with Anacredit rules.

²² This figure increases significantly—to around three quarters—when we consider only domestic intragroup exposures (see par. 5.4.1).

²³ As of June 2025, system-wide exposures to asset management companies are very limited, at €3 billion for banks (0.1% of their total assets) and €100 million for insurance companies.

For investment funds, the overall picture remains unchanged, as they do not hold intragroup positions.

Figure 6: Sankey chart of asset exposures for banks, insurance companies and investment funds, with and without intragroup (June 2025)



Note: The entities shown on the left side of each chart represent the Italian financial institutions whose assets are analysed in this study, namely banks, insurers and open-ended investment funds, while the categories on the right side of each chart indicate the counterparties or asset classes in which these entities have exposures. The percentages on the left side represents the share of assets into consideration over total assets for each sector; the percentages on the right indicate the share of specific exposures in the sector's total assets. The width of each band reflects the percentage of the sector's exposure in a specific asset. When the label includes "(L)", it refers to loans; when no specification is provided, it refers to investments. The different asset categories are not disaggregated on a geographical basis or based on any other feature, except for government bonds. As an example, the category "Funds" contains all fund' shares found among the mapped assets, regardless of whether they are issued by open-ended, closed-ended, Italian or foreign investment funds. "GOV" refers to the central government, while "PA" also includes entities belonging to the 'other general government' (i.e. local government and social security funds).

5.2 In-depth analysis of bank exposures without intragroup (June 2025)

Figure 7 focuses on the overall banking exposure to NBFIs, broken down by instrument type and banking category, excluding intragroup positions and equities. These exposures account for around 5% of total assets. The data highlights how banking exposures are distributed across investment funds (IFs), insurance corporations (ICs), and other financial intermediaries (OFIs).

Loans represent the largest component of these exposures. They are predominantly directed toward OFIs, with IFs accounting for a smaller proportion and ICs remaining negligible. Significant institutions dominate lending, particularly toward OFIs, while foreign banks hold a notable share.²⁴ LSIs remain marginal lenders, reflecting their limited scale.

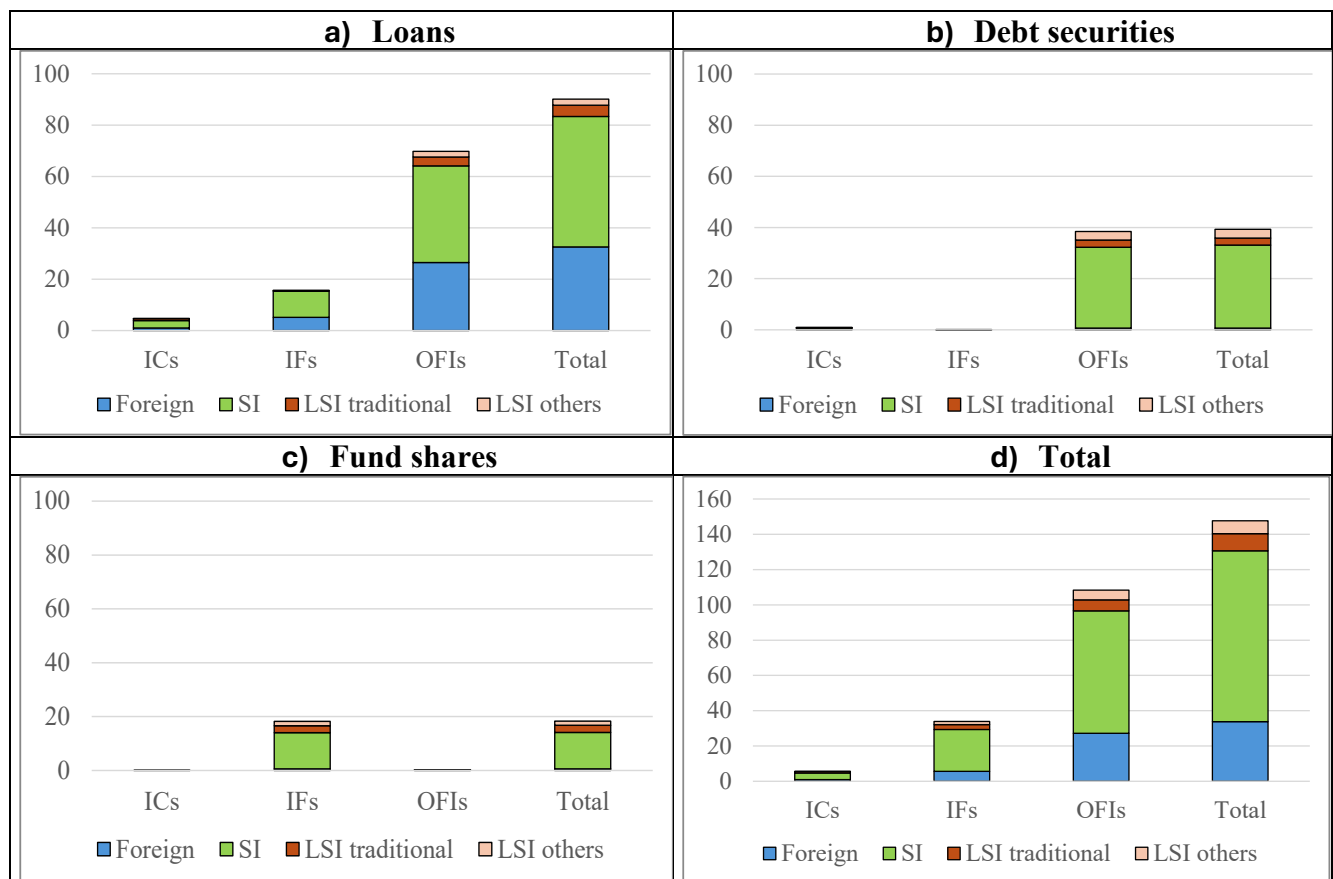
Debt securities exposures are concentrated almost entirely in OFIs, mostly consisting of securitization-related bonds²⁵. Here again, SIs constitute the dominant holding category, with other

