Non-Bank Lending to Mid-Size Firms in Europe: Evidence from Corporate Securities*

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Abstract

Using newly available micro-data, this paper documents new evidence on the rise of non-bank credit to mid-size firms in the euro area. Recent new issuers of debt securities are typically small, private, and unrated. Their spreads are comparable to high-yield bonds. Traditional "buy-and-hold" investors are small for unrated and smaller issuers, while non-bank intermediaries are large. These non-bank intermediaries were however as stabilizing as insurers during the March 2020 turmoil. Nevertheless, the subsequent bond issuance wave was restricted to large and rated firms. This market thus more closely resembles "private debt" markets than the traditional bond market.

Keywords: Non-bank lending, private debt, bond markets, financial fragility
JEL codes: G21, G32, E44

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1 Introduction

With the rise of non-bank lending, the landscape of corporate borrowing has changed significantly in the past few decades. This shift is of particular interest in Europe as its financial sector has always been heavily bank-based, unlike the United States. The transition toward more non-bank lending in Europe was seen as a priority in the wake of the Global Financial Crisis. Diversifying firms' sources of funding is thought to increase financial stability and growth, by improving firms' financing conditions and their ability to invest.[1] This transition is particularly important for smaller firms that might be vulnerable to credit cycles but have traditionally been dependent on bank loans. This is why the recent emergence of "private debt" markets that directly lend to mid-size borrowers has attracted much attention from policy-makers and academics alike [BIS, 2021, IMF, 2024, Erel and Inozemtsev, 2024]. At the same time, the traditional corporate bond market is often viewed as a useful "spare wheel" when the banking sector curtails loan supply [Becker and Ivashina, 2014], but has historically been dominated by large public borrowers. It is also well-known that both of these sources of non-banks lending are significantly less developed in the euro area relative to the United States despite their recent growth [Becker and Ivashina, 2021, Becker and Josephson, 2016].

In spite of its central importance, we nevertheless know very little about non-bank lending to mid-size firms in Europe. Existing work typically focuses on either the traditional corporate bond market or on U.S. private debt markets.[2] There are thus many open questions related to what forms non-bank lending takes in Europe. To this end, this paper presents the first comprehensive study of a growing segment: the market for debt securities ("bonds" or "capital market financing") for new and small issuers in the euro area. Bonds are different

[1] For instance, the Expert Group on European Corporate Bond Markets mandated by the European Commission in 2017 stated: "Corporate bonds reduce the over-reliance of the financial system on credit institutions and hence the susceptibility of the wider economy to bank deleveraging. The availability of an alternative source of funding for productive investment in the EU supports the wider economy, enables greater risk sharing and a more sustainable and smoother credit supply throughout the cycle."

[2] Iannamorelli et al. [2021] and Ongena et al. [2020] are important exceptions: they study the introduction of "minibonds" for small firms in Italy. Becker and Ivashina [2021] and Block et al. [2023] study private debt markets in Europe. In the U.S., Davydiuk et al. [2020] study Business Development Companies and Jang [2023] private debt funds. Chernenko et al. [2022] study all types of non-bank loans made to U.S. public middle-market firms.

from traditional bank loans and this market has been growing fast in recent years. How close is it to the traditional corporate bond market? How does it compare or contrast with private debt markets? This is key to understanding the implications of the rise of non-bank lending in modern financial systems.

To answer these questions, we leverage newly available micro-data on the universe of firm security issuance in the Euro Area, including both public and private firms. Recent new issuers are typically small, private, and unrated, which makes them largely "invisible" when looking at aggregate or rating-based bond market data. We also document differences in investor base as well as borrowing patterns during the 2020 crisis relative to historical bond issuers. Our evidence implies that the market for new issuers' debt more closely resembles private debt markets than the traditional bond market, albeit with some important differences.

We provide this new evidence by constructing the first comprehensive panel of euro area firms' capital structure, bond investors, banking relationships, and balance sheets including both public and private firms. Many of the data come from new harmonized datasets created by the European Central Bank and the Eurosystem. We merge four different sources: (i) security-level data on bonds outstanding from the Centralized Securities Database (CSDB); (ii) security-level bond holdings by categories of euro area investors from the Securities Holdings Statistics data (SHS-S); (iii) loan contracts from AnaCredit, the harmonized credit registry of the euro area that contains confidential loan-by-loan information on bank credit to corporations; and (iv) firms' balance sheet data from Orbis (private firms) or Capital IQ-Compustat (public firms). We carefully account for firms' group structure and subsidiaries using the Register of Institutions and Affiliates Data (RIAD). This data effort yields new insights into the understudied segment of new and small issuers.

We document five facts. First, the vast majority of recent new issuers are significantly smaller than historical bond issuers, are private firms, and lack a credit rating from a large rating agency. For instance, issuers below the median of assets are about 400 times smaller than the top quartile, with over 85% being private firms and over 95% being unrated. On the

one hand, this shows that the growth of European bond markets has benefited many firms. On the other hand, these new issuers are thus largely "invisible" when looking at aggregate, public firms, or ratings-based data alone, which are driven by the largest historical issuers. Moreover, the fact that new issuers have very different characteristics has drastic implications for how this market behaves. We leverage our newly available data to document this in detail.

The second fact is that credit spreads of small unrated issuers's securities are comparable to high-yield rather than investment-grade bonds. This result persists in regressions that control for maturity and month fixed effects. In general, spreads reflect a combination of firm credit quality and bond illiqudity. This raises the potential concern that the rise of new and small issuers might lead to more risk, building up in the dark. This however crucially depends on who lends to these firms, i.e. who are the underlying bond investors.

The third fact is that these issuers actually have a very different investor base. Investor composition plays an important role in financial stability: traditional 'buy-and-hold' bond investors such as pension funds and insurance companies have a long-term horizon and protect issuers from price dislocation in bad times [Coppola, 2021, Becker and Benmelech, 2021, Chodorow-Reich et al., 2021]. Using micro-data on investor holdings at the bond level, we find that traditional buy-and-hold bond investors are large in aggregate, but small for unrated and smaller issuers. For instance, insurance companies, pensions funds, and the ECB hold only 8% of small, unrated, private issuers' bonds, compared to 45% of the aggregate in our sample. Mutual funds are also significantly smaller than in the aggregate (14% vs. 37%). In fact, non-bank financial institutions are particularly large investors for this type of issuers. They hold 35% of their bonds, making them the largest investor category in spite of owning only a trivial share of the aggregate.[3] Two complementary facts is that many of these non-traditional investors are local, i.e. located in the same country as the issuer, and hold more concentrated positions than in traditional bonds.

How do these non-traditional lenders behave in bad times? To answer this question, we

[3]One important data limitation is that our data does not break down investors within this group. The category of "other financial intermediaries" combines a heterogeneous group of financial firms involved in lending and securities markets: dealers, private debt funds, finance companies, securitization, hedge funds, venture capital, etc.

study the March 2020 market turmoil, during which it is well known that bond issuance plummeted in the midst of rising yields and sell-offs in secondary markets. The fourth fact is that these non-bank institutions were as stabilizing as insurers during that episode. We use a methodology in a spirit similar to Coppola [2021] to study the effects of investor composition on bond spreads during the turmoil. In line with prior work, mutual fund ownership increased a bond's spike in spread relative to insurer investors. However, there are no similar patterns for non-banks institutions. Their effects on bond spreads is indistinguishable from insurers. This evidence alleviates concerns about market stability for new issuers, at least during times without banking crises.

Finally, we study the April 2020 bond market rebound. At an aggregate level, it is well understood that the ECB intervention, including corporate bond purchases, lead to a quick recovery. The fifth fact is that this bond issuance wave was restricted to large and rated firms. Using event study regressions at the firm level, we find that unrated firms increased their borrowing during this period, but that entirely came from bank loans. In contrast, IG firms strongly increased their bond issuance. Similarly, across the size distribution, only the largest issuers increased their bond borrowing while smaller issuers were restricted to loan markets instead.

These facts are naturally connected. While large issuers generally benefit from obtaining a credit rating by extending their investor base, this is less obvious for smaller and riskier issuers. Such issuers would be more likely to be rated below the investment-grade threshold, which would discourage traditional buy-and-hold investors from buying their bonds. This includes intervention by the ECB, whose corporate bond purchases are restricted to IG-rated bonds. Mutual funds are by far the largest investors in HY bonds, but have a strong preference for liquid bonds which can be sold to meet redemptions. On the other hand, local non-bank institutions may be more natural lenders because of their ability to handle risk and illiqudity for small unrated borrowers. This in line with the emergence of "private debt" and other forms of direct lending to middle-market firms, which typically does not involve credit ratings [Chernenko et al., 2022, Davydiuk et al., 2020, Block et al., 2023, Jang, 2023].