²⁴ As discussed in more detail below, half of OFI lending is intragroup. Importantly, the non-intragroup portion still evidences substantial bank connectivity, often through foreign intermediaries.

²⁵ According to supervisory data reporting rules, securities repurchased by originator banks (such as Asset-Backed Securities, ABS) are not included among debt securities if the banks still keep the underlying loans on their balance sheets, as in the case of self-securitizations.

banks playing a secondary role. Fund shares involve much lower amounts compared with loans and debt securities²⁶ and, as expected, exposures are exclusively toward IFs. The distribution by banking category confirms the systemic relevance of SIs, followed by foreign banks, with LSIs showing minimal involvement.

Figure 7: Total banking exposure to NBF entities, by type and banking category
(billion euros; excluding intragroup positions)



These patterns underscore the structural interconnectedness between banks and NBFIs. The concentration of exposures within SIs suggests potential channels for systemic risk transmission, given their size and cross-border activities. Moreover, sizeable loan exposures to OFIs could entail credit risk.

5.3 Evolution of intragroup positions

The evolution of intragroup positions shows a heterogeneous pattern (see Table 5).²⁷ Between 2019 and 2025, banks' intragroup loans to other banks declined from 10.2% to 5.5% of total assets, while intragroup holdings of bank-issued securities, after an initial decline, stabilized at comparable levels. Intragroup bank exposures towards NBFIs are mostly concentrated towards the OFIs and it is broadly stable around 3%. Insurance companies' intragroup holdings of bank-issued securities remained broadly

²⁶ In this paper, when analysing banking exposures by category for financial conglomerates, we only consider exposures originating from banking entities. However, banks that are part of a financial conglomerate face indirect but significant exposure to fund shares, arising from the investment holdings of the associated insurance companies. In June 2025, entities included in financial conglomerates reported holdings of roughly 130 billion euros of fund shares, almost all of which were entirely issued by foreign investment funds.

²⁷ The results are in line with the Sankey chart (Figure 6); intragroup positions are measured as the difference between exposures with intragroup links and those net of intragroup exposures.

stable following an initial decline, whereas their holdings of insurance-issued securities decreased after a period of increase.

Table 5: Evolution of intragroup shares (2019-2025)²⁸
(percentage of total assets)

holder	type	2019	2020	2021	2022	2023	2024	2025 (June)
Banks	banks - loans	10.2	6.2	6.3	6.4	5.5	5.5	5.5
	banks - securities	3.5	3.1	3.0	3.1	3.3	3.4	3.5
	OFIGs - loans	2.2	2.0	1.9	1.8	2.0	2.1	2.1
	OFIGs - securities	0.6	0.6	0.5	0.6	0.6	0.5	0.6
	insurers - securities	0.2	0.2	0.2	0.2	0.3	0.3	0.4
Insurers	banks - securities	0.4	0.2	0.4	0.3	0.2	0.4	0.4
	insurers - securities	2.5	2.4	2.5	2.8	2.5	2.5	2.1

This evolution reflects the specific balance-sheet structures of each sector. For banks, the significant decline in intragroup loans is partly explained by the structural evolution in group organization: in recent years, several banking groups have simplified their legal architectures by merging subsidiaries into the parent company or consolidating intermediate entities (the most relevant are Intesa Sanpaolo's integration of Banca IMI in 2019–2020, UBI Banca acquisition and incorporation by Intesa Sanpaolo in 2020–2021, BPER Banca acquisition of Banca Carige in 2022–2023). Such streamlining mechanically lowers the volume of intragroup loans and cross-holdings recorded in sectoral data, as exposures that previously appeared as bilateral links between legally distinct entities are now absorbed within a single balance sheet.

5.4 In-depth analysis of intragroup bank exposures (June 2025)

Within our network, intragroup activities are relevant from two main perspectives: one that is sector-specific and another involving the entire network. Given the central role of banks — which as of December 2025 held more than half of the total assets of the Italian financial system — in this section we focus specifically on exposures sourced by these intermediaries. On the one hand, they extend credit to other banks belonging to the same banking group; on the other hand, they also supply funding to group-affiliated NBFIs. Internal lending activities (both banking and non-banking) optimise liquidity flows within groups, influence the distribution of risk, and increase the interconnectedness of the financial system as a whole. In this paragraph we assess the scale of these transactions, taking into account the various characteristics of banks.

5.4.1 Intragroup banks exposure towards other domestic banks

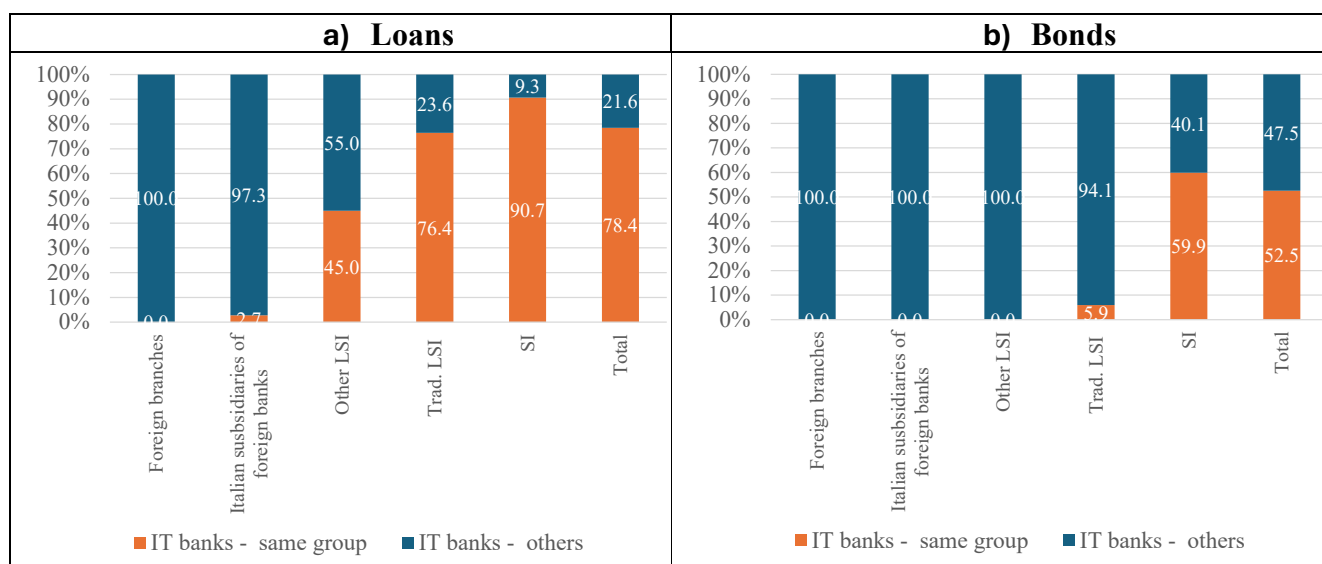
In June 2025, Italian banks' total asset exposures (excluding equities) to other domestic banks totalled approximately 240 billion euros (around 8% of total assets),²⁹ with intragroup exposures accounting for 73%. If we limit the analysis to loans, this share rises significantly (see Figure 8, panel a), highlighting

²⁸ Only asset class with intragroup share above 0.05% are reported.