At a high level, the main implication of these facts is that the market we study is to some extent disconnected from the traditional bond market. Instead, it is closer to – and has grown in parallel with – "private debt" markets that have received considerable attention in recent years, especially in the United States. There seem to be a common thread: the rise of new types of non-bank intermediation targeting middle-market, typically private and unrated, borrowers to fill gaps left by traditional lenders.

At the same time, we find some important differences that relate to contrasting institutional forms. It is well known for instance that private debt funds are smaller in euro area, while business development companies as such do not exist [Becker and Ivashina, 2021]. Relative to U.S. studies, our issuers seem to be less profitable and in a wider range of industries, in line with U.S. private lenders often helping to finance buyouts by private equity firms, and that buyout targets tend to tilt towards certain characteristics and sectors.[4] Instead, the market we study seem to be drawing relatively more from the pool of traditional bank borrowers. We also observe differences in lending terms, with the majority of lending in our sample having a fixed interest rate, as opposed to floating rates typically offered by U.S. private lenders. We show that this market is not driven by the existence of the ECB collateral framework for corporate bonds, which is absent in the United States. Only a negligible share of these bonds are eligible to be pledged for central bank funding. Instead, broader institutional factors seem to be responsible for the smaller share of private equity/debt in the euro area, limiting the ability of investors and firms to scale up.[5]

We conclude by discussing implications of our evidence for four key outstanding macro-finance issues. First, the fact that intermediaries are still important for small and new issuers blurs the conventional dichotomy between intermediated and market financing. Second, it is important to build a broader framework for bond credit supply and its implications for firms'

[4]See for instance Jang [2023] or Davydiuk et al. [2020]. This not to say that all non-bank lenders in the U.S. targets this type of firms. For instance, Chernenko et al. [2022] provide clear evidence that some non-bank lend to unprofitable (i.e. with negative EBITDA) public firms, that are typically under-served by banks.

[5]Potential factors include: (i) weak and nationally fragmented insolvency rules [Becker and Ivashina, 2021], (ii) less developed financial system due to a lack of Capital Market Union and different pension systems [Scharfstein, 2018], (iii) high-level divergence in key policy areas, including taxation, redistribution, and labor markets.

access to credit: traditional investors are significantly smaller for small and new issuers, while less-studied investors are larger. Third, there are potential lessons for the design of credit policies: one implication of rating restrictions on bond purchases by central banks is that they might have limited effects on new issuers, which tend to be small and unrated. Fourth, the opacity of small, unrated, and private borrowers as well as of non-traditional lenders makes gauging the underlying risks in non-bank lending particularly challenging.

1.1 Related Work

This paper first contributes to the literature on the rise of non-bank lending [Berg et al., 2020, Erel and Inozemtsev, 2024, BIS, 2021, IMF, 2024]. Studying this shift in Europe is particularly interesting as its financial sector has always been much more heavily bank-based than the United States. We relate to an emerging body of work studying direct lending by non-banks in loan markets, usually in the U.S. For example, Chernenko et al. [2022] study non-bank lending for U.S. public middle-market firms, while Davydiuk et al. [2020] study U.S. Business Development Companies (BDC). Block et al. [2023] and Jang [2023] focus on private debt funds which often provide loans for buyouts deals. We complement this body of work in three ways: (i) we focus on Europe, where BDC do not exist and private debt funds are significantly smaller [Becker and Ivashina, 2021]; (ii) we focus on security issuance rather than loans; (iii) our data covers the near-universe of firm security issuance, thus alleviating the need to focus on a specific type of non-banks or firms. However, the downside of our data is that we cannot distinguish between different types of non-banks, unlike these existing works.

We also contribute to the literature on the growth of corporate bond markets. Specifically, we focus on the key topic of new issuers (the extensive margin of growth), which has received surprisingly little attention given how crucial it is to a successful transition. The closest papers in that respect are Ongena et al. [2020] and Iannamorelli et al. [2021], who study the introduction of minibonds in Italy in 2012. They find that entering the bond market can improve financing conditions for small and private firms. The two approaches

are complementary: detailed data from the Italian central bank helps to narrow some of the mechanisms at play, while our broad sample increases external validity. Becker and Josephson [2016] also study the effects of entering the bond market, although their data stops in 2010 and includes only public firms, many outside the euro area. Relative to these works, we focus less on the (generally positive) effects of bond market entry on firms' balance sheets and instead provide complementary facts on this segment of the market, with an emphasis on investor composition and behavior across the credit cycle. At a high level, we take as given important (non-exclusive) macroeconomic factors that have been identified as drivers of bond issuance in Europe, often using variation around specific events.[6] Relative to these works, this paper takes a more holistic view of bond issuance in the euro area. Moreover, contrary to most prior studies, we include private issuers, which have multiplied in recent years. This allows us to offer the first comprehensive analysis of new and small issuers in Europe.

We also contribute to the link between financial fragility and non-bank lending, broadly defined. A growing strand of literature has emphasized the role of bond investor composition for financial stability. The fragility of fast-growing corporate bond funds contrasts with the fact that insurance companies and other long-term investors can insulate firms from market turmoil [Coppola, 2021, Becker and Benmelech, 2021, Goldstein et al., 2017].[7] We provide novel evidence of how large non-traditional bond investors are for small and unrated issuers, in spite of being small in the aggregate. We also find that non-bank intermediaries were as stabilizing as insurers during the 2020 market turmoil.

[6]These factors include: the creation of the euro [Pagano and Von Thadden, 2004], a fall in loan supply [Becker and Ivashina, 2018, Altavilla et al., 2017], bankruptcy reform [Becker and Josephson, 2016], conventional and unconventional monetary policy [Grosse-Rueschkamp et al., 2019, De Santis and Zaghini, 2021, Pegoraro and Montagna, 2021, Arce et al., 2018, Ertan et al., 2019, Giambona et al., 2020, Todorov, 2020, Becker and Ivashina, 2014, Lhuissier and Szczerbowicz, 2018, Elliott et al., 2019], reach for yield [Becker and Ivashina, 2015, Bubeck et al., 2020, Di Maggio and Kacperczyk, 2017], or the ECB collateral framework Pelizzon et al. [2019].

[7]In fact, bond funds outflows were at the core of credit market disruptions in 2020 [Falato et al., 2020, Ma et al., 2020, Zaghini, 2020].

2 Background and Data

2.1 Aggregate Growth in the Euro Area

At an aggregate level, the amount of outstanding debt securities (bonds) issued by firms in the euro area has been rising steadily. Developing non-bank lending in Europe was seen as a priority in the wake of the last banking crisis: diversifying firms' sources of funding is thought to increase financial stability and growth. Entering the bond market can improve financing conditions for small and private firms. At a micro-level, bond market entry can have a positive impact on firms' balance sheets by improving their financing conditions and their ability to invest [Iannamorelli et al., 2021, Ongena et al., 2020, Becker and Josephson, 2016]. Internet appendix IA.2 confirms these findings in a sample of European new issuers. The key macroeconomic factors driving this aggregate growth have been identified in prior work, including a fall in loan supply, bankruptcy reform, and loose monetary policy and quantitative easing (see, e.g. Becker and Ivashina [2018], Altavilla et al. [2017], Becker and Josephson [2016], Grosse-Rueschkamp et al. [2019], De Santis and Zaghini [2021]).

For background, we illustrate this growth using aggregate and public firm data commonly used in existing work. Figure 1 shows the growth of the Eurozone corporate bond market in the period 2002–2021.[8] Aggregate data on firms' outstanding bonds come from the quarterly sector financial accounts of the ECB Statistical Data Warehouse (SDW), while bond-level data come from the Corporate Securities Database of the Eurosystem (CSDB), which we describe in more detail in the next section. The growth of the bond market has been continuous since the early 2000s and has accelerated after the financial crisis. The data show that the corporate bond market has massively increased in size from €508B in 2002 to €1,642B in 2021. Both micro-level and aggregate data display similar magnitudes. Figures IA.1 and IA.2 in the Internet Appendix show that growth was not restricted to a particular country or sector.

[8] Berg et al. [2020] provide a more detailed overview of trends in corporate borrowing using data from public firms in the United States and Europe.