²⁹ The AnaCredit database collects detailed loan-by-loan information to support monetary policy, supervision, and financial stability analysis. In this context, it is focused on credit provided to businesses and financial institutions other than banks; it does not encompass all interbank loans, also because very small intermediaries are exempt from the reporting. We prefer this database over data on interbank transactions at the individual level from supervisory reports, to avoid heterogeneity issues in the network data. Although the data on interbank loans from AnaCredit underestimates the size of the real interbank market, it remains highly representative of the overall market.

a strong network of relationships, involving banks belonging to both the SI and LSI categories. Intragroup exposures are considerably lower for bonds and are almost entirely sourced from SI.

**Figure 8: Composition of Italian banks' assets towards domestic banks:
breakdown by instrument type and counterparty affiliation
(percentage)**



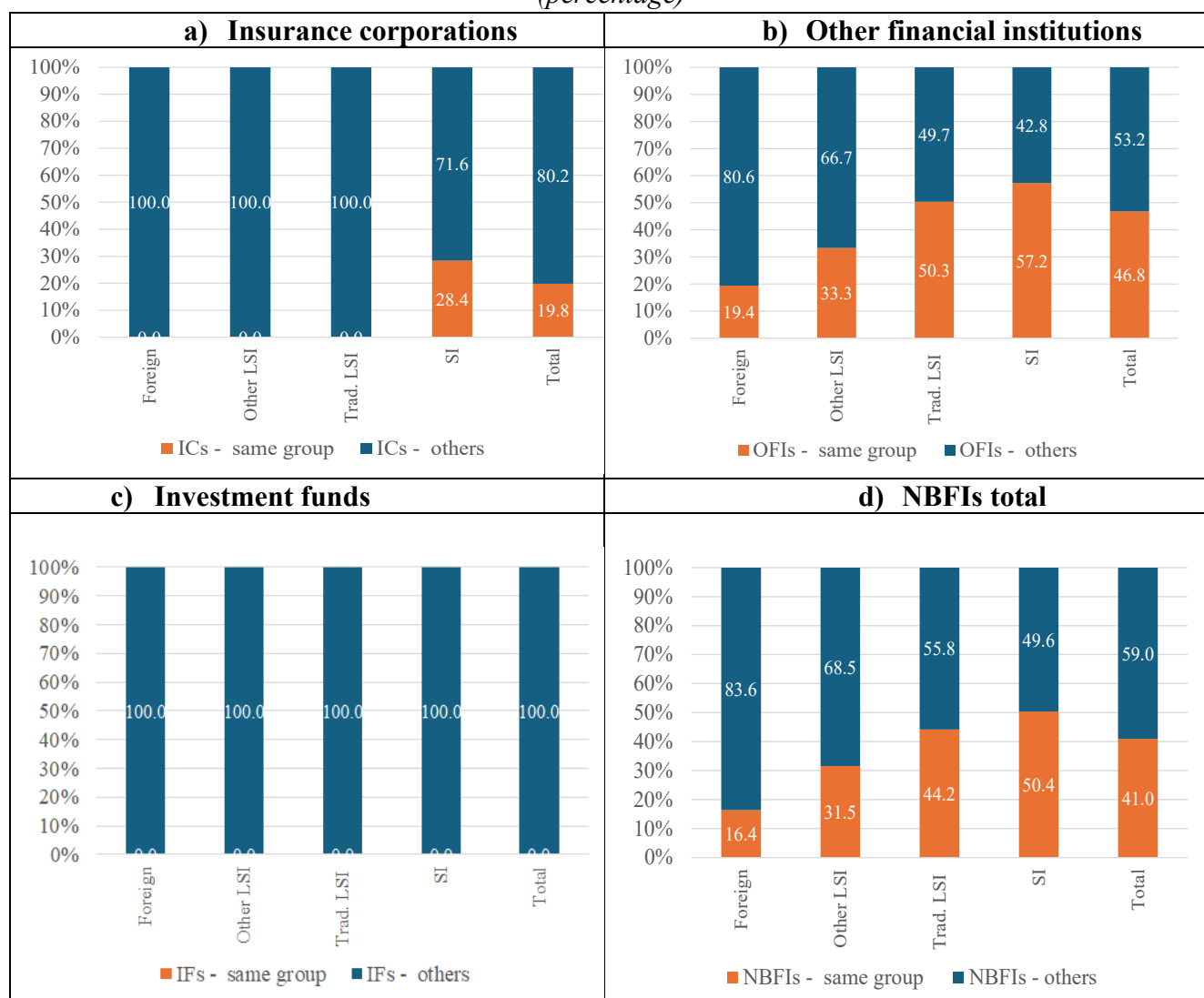
5.4.2 Intragroup banks exposure towards NBFIs

After having analysed banks' exposure towards other banks, we now focus on banks' exposures to NBFi entities.³⁰ These exposures were partially examined in the previous section ("Interconnections across financial sectors without intragroup positions"), which focused on the component net of intragroup positions and equities, amounting to 5% of total assets. As of June 2025, banks' intragroup asset exposures to NBFIs, net of equities, accounted for a further 2% of total assets.

Italy has a high number of banks with great credit exposures towards NBFi entities within the same group. In fact, a large part of total loans granted to NBFi entities are intragroup loans (over 40%, Figure 9), with significant heterogeneity among the NBFi sector and banking category. Intragroup loans are negligible for investment funds and account for only a small portion of loans granted to insurance corporations, especially from SI. Conversely, intragroup loans account for nearly half of all bank loans to OFIs, with a higher incidence among SI.

³⁰ As of June 2025, banks' total asset exposures (i.e. not only intragroup) to NBFi entities stood at 210 billion euro (excluding equities). With respect to the type of exposure to NBFIs, almost three-quarters consist of loans; 19% are bonds—primarily asset-backed securities issued by special-purpose vehicles (SPVs) classified under 'other financial institutions'—and the remainder consists of fund shares.

**Figure 9: Composition of Italian banks' loans towards NBFI entities:
breakdown by institution type and by counterparty affiliation
(percentage)**



6 Conclusions

This paper provides a comprehensive assessment of interconnectedness across banks, investment funds, insurance companies and the real economy in Italy. By combining granular supervisory and statistical data, we map loans and securities exposures that link financial intermediaries to one another and to the real economy. Our results highlight substantial cross-sector dependencies, with insurers emerging as major holders of fund shares, investment funds maintaining significant portfolio shares in securities issued by NFCs, and banks connected to the real economy through loans to both households and NFCs. Not surprisingly, overlapping-portfolio analysis shows that bond holdings —particularly Italian government securities—represent the dominant common exposure across sectors. Finally, our examination of intragroup positions reveals that a large share of interbank and NBFI-related exposures is internal to financial groups, and excluding these intragroup exposures markedly alters the structure of the financial network reducing the number and weight of interconnections.

While the paper offers a detailed system-wide perspective, several avenues for improvement and extension remain. First, expanding our dataset integrating information from commercial data providers may critically widen the scope of the analysis, encompassing open-ended investment funds on a global scale. Second, disentangling data at geographical level, when possible, to capture cross-border holdings and geopolitical risks. Finally, extending the dataset to incorporate deposits, derivatives, collateralized positions, off-balance-sheet commitments and other liability variables³¹ would capture additional layers of interconnectedness.

³¹ Such as, bank deposits from households, NFCs, other entities outside of the financial network and securities held by households, NFCs, and other entities outside of the financial network.