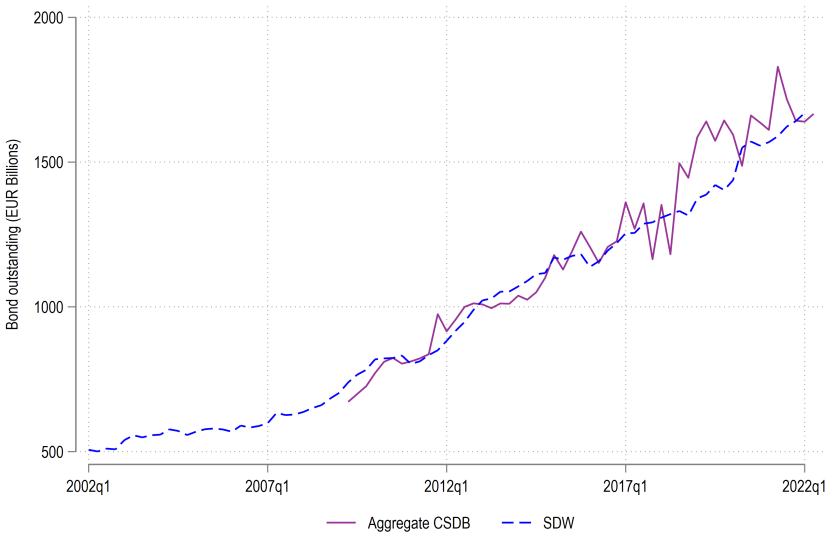


Figure 1 – Aggregate Growth of the euro area Corporate Bond Market

This figure shows the aggregate level of bonds in the euro area for non-financial corporations from 2002 to 2021, and from 2009 Q2 to 2021 Q4 for the CSDB aggregate. The sources are the ECB Statistical Data Warehouse (SDW) Macroeconomic and sectoral statistics and the Corporate Securities Database of the Eurosystem. In SDW, bonds correspond to the variable liabilities-debt. In CSDB, all debt securities issued by subsidiaries of non-financial corporates are summed. Data are at the quarterly level. Data are corrected for inflation, and reported in billions €.

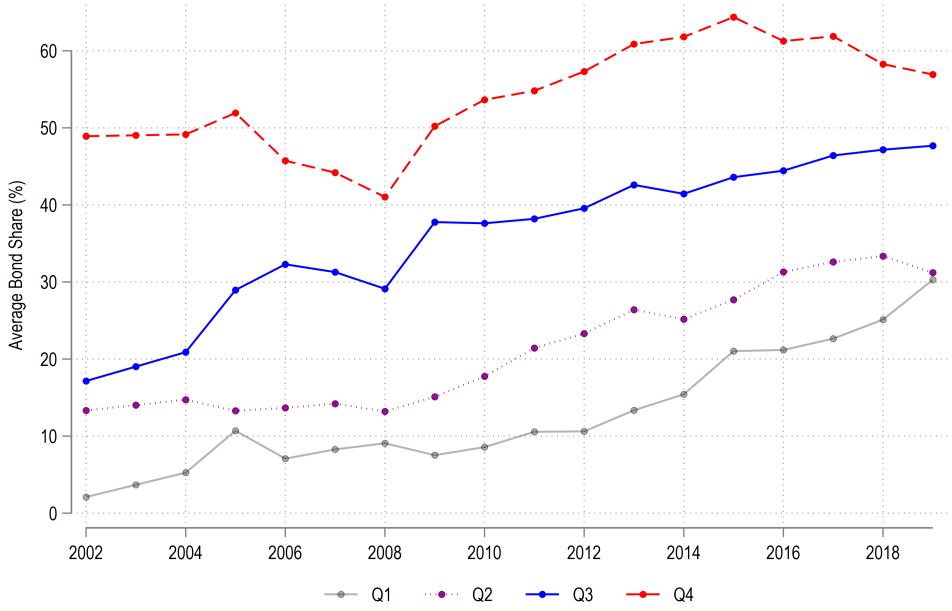


Figure 2 – Bond Share Across Firms' Size in Eurozone

The graph represents the evolution of bond share across quartiles of total assets of public firms in our sample for the period 2002–2021, by plotting within-quartile mean. Quartiles are dynamic over years, that is, they are computed in each year. The data are collected from Capital IQ. Bonds are defined as the sum of Senior Bonds and Subordinated Bonds. The average bond share is expressed in %.

To motivate the rest of our analysis, we also use Capital IQ data to display the growth in bond financing in the cross-section of euro area public firms. Figure 2 presents the time series of the average bond share across public firms of different sizes. The average bond share increased steadily and significantly from 20% to 40% between 2002 and 2021. Importantly, this increase in the firms' dependence on the bond market is not concentrated at the very top. While the largest firms have a significantly higher level of bond share, the bond share has more than doubled for many firms.

To better understand the transition, this paper focuses on new and smaller issuers, including private firms. Even if their total contribution to aggregate volume is smaller, these firms are key to a successful transition. Yet, very little is known in general about this segment of the market in Europe.[9] An important potential source of non-bank lending for these firms are so-called "private debt markets." Their growth has attracted considerable attention

[9]The case of Italy has been studied in detail in Iannamorelli et al. [2021] and Ongena et al. [2020].

in recent years. This new form of non-bank intermediation has been growing particularly fast in the United States. It is often defined as including two types of investors engaged in "direct lending" to firms: private debt funds and business development companies (BDC) [Davydiuk et al., 2020, Block et al., 2023, Jang, 2023]. Like banks, they originate loans to middle-market firms. Unlike banks or mutual funds, these lenders are close-end funds, often backed by larger asset-management companies, such as private equity firms.[10] The growth of these new private lenders has been fast-paced in the U.S., reaching about $1T [Jang, 2023, ECB, 2024]. At the same time, it is well-understood that private debt markets are significantly less developed in Europe [Becker and Ivashina, 2021].[11] Part of our goal is to understand the different form that non-bank lending takes in Europe.

2.2 Data

We construct a panel of euro area firms' capital structure, bond investors, banking relationships, and balance sheets including both public and private firms. Many of the data come from new harmonized datasets created by the European Central Bank and the Eurosystem. In total, we combine five data sources.

The first dataset consists of security-level information on bonds outstanding from the Centralized Securities Database (CSDB) maintained by the ECB. For each bond outstanding in the euro area, we can observe its issuer, issuance and due date, size, price information, and bond characteristics. Amount outstanding and secondary market prices are recorded in a monthly panel starting in 2010. We add information on ratings from the three main rating agencies (Standard and Poor's, Fitch, Moody's). If applicable, we use the average issuer rating across agencies. Otherwise, we apply the average rating of the firm's instruments[12].

[10] Middle-market firms are typically defined as having annual revenues between $10 million and $1 billion. Unlike the syndicated loan market, private lenders are less likely to sell the loan after origination, holding more concentrated positions [Jang, 2023]. BDC also have specific regulatory status, with implications for their capital structure, investment restrictions, and income distribution [Davydiuk et al., 2020].

[11] While the growth rate is significant, it remains a much smaller market, especially outside of the United Kingdom. BDC do not exist as such in Europe, and private debt funds are significantly smaller. By 2023, the asset-under-management of private lenders in the euro area still below 100B € in spite of growing 18% annually since 2010 [ECB, 2024].

[12] Although we use data on ratings from the three main rating agencies, we acknowledge that this does not

We then merge this bond-level information with firm-level information. Private issuers are matched to Orbis, while public firms are matched to Capital IQ. This gives us access to balance sheet information on the firms' assets and liabilities. We carefully account for the firms' group structure by identifying multiple subsidiaries of each company and ensuring that we restrict our sample to the parent company of each group[13].

To identify the parent company of each group and correctly allocate the subsidiaries of the group under the parent company we use the Register of Institutions and Affiliates Data (RIAD). RIAD is a dataset developed by the European System of Central Banks (ESCB) that allows us to successfully link different databases and aggregate data according to multiple group structures. For the purpose of this analysis, we start with all bond issuers in the euro area as reported in CSDB and link these with the respective RIAD codes and/or LEIs from Orbis. Next, we retrieve the group structure as available in RIAD and Orbis.[14] We hand-match firm identifiers that appear to have issued a large amount of bonds and should be matched to an Orbis entity. Last, we keep only non-financial corporations.[15]

Parts of our analysis study heterogeneity in investor composition across issuers. To this end, we match our core dataset at the bond ISIN level with the Securities Holdings Statistics data (SHS-S), which are collected by the Eurosystem, as well as with the Securities Holdings Statistics – Eurosystem (SHS-E) data, which are provided by the Eurosystem market operations departments. The SHS-S dataset provides information at the security level on the amount held by selected categories of euro area investors; similarly, the SHS-E dataset provides information at the security level on the amount held by the Eurosystem. For

cover the universe of rated bonds in the euro area as many bonds may be rated by specialized local agencies that operate at a national level. For example, Franke and Krahnen [2017] document that 52% of the German SME bonds were rated by the German rating agency Creditform in 2016. Nevertheless, most rating-based mandates for institutional investors are based on the three main rating agencies.

[13]For completeness, we include information on the financial subsidiaries of the non-financial corporations. We have verified that all our main results hold if we exclude financial subsidiaries.

[14]We first try to match all bond issuers to their corresponding ultimate parent in Orbis via the LEI. If this link is not available, we use the Orbis-RIAD mapping or the Group structure in RIAD by first retrieving the ultimate parent in RIAD and the associated ultimate parent in Orbis.