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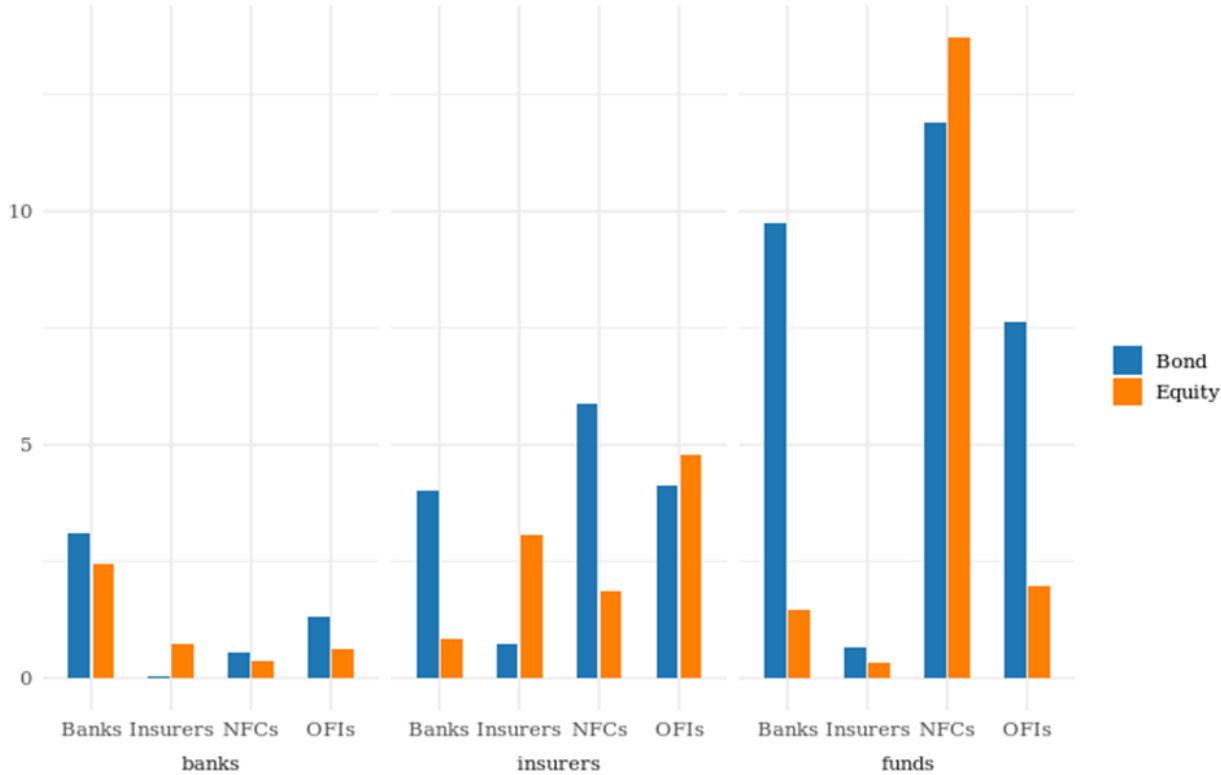
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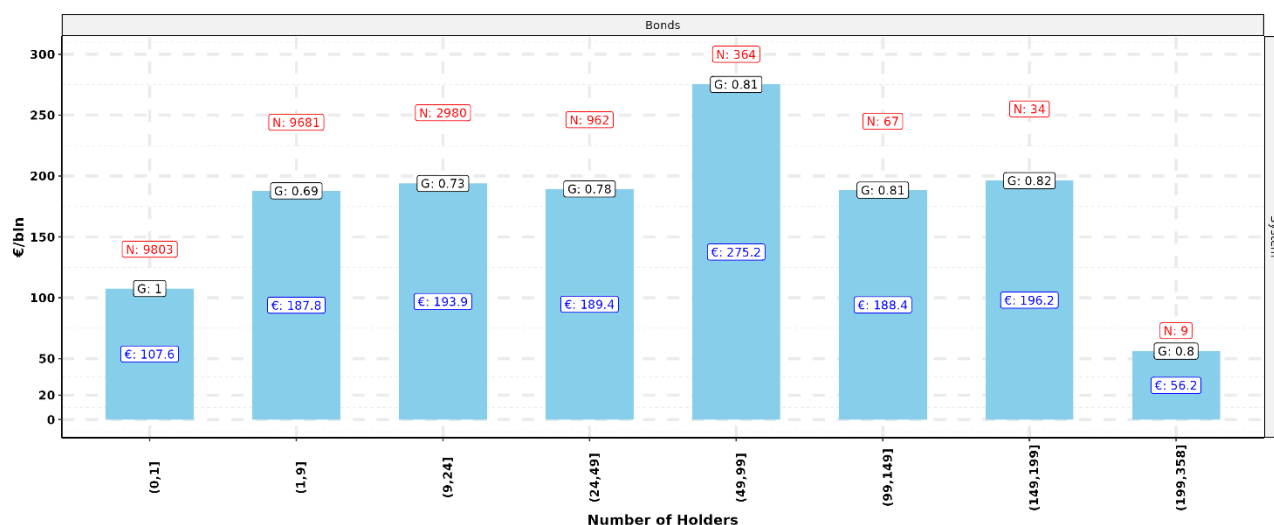
Appendix