[15]That requires cleaning of the industry classification of the ultimate parent. For the industry classification, it was necessary to hand-collect information for some firms based on the name and reported industry of each firm.

our analysis, we group the investor types into the following categories: insurance companies and pension funds, non-MMF investment funds, central bank, deposit-taking corporations, non-financial corporations, households, general government, and other non-bank financial institutions. The rest of the world is estimated as the residual amount from the total amount outstanding and the amounts held by selected investors in the euro area. The frequency of these data is quarterly.

Finally, we gather information on loan contracts and lending relationships from AnaCredit. AnaCredit is the harmonized credit registry of the euro area that contains confidential loan-by-loan information on bank credit to corporations.[16] The data are available at monthly frequency, beginning in September 2018. Matching our sample of bond issuers to AnaCredit requires additional work on linking different subsidiaries with the parent company. We applied a procedure similar to the one described above to ensure that we link the information for each firm correctly.[17]

This data effort allows us to build a panel of euro area bond issuers to include both private and public firms, with information on bonds, loans, investor base, and balance sheets. One caveat is that not all datasets cover the same time periods. The bond- and firm-level data are available from 2010 onward, while the investor base and loan-level data start in 2018.

The final sample includes in total 2,580 firms (groups), out of these 737 are public firms and 1,843 are private firms. This is a significantly larger number than previous studies on bond issuance in Europe that include private issuers.[18]

[16] AnaCredit reports all loans granted by credit institutions residing in euro area member states, including loans granted by their domestic/foreign branches. For that reason, any credit that is granted by a bank outside the euro area will not be included in our analysis. The data are maintained by the ECB and the Eurosystem National Central Banks and are harmonized across member states. A credit instrument is subject to reporting if the borrower is a legal entity and if the total commitment amount at the creditor-debtor level is greater or equal to €25.000 at any point within the reference period.

[17] Specifically, we start with all active borrowers that are listed with their unique LEI and RIAD codes and we apply the same group structure extraction as described above. Next, we proceed with ensuring there is only one unique link between the bond issuer and the AnaCredit borrower and their ultimate parent. This step allows us to have only one ultimate parent for each entity, and we restrict our analysis to the parent company of each group.

[18] For example, in the context of Italian minibonds, the final sample of Ongena et al. [2020] includes 92 firms, while Iannamorelli et al. [2021]'s includes 294 issuers. However, given our matching criteria, it is likely that our sample does not contain all Italian firms that issued a minibond.

3 The Cross-Section of Issuers

3.1 Entry in the Euro Area Bond Market

The increase in firms' dependence on market financing is not restricted to historical issuers (intensive margin) but is also driven by firms entering the bond market in recent years (extensive margin). We define as new issuers firms that issued a debt security for the first time in the period on or after 2010.[19] Figure 3 shows there was a constant entry of firms issuing bonds for the first time during our sample period. Every year, new issuers entered the bond market for the first time, and entry has accelerated since 2016. In early years, new issuers represented a small fraction of all issuers, but since 2017, each new cohort made up between 8 and 10% of all issuers in our sample (see Figure IA.3 in the Internet Appendix) .

Moreover, we see that there were more private new issuers than public new issuers, especially in recent years.[20] This underscores the need to go beyond traditional data on public firms to understand the shift towards non-bank lending in Europe.

3.2 Issuer Characteristics

Next, we investigate in more detail the characteristics of new and small bond issuers. Table 1 presents a comparison of firms of different sizes (quartiles of assets) in terms of: (i) credit rating status, (ii) new versus historical issuers, and (iii) private versus public firms. The table shows that a significant share of bond issuers are private and unrated firms that entered recently the bond market. Specifically, among the smaller issuers (Q1 and Q2 firms), more than 95% are unrated by the top three rating agencies, over 85% are private firms, and over 75% entered the bond market only in the last decade. The size differences are also large: Table 2 shows that issuers in the first or second quartile are 300 to 800 times smaller relative to the largest quartile (€25-70M versus €20B in assets). While small bond issuers are larger

[19] Although our data start earlier, we choose 2010 as a cutoff to prevent an excessive number of false positives.

[20] Note that the number of private issuers is likely even larger because our sample is restricted to firms that we could match to Orbis. Figure IA.4 in the Internet Appendix also shows the geographical distribution of new entrants, many of which come outside of "core" countries like France, Germany or the Benelux.

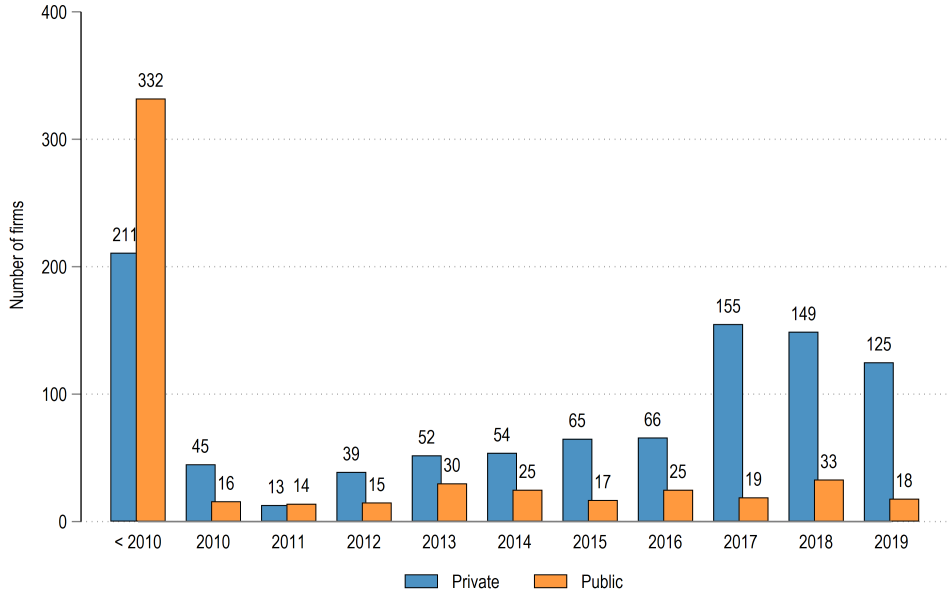


Figure 3 – Euro Area Bond Market Entry

This figure presents the total number of public and private issuers from 2010 to 2019. In each year, new issuers are defined as firms that issue bonds for the first time in that year. The first year of issuance was obtained by combining Capital IQ and Centralised Securities Database (CSDB), which corresponds to the earliest issue year one could identify for any subsidiary or branch within the group structure of firms in the sample, that is, for any group, as well as the date of issuance - either identified directly using the variable *date of issuance* from CSDB or first year with non-zero bond volume outstanding in Capital IQ - which corresponds to the earliest issuance date across all entities within the group is kept. Bonds in Capital IQ correspond to the sum of Senior and Subordinated Bonds. Bonds in CSDB correspond to debt securities, where we exclude commercial papers.

Table 1 – Share of Private, Rated, & New Issuers by Size

category	Q1	Q2	Q3	Q4	Total
A (%)	1.90	0.45	1.27	9.97	4.51
BBB (%)	0.63			28.61	11.02
HY (%)			4.24	17.06	7.52
NR (%)	97.47	99.55	94.49	44.36	76.95
New Issuers (%)	82.91	75.78	60.26	30.19	56.35
Private Issuers (%)	91.14	86.10	70.09	26.04	60.86

This table shows the share of the following subcategories of issuers in our sample according to all categories used in our analysis: (i) size, (ii) rating, (iii) issuance history, and (iv) private/public status of the firm. The table first breaks our sample between quartiles of total assets. Quartiles are fixed and calculated only once with total assets values for the year 2019. Additionally, each quartile is further broken down between four rating categories: Unrated (NR) for the groups without a rating from S&P, Moody's, or Fitch; High Yield (HY) for all group ratings below 9; BBB for all groups rated between 9 and 11; and Investment Grade (IG), which includes all ratings of 12 and above. Ratings data are obtained from the Corporate Securities database (CSDB) collected by the Eurosystem and harmonized on a scale from 0 to 18 before defining rating subgroups. We identify the share of new issuers in our dataset by collecting information on the first year of issuance of bonds for each group on Capital IQ and/or CSDB. New issuers correspond to any groups that first issued a bond during and/or after 2010. Last, we differentiate between private and public issuers, where public firms are identified via the existence of the ISIN of a public stock in Orbis and/or Capital IQ. The data are expressed in %.

than the typical SME, they are nevertheless orders of magnitudes smaller than bond issuers typically studied in existing work.[21]

Perhaps the most striking aspect is the prevalence of issuers who lack a rating from a large credit agency. In line with common practice, we used the phrase "unrated" to denote the absence of a rating from one of the big three credit rating agencies (CRA): S&P, Moody's, and Fitch. This is because their market share exceeds 90% of European rated bonds and because many rating-based investment mandates specifically require a rating from one of these CRAs [Baghai et al., 2022].[22] Although we cannot rule out some small amount of measurement error, the prevalence of unrated issuers in Europe is corroborated by anecdotal sources.[23] Note also that we observe very few firms that were unrated at their first issuance

[21]For reference, Tables IA.1 and IA.2 in the Internet Appendix provides summary stats across countries.

[22]For more information on the penetration of small rating agencies, see this report by the European Securities and Markets Authority.

[23]Recall that our classification of rated firms includes both the existence of an issuer-level rating as well as a bond-level rating. Unrated firms have neither of these from any of the big three (S&P, Moody's, and Fitch). Although imperfect matching between datasets could lead us to underestimate this share, external sources confirm this low number of rated issuers. For instance, the ECB estimates that in 2004 only 11% of euro area firms with a turnover above €50M had an S&P rating, while 92% of corresponding U.S. firms were

Table 2 – Summary Statistics across Type of Issuers - Size

	(1)				
	Q1	Q2	Q3	Q4	Total
Total Assets (Mlns EUR)	25.27	71.19	444.4	20945.1	8988.8
	(162.3)	(32.90)	(260.7)	(37033.7)	(26173.7)
Bond Share (in %)	32.25	24.76	30.82	56.64	39.70
	(34.45)	(30.79)	(32.33)	(36.69)	(36.73)
Total Credit / Assets (in %)	31.68	30.51	31.56	24.17	28.34
	(29.29)	(26.14)	(23.24)	(16.25)	(22.62)
Profitability (EBITDA / Assets) (in %)	3.833	4.616	5.680	7.748	6.216
	(22.62)	(9.249)	(5.785)	(4.960)	(9.475)
Negative EBITDA indicator	0.169	0.185	0.0794	0.0234	0.0839
	(0.375)	(0.388)	(0.270)	(0.151)	(0.277)
Cash / Assets (in %)	6.955	6.286	7.533	7.656	7.288
	(8.523)	(7.324)	(8.185)	(5.749)	(7.067)
Fixed Assets / Assets (in %)	47.44	47.93	53.26	45.73	48.30
	(26.45)	(23.32)	(24.81)	(28.98)	(26.74)
Bond Remaining Maturity (in years)	3.850	3.915	4.348	5.894	4.855
	(4.288)	(5.917)	(4.100)	(7.381)	(6.123)
Volume Share of Fixed Coupon Bonds (in %)	70.49	69.60	77.97	93.19	82.88
	(44.52)	(45.10)	(39.85)	(19.89)	(35.34)
Volume Share of Senior Bonds (in %)	91.75	97.42	97.28	97.87	96.96
	(27.53)	(15.46)	(14.44)	(12.08)	(15.78)
Volume Share of Unsecured Bonds (in %)	95.41	95.98	97.51	99.37	97.98
	(20.22)	(19.65)	(14.03)	(5.466)	(12.97)
Bond Yield at Offering (in %)	5.059	4.463	6.092	1.286	3.196
	(3.301)	(2.239)	(29.80)	(1.316)	(13.93)
Interest Rate on All Loans (in %)	2.847	2.666	2.249	1.865	2.281
	(4.243)	(3.798)	(2.714)	(2.824)	(3.298)
Interest Rate on Term Loans (in %)	2.377	2.047	1.791	1.637	1.861
	(3.603)	(1.210)	(1.280)	(2.687)	(2.323)
Observations	14479				

The table reports mean and standard deviation (in brackets) of the main variables of interests for our sample of EA non-financial issuers in 2019, broken down by quartiles of total assets. Quartiles are fixed and calculated only once with total assets values for the year 2019. All variables are reported on a monthly basis. Interest rates are volume weighted.

but obtained a rating later on during our sample period.[24] Section 4.1 discusses the potential reasons for being unrated in more detail.

Table 1 also makes clear that there is a high correlation between these issuers' characteristics. It is thus useful for exposition to emphasize the dichotomy between the "top" of the euro area bond market, consisting primarily of large rated public historical issuers, and the "bottom", consisting primarily of small unrated private new issuers. On the one hand, this evidence shows that the growth of European bond markets has benefited many firms. On the other hand, these new issuers are thus largely "invisible" when looking at aggregate, public firms, or rating-based data alone, which are driven by the largest historical issuers.

We summarize the first fact as follows:

Fact 1: *Most recent new issuers are significantly smaller than historical issuers, are private firms, and lack a credit rating from a large rating agency.*

While the focus of this paper is squarely on small issuers in Europe, we nevertheless note from the outset the presence of some large unrated issuers that contrasts with the U.S. Although this is an interesting phenomenon, explaining it is beyond the scope of this paper.[25]

3.3 Credit Spreads

To better understand small unrated issuers in particular, we next compare their credit spreads to that of other issuers. Figure 4 plots a time series of the average bond spreads of across rating categories. Unrated issuers are split by size. Small unrated issuers' bond

rated (Table 10 here). Moreover, in 2017 the European Commission estimated the share of unrated bonds to be similar to HY bonds, around 14% of the total (Figure 6 here).

[24]These firms amount to less than 7% of new (post 2010) unrated issuers. Among historical issuers (firms that entered the bond market before 2010) without a rating, about 30% had a rating by the end of our sample.

[25]These firms are often household names (Barilla, Prada, Air France, Sixt, etc.) and the underlying economics are likely to be substantially different. For instance, their bonds appear to often be of higher credit quality and liquidity: Fitch reported that many display credit profiles that could be classified as investment, or near-investment grade, while UniCredit maintains an unrated core corporate-bond index tracking the performance of a basket of large European unrated bonds.[26] This is in line with Figures 4 and 6 that shows that their spreads and investor composition are much more similar to IG issuers. A complementary explanation is that rating-based investment mandates are somewhat less prevalent in Europe, as documented in Baghai et al. [2022].

spreads are much more comparable to that high-yield bonds rather than investment grade. This result persists in regressions that control for bond maturity and month fixed effects, as shown in Table 3.

Fact 2: *The credit spreads of small unrated issuers are comparable to high-yield bonds.*

In general, spreads reflect a combination of firm credit quality and bond illiqudity. Bond spreads can be high because of a risk premium and/or an illiquidity premium. Decomposing the two is challenging in our setting given the limited data on small private firms. Indeed, default risk is often estimated using data on CDS or equity volatility, while liquidity is often measured with bid-ask spreads or turnover. No such measures is available for our sample of small unrated private issuers, which are largely not covered by standard datasets.[27] This is a significant limitation, but also shows the importance of documenting facts on this understudied segment of the market.

It is nevertheless plausible that these bonds are both risky and illiquid. For instance, Table 2 shows that small issuers tend to have higher leverage and lower profitability relative to large issuers. Table IA.3 in the Internet Appendix shows that this is also true for unrated issuers relative to IG issuers. More generally, smaller firms often have more opaque balance sheets and less diversified operations. In addition, small firms by definition issue bonds with smaller float that are unlikely to held by many investors. Small bonds thus tend to be illiquid, since it is often hard to find a counterparty to trade with if needed.[28] As suggestive evidence, we construct a proxy for bond liquidity based on changes in investor holdings and find that it is smaller for small unrated issuers' bonds relative to other bonds.[29]

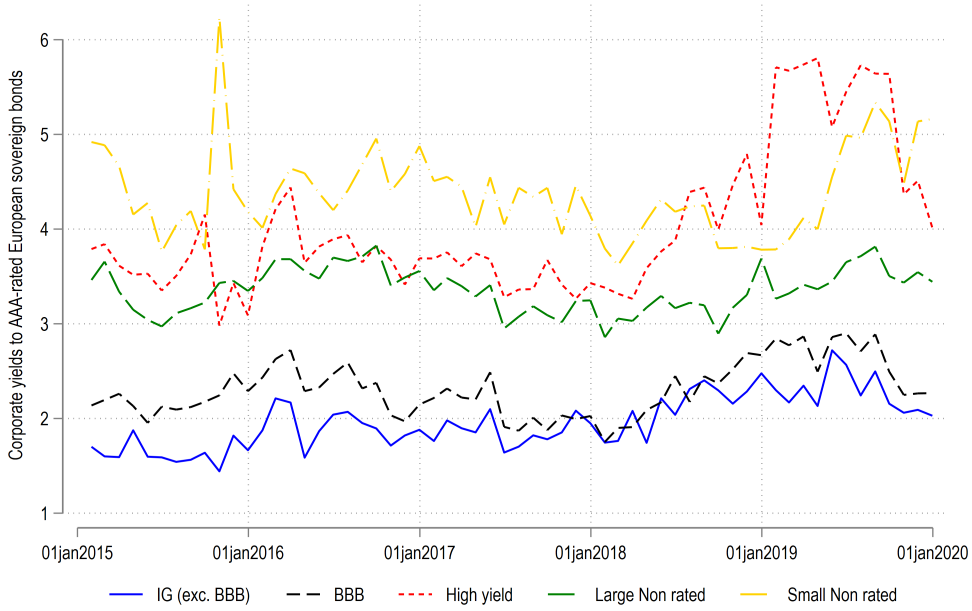
This lack of credit quality and/or liquidity raises the potential concern that the rise of

[27]For instance, Markit provides data on CDS and bid-ask spreads but only for a subset of rated bonds.