Figure 1A: Breakdown of Securities into Bonds and Equities (June 2025)
(as a share of each sector's total assets)



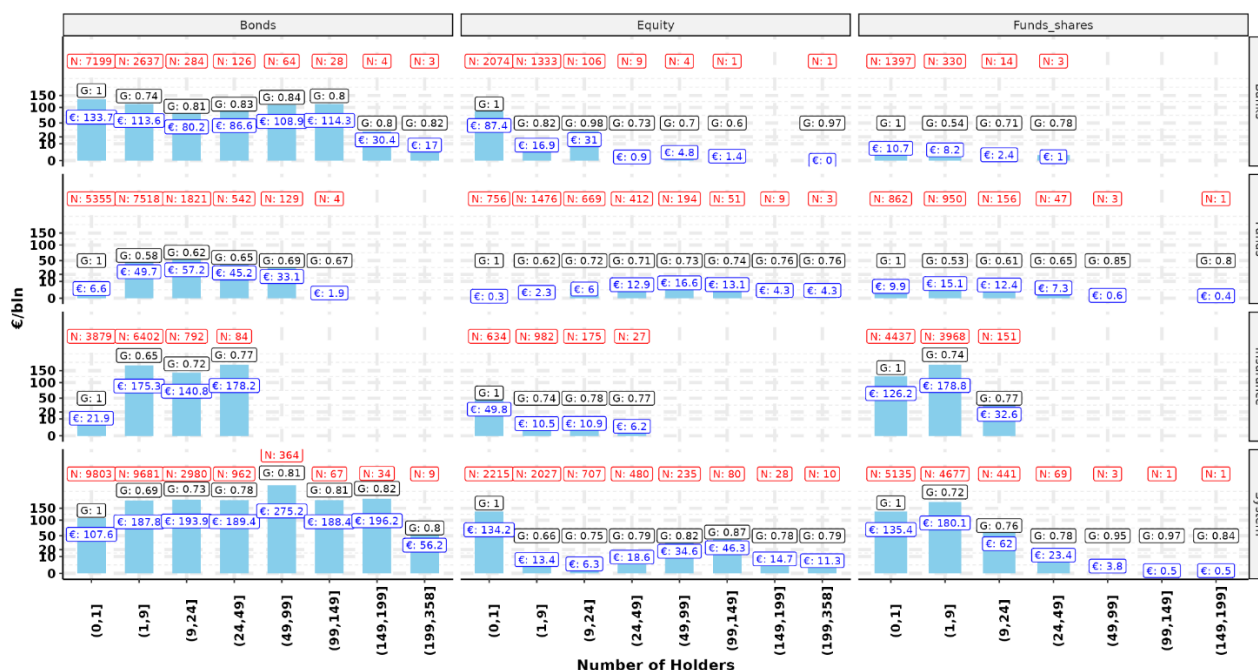
Note: For each Italian financial sector (banks, insurers, and funds), the figure reports the share of total assets invested in bonds (blue bars) and equities (orange bars) issued by banks, insurers, NFCs, and OFIs.

Figure 2A: Bonds in the financial system, distribution and concentration with details on loan amount (June 2025)



Note: Each bar shows the aggregated exposure by number of holders (x-axis), with the blue labels showing the exact corresponding amount. For each bar, the black labels indicate the corresponding average Gini index, computed for each security across its holders, weighted against the exposure corresponding to each security, and the red labels indicate the number of securities (i.e., different ISINs) in each class.

Figure 3A: Securities across financial sectors, distribution and concentration with details on loan amounts (June 2025)



Note: Each bar equals the aggregated exposure in the corresponding class (x-axis) and financial sector, with the blue labels showing the exact corresponding amount. For each bar, we also show with black labels the corresponding average Gini index, weighted against the exposure corresponding to each security, and with red labels the number of securities (i.e., different ISINs) in each class. For instance, in the Bonds-Banks chart, there are N = 2,637 securities held by between 2 and 9 banks, representing a total value of €113.6 bn, with a weighted-average Gini index of 0.74.