[28]It is well known that corporate bonds tend to be more liquid than loans, but less liquid than stocks, partly because they trade over-the-counter rather than on centralized exchanges. See [Benos et al., 2022] for a recent description of the market micro-structure of corporate bond markets.

[29]More precisely, we construct for each bond the (Euclidian) distance between its ownership vector in 2019q4 relative to 2019q3. A bond's ownership vector is defined as the holdings shares across investor sectors available in the SHS data. Table IA.4 in the Internet Appendix reports the distribution of this statistic across different type of bonds. Intuitively, bonds that are not traded across sectors have a distance of zero.

Figure 4 – Corporate Yields to AAA-Euro Area Sovereign Bonds



This figure shows time series of the spread between the average corporate bond yields of firms in our sample to the (maturity matched) AAA-rated sovereign bonds in the euro area, depending on their rating group. Unrated firms are split between large and small, defined to relatively the sample median of assets at the end of 2019Q4. The spreads correspond to the average spread by group. The time window comprises data between January 2015 and December 2019. The source of this data is the Corporate Securities Database collected by the Eurosystem, ratings data collected from S&P, Fitch, and Moody's, as well as the euro area AAA sovereign yield curve.

new and small issuers might represent a risk for financial stability, building up in the dark. This however crucially depends on who lends to these firms, i.e. who are the underlying bond investors, which we turn to next.

3.4 Investor Composition

This section investigates how investor composition varies across different types of issuers. This is a central question because bond investor composition plays an important role in financial stability: while traditional 'buy-and-hold' bond investors such as pension funds and insurance companies have a long-term horizon [Coppola, 2021, Becker and Benmelech, 2021], other bond investors, such as open-ended mutual funds, can be responsible for fire sales and price dislocation in bad times [Goldstein et al., 2017, Falato et al., 2020].

Table 3 – Corporate Yield to AAA-euro area Sovereign Bonds

	Spread (%)	Spread (%)	Spread (%)
HY	1.637***	1.733***	1.818***
	(0.0179)	(0.0192)	(0.0204)
NR * Small	2.004***	2.330***	2.406***
	(0.0234)	(0.0267)	(0.0272)
NR * Large	1.022***	1.057***	1.095***
	(0.0173)	(0.0197)	(0.0201)
IG (exc. BBB)	-0.332***	-0.356***	-0.356***
	(0.0128)	(0.0144)	(0.0153)
Month FE	Yes	Yes	Yes
Original Bond Maturity	No	Yes	Yes
Residual Bond Maturity	No	No	Yes
Observations	200722	200715	200715
R^2	0.108	0.150	0.157

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table displays the results from estimating a time series regression of the spread between the average corporate bond yields of firms in our sample to the (maturity-matched) AAA-rated sovereign bonds in the euro area. Rating categorical variables are included. BBB bonds are the omitted category. Unrated firms are split between large and small, defined to relatively the sample median of assets at the end of 2019Q4. The dependent variable is the spread of each bond and the dataset is at the isin level. The time window comprises data between January 2015 and December 2019. Month fixed effects are included in all specifications. The source of this data is the Corporate securities database collected by the Eurosystem, as well as the euro area AAA sovereign yield curve. Standard errors, in parentheses, are corrected for clustering of the observations at the firm level. $p < 0.10, p < 0.05, p < 0.01$

We use detailed micro-data from the Securities Holdings Statistics by Sector (SHSS) that include the breakdown of holdings by investor type at the security-by-security level.[30] We merge these data with our other datasets on firms' balance sheets, bonds, and credit ratings. This allows us to compare the investor base for specific types of issuers relative to aggregate holdings. This section focuses on 2019,[31] while the next section studies the 2020 crisis. We only include investor sectors that are reported in SHS.[32]

As a benchmark, we first look at aggregate data on investor composition. Figure 5 presents the investor composition for all corporate bonds issued by euro area non-financial corporations. Traditional long-term investors hold a large share of the aggregate. In particular, insurance companies and pension funds hold a third of the total. The ECB (and the Eurosystem) also holds as much as 13% of the total in 2019. These investors tend to be classified as buy-and-hold and are a source of stability for corporate bond supply. On the other hand, bond mutual funds also represent a large share of the investor base: their 37% share makes them comparable in importance to insurance and pension funds investors. Other investors, which are traditionally much less studied, are significantly smaller. For instance, commercial banks, other financial intermediaries, and households together are limited to less than 20% of the total.

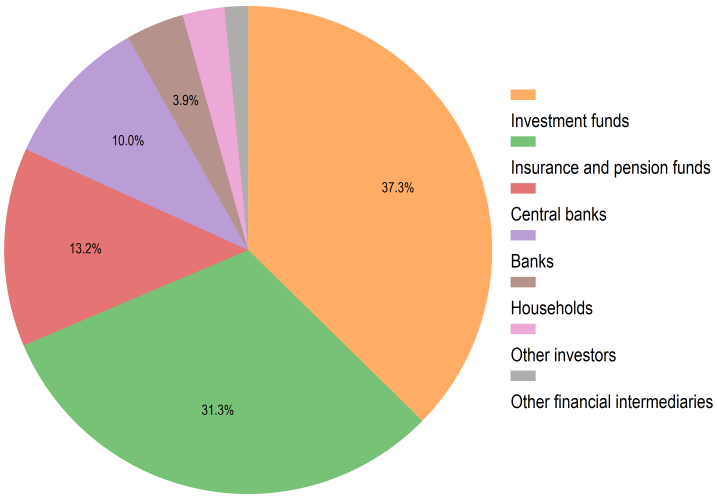
How does bond investor composition vary across issuing firms? Figure 6 shows investor composition for four groups: (i) investment-grade rated issuers, (ii) high-yield rated issuers, (iii) large unrated issuers (above the median of 2019Q4 assets); (iv) small unrated issuers (below the median). The first fact is that for IG-rated issuers the investor composition is remarkably similar to the aggregate: for instance, insurance and pension funds hold about a third, investment funds about a third, and the ECB 15%. This is unsurprising: IG-rated firms tend to be large, so large in fact that they fully drive aggregate patterns.

[30] This includes data from the Securities Holdings Statistics of the Eurosystem (SHSE), which contain the holdings of the Eurosystem.

[31] Recall that the micro-data on securities holdings only starts in 2018. The distribution of investor holdings is fairly stable throughout 2018 and 2019, until the large-scale ECB asset purchases in 2020.

[32] That means that our analysis excludes some foreign investors and small investors below the reporting threshold. These "residual" investors make up 28% of rated issuers' bonds outstanding, 18% for large unrated issuers, and 29% for small unrated issuers. Large/small issuers are defined as above/below the sample median of 2019Q4 assets.

Figure 5 – Aggregate Bond Investor Composition, 2019Q4



The figure presents the investor composition of the debt securities issued by EA non-financial corporations in 2019Q4. The source of this data is ECB Securities Holding Statistics per Sector (SHSS).

However, investor composition for smaller unrated issuers is strikingly different from the aggregate. For instance, the share of traditional buy-and-hold investors (ECB, insurance companies, pensions funds) is only 7.5%, or about 37 percentage points lower than in the aggregate. The ECB in particular holds none of their bonds as these are not eligible for asset purchase programs. Mutual funds also hold significantly less, with 14% or 23pp less than in the aggregate. Importantly, note also that this last point is in sharp contrast with HY-rated bonds, for which mutual funds are by far the largest investors with almost 60%. This is likely due to the fact that many other investors often face capital requirements or investment mandates that discourage holding HY bonds [Baghai and Becker, 2018].

Instead, non-traditional bond investors are large in this segment of small unrated bond issuers. In particular, non-bank financial intermediaries are strikingly important. With 34% of holdings, they are the single largest investor category in that segment. These non-bank institutions seem to specialize in lending to small and unrated issuers, as they hold trivial amounts of bonds issued by all other issuers, whether they are IG, HY, or large and unrated. The large share of non-banks' holdings comes mostly at the expense of the three largest investor groups in the aggregate: insurers/pensions, mutual funds, and central

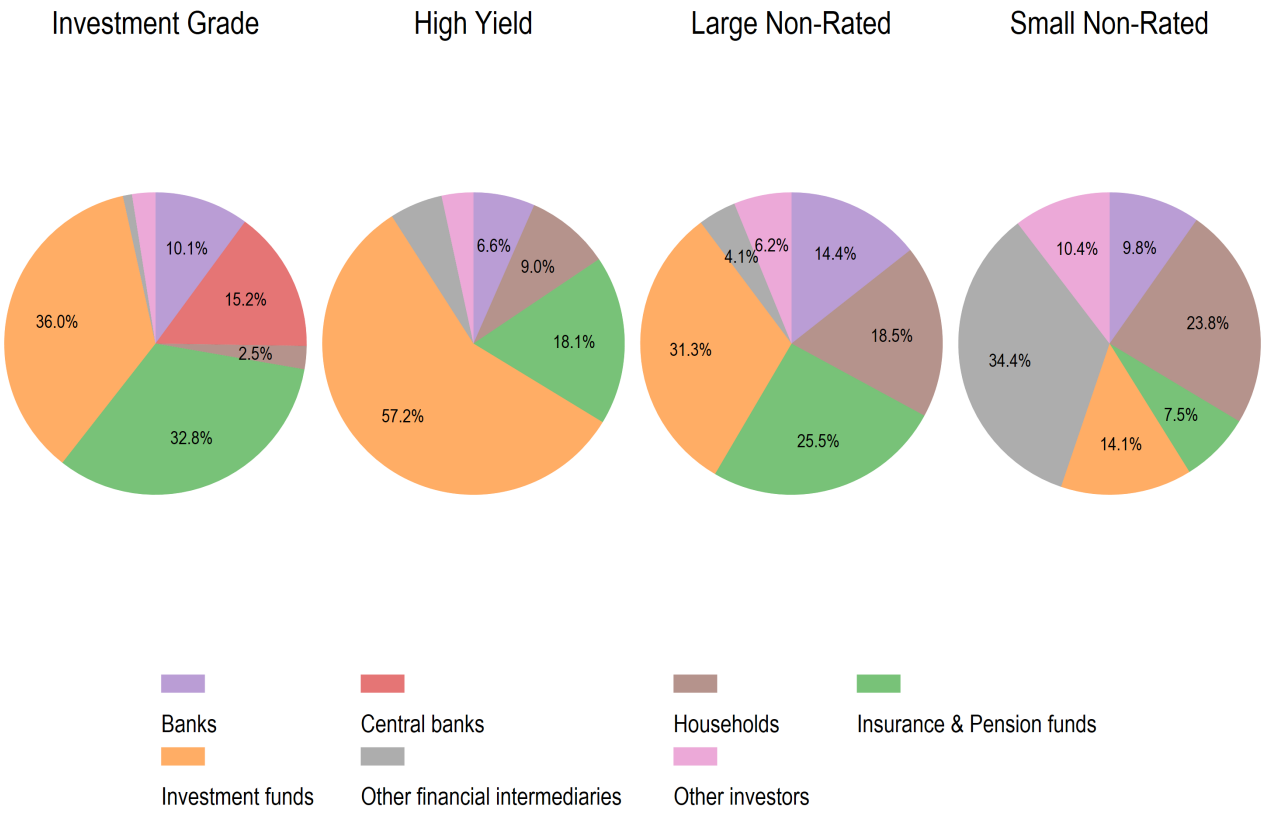


Figure 6 – Bond Investor Composition, Details by Size and Rating, 2019Q4

The figure presents the investor composition of the bonds issued by euro area non-financial corporations in 2019Q4, depending on whether the firms have a rating as of 2019Q4 and, for the unrated firms, if they have an asset size above (large) or below (small) the median of the sample at the end of 2019Q4. The source of this data is ECB Securities Holding Statistics per Sector (SHSS).

Table 4 – Bonds Investors Composition in 2019Q4: Cross-Sectional Regressions

	IC & PF	Inv. funds	Other FI	Banks	Central Bank	Households	Other
Q1	-0.225***	-0.0591	0.132***	-0.0122	0.00100	0.140***	0.0830***
	(0.0358)	(0.0361)	(0.0174)	(0.0235)	(0.00845)	(0.0193)	(0.0105)
Q2	-0.215***	-0.0395	0.154***	-0.0360	0.000725	0.0487***	0.00321
	(0.0344)	(0.0347)	(0.0167)	(0.0226)	(0.00811)	(0.0185)	(0.0101)
Q3	-0.170***	-0.0767***	0.0935***	-0.0170	0.000175	0.0865***	0.0185**
	(0.0284)	(0.0287)	(0.0138)	(0.0187)	(0.00672)	(0.0153)	(0.00833)
Private	0.0602***	-0.0735***	0.0399***	0.0361***	-0.00310	0.00172	-0.00860
	(0.0187)	(0.0188)	(0.00909)	(0.0123)	(0.00441)	(0.0101)	(0.00546)
HY	-0.164***	0.144***	-0.00537	-0.0487***	-0.0103**	0.00228	0.00644
	(0.0212)	(0.0214)	(0.0103)	(0.0140)	(0.00501)	(0.0114)	(0.00622)
NR	0.00977	-0.0242	0.00957	0.101***	-0.0110**	0.161***	0.0345***
	(0.0218)	(0.0220)	(0.0106)	(0.0144)	(0.00515)	(0.0118)	(0.00639)
Observations	3412	3412	3412	3412	3412	3412	3412
R^2	0.041	0.036	0.103	0.044	0.005	0.196	0.052

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table displays the results from estimating a cross-sectional regression of the investor holding shares of bonds on firms' characteristics. Specifically, size dummies, a variable equal to one if the firm is private, and rating categorical variables are included. The dependent variables are constructed as the share of each firm's total outstanding bonds held by each investor type. For this table data from only 2019Q4 are included. The source of this data is the Securities Holdings Statistics by Sector (SHSS) for debt securities issued by non-financial corporations. Standard errors, in parentheses, are corrected for clustering of the observations at the firm level. p < 0.10, p < 0.05, p < 0.01

banks. Households are also larger investors relative to the aggregate, although they hold a relatively similar amount of large and small unrated issuers' bonds. Traditional banks' share of holdings is similar to the aggregate.

Table 4 presents the results of cross-sectional multivariate regressions that jointly include size, rating, and private status indicators. It shows issuer characteristics correlates with the holding share of different investor groups relative to the omitted category of the largest, IG, and public issuers. Overall, a similar picture emerges. Insurers and pension funds tilt their holdings away from smaller while non-bank financial institutions are more likely to hold bonds of these issuers.

Nevertheless, more work is needed to understand better these non-bank investors and important data limitations limit our ability to delve further. In particular, it seems difficult

to precisely identify differences within this group. For instance, in our data, the sector of "other financial intermediaries" excludes commercial banks and mutual funds but combines a heterogeneous group of financial firms involved in lending and securities markets: dealers, finance companies, securitization, hedge funds, venture capital, etc.[33] There is no available breakdown within this group. This is an important limitation, but it also shows the importance of documenting facts for this under-studied segment of the bond market. In this way, we complement the emerging body of work studying direct lending by non-banks in loan markets, usually in the U.S. [Chernenko et al., 2022, Davydiuk et al., 2020, Block et al., 2023, Jang, 2023]. These papers often focus on a specific type of non-bank lender (business development companies, private debt funds) or specific firms (public middle-market U.S. firms). While we can observe the near-universe of issuance on the firm side, our data on lenders is significantly more limited.

We summarize the third fact as follows:

Fact 3: *Holdings of traditional buy-and-hold bond investors are large in aggregate but small for unrated and smaller issuers. Non-bank financial institutions are large investors in that segment.*

We also document two complementary facts. The first is that many of these non-traditional investors are local. Figure IA.5 in the Internet Appendix shows a more detailed breakdown of investor composition, distinguishing for each investor category between domestic (located in the same country as the issuer) and other-EA countries. We see for example that almost all holdings of non-bank financial intermediaries are domestic. Table IA.5 in the Internet Appendix confirms this pattern in a regression setting. The tilt towards small and unrated issuers of non-bank financial institutions is entirely driven by domestic

[33] In the SHS classification, the sector "Other financial intermediaries" consists of: (i) financial vehicle corporations engaged in securitization transactions, (ii) security and derivative dealers, (iii) financial corporations engaged in lending via financial leasing, hire, purchase and the provision of personal or commercial finance or factoring, (4) specialized financial corporations, including venture and development capital companies, export/import financing companies, or financial intermediaries that acquire deposits and/or close substitutes for deposits or incur loans vis-a-vis monetary financial institutions only. These financial intermediaries also cover central counterparty clearing houses (CCPs) carrying out inter-MFI repurchase agreement transactions.

investors. While home bias is a general phenomenon, it is less pronounced for more traditional investors, especially mutual funds. Second, we also find that investors holdings seem to be more concentrated for small unrated bonds. Table IA.6 in the Appendix shows the Herfindahl-Hirschman concentration index (HHI) in the cross-section, computed both at the firm- (GUO) or bond-level (ISIN). The HHI is significantly higher for the small unrated category. This suggests that ownership of these bonds is less dispersed than for traditional issuers.[34]

3.5 Investor Composition and Spikes in Spreads in Spring 2020

This section aims to better understand the role of investor composition in episodes of market turmoil. Prior work has emphasized that insurers and pension funds in particular are "safe hands" investors that can insulate firms from price dislocation, while mutual funds investors tend to be more flighty [Coppola, 2021]. The previous section has shown that non-traditional investors are important for small unrated issuers. How do these investors behave in bad times? To answer this question, we study the March 2020 market turmoil. At the aggregate level, it is well understood that we observed a sharp rise in bond spreads, in the midst of investor sell-off and illiquidity in secondary markets.

We use a methodology similar in spirit to Coppola [2021] to study the effects of investor composition on bond spreads during this episode. We run the following cross-sectional regression in our sample of bonds:

$$\max \Delta Spread_b = \sum_{i \in I} \beta_i \phi_{i,b} + \text{Controls and FE} + \epsilon_b \tag{1}$$

The dependent variable is the maximum spread increase for a bond b during that episode relative to December 2019. The variables of interest are the holdings share $\phi_{i,b}$ of different investor sectors $i \in I$ for a bond b measured as of end of 2019. We take insurers and

[34]Note a limitation of this exercise: we only observe holdings at the investor sector level, not for individual investors. The HHI measures how concentrated holdings are within sectors. Nevertheless, a bond held by a single investor would still have a high HHI of 1 according to our measure.

pensions to be the omitted category, and the set I of investors types includes mutual funds but also other non-bank financial institutions given their importance documented earlier. For completeness, we also include banks, central banks, households and other investors.[35] The coefficients β_i reveal the impact of a particular investor type on spread dynamics in Spring 2020. A positive β_i on a particular investor type suggests that it it amplified the spike in spread relative to insurers and pensions.

The regression specifications include bond and issuer-level controls in order to isolate the price dislocation due to investor composition within similar bonds. For instance, we include Industry $\times$ Country fixed effects to compare issuers in similar sectors. Among other variables, we also control for issuer rating, bond currency, size, maturity or seniority. For completeness, we also include the tightest specification which includes firm (group) fixed effects. This is attractive for identification but only isolate variation in investor composition for firms issuing multiple bonds, which is a limited number in our sample.

Table 5 displays the results. First, we find unsurprisingly that the coefficient on mutual funds is positive. This indicates that these investors are destabilizing relative to insurers and pensions, consistent with the evidence in Coppola [2021]. A 10p.p. increase in the ownership share of mutual funds at the expense of insurers increases the spike in spread by about 2bps.

More importantly, we find no similar pattern for non-bank financial institutions. Their coefficient is close to zero in magnitude and statistically insignificant. This implies that these lenders were as stabilizing as insurers during this episode. The signs, magnitudes and significance of all of these coefficients are preserved when we include controls. When adding firm fixed effects, the magnitudes remain largely unchanged. The coefficient on mutual funds is no longer significant, likely because there are not that many firms issuing multiple bonds in our sample. Nevertheless, these different specifications to some extent assuage the concern that these correlations are driven by unobservable issuer characteristics, such as a deterioration of their fundamentals during this time. For comparison, banks and the ECB also appear to be stabilizing, while direct holdings by households appear to be destabilizing.

[35]Other investors include corporations and governments, and represent a small share of bond holdings.

In general, there is always a concern that bond spread dynamics can be influenced by illiquidity, that is, prices do not adjust absent trading. Note however that this is partly what we are trying to capture: we infer from a smaller spike in spreads that investors are relatively less eager to sell. Coppola [2021] dubs this effect "endogenous illiquidity" while Chodorow-Reich et al. [2021] refer to "asset insulators." To give one example that differs from the traditional case of insurers, consider the "PEA-PME", a popular saving vehicle offered by financial institutions in France to invest in small companies' securities. It requires households to keep their funds invested for at least five years in order to claim a tax advantage. This type of arrangements are appealing for illiquid bonds, since there is little risk of large redemptions in bad times. This type of investment is classified as non-bank in our data, and seem indeed significantly less flighty than mutual funds or direct household holdings.

This evidence alleviates some concerns for bond market stability for new issuers. While these bonds are likely to be more risky and/or illiquid, their largest investors seem less flighty than mutual funds, at least during this episode where there was no banking crises. While more work is needed in this area, this result is nevertheless interesting given the concerns about financial stability implications of the rise in non-bank lending [Erel and Inozemtsev, 2024]. Interestingly, the large share of household holdings seems potentially more concerning. We summarize the fourth fact as follows:

Fact 4: *Non-bank investors were as stabilizing as insurers during the March 2020 turmoil.*

3.6 Firm Borrowing during the Market Rebound of Spring 2020

The next piece of evidence relates to the April 2020 bond market rebound. At an aggregate level, it is well understood that interventions by the ECB, including corporate bond purchases, lead to a quick recovery.[36] Credit policy is an integral tool of monetary policy in addressing financial stability and direct support for corporate bond markets is becoming more common across the globe. While the market as a whole tends to strongly respond,

[36]There is similar evidence in the United States [Halling et al., 2020, Darmouni and Siani, 2022].

Table 5 – Maximum Difference in Spread

	(1)	(2)	(3)	(4)
Mutual funds	0.236**	0.274**	0.276**	0.143
	(0.110)	(0.111)	(0.112)	(0.114)
Other FI	-0.128	-0.0805	-0.0896	-0.139
	(0.180)	(0.181)	(0.183)	(0.199)
Banks	-0.183	-0.137	-0.139	-0.216*
	(0.125)	(0.127)	(0.127)	(0.131)
Households	0.381**	0.389**	0.395**	0.263
	(0.159)	(0.159)	(0.161)	(0.174)
ECB	-0.347	-0.333	-0.333	-0.277
	(0.254)	(0.255)	(0.255)	(0.256)
Other investors	0.190	0.239	0.242	0.211
	(0.231)	(0.232)	(0.233)	(0.242)
Log(Bond Size)	Yes	Yes	Yes	Yes
Log(Residual Maturity)	Yes	Yes	Yes	Yes
EUR Denominated FE	Yes	Yes	Yes	Yes
Industry*Country FE	Yes	Yes	Yes	Yes
Senior Bond FE	No	Yes	Yes	Yes
Call Option FE	No	Yes	Yes	Yes
Floating rate coupon FE	No	Yes	Yes	Yes
Firm size FE	No	No	Yes	No
Rating FE	Yes	Yes	Yes	Yes
Firm FE	No	No	No	Yes
R-squared	0.151	0.155	0.155	0.631
N	2492	2492	2492	2492

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table displays the results from estimating a cross-sectional regression on the maximum increase in spread at the bond level between 2019 Q4 (October-December) and June 2020 on investor sector shares of the same bond at the end of 2019 and a series of interacted fixed effects. Insurers and pensions is the excluded category. The dependent variable is constructed as the maximum difference between the spread of bond yields - expressed in % - to the (maturity-matched) AAA-rated sovereign bonds in the euro area for the window of February to June 2020 compared to the value of the spread in 2019 Q4 (October-December). The maximum difference is kept. Outliers with an maximum difference larger than 10% are dropped from the analysis. The sources of this data are the Centralised Corporate Security Database (CSDB) for debt securities issued by non-financial corporations, the Securities Holdings Statistics per Sector (SHSS), the Orbis database for the industry classification of the firm, as well as the euro area AAA sovereign yield curve. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

whether small and new issuers are equally affected is still an open question. To this end, we document the dynamics of firm borrowing during this episode, using data on bonds, but also on bank credit (credit lines and term loans) from the AnaCredit credit registry.

Table 6 includes the regression estimations of an event study analysis of the flow of credit around March 2020. We consider different types of firm credit and compare one year post March with the previous year. All columns include issuer (group) fixed effects to isolate within-firm changes in debt outstanding around the shock. The first panel examines firms in different rating categories by interacting the post March 2020 dummy with firm's rating status as of end 2019, while the second panel examines firms in different sizes by interacting the post March 2020 dummy with asset quartiles constructed in 2019.

There was significant heterogeneity in the sources of financing across firms with different ratings. The first panel shows that, while all firms increased credit during this episode, only firms with an investment-grade rating increased their bond borrowing. In contrast, for unrated firms the increase in total borrowing entirely comes from bank loans. Similarly, the comparison across firms' size groups presented in the second panel confirms that all but the largest firms did not increase their bond financing during this episode.

Fact 5: *The April 2020 bond issuance wave was restricted to large and rated firms.*

These dynamics are at least in part consistent with the nature of credit policies put in place during this time. For instance, the scope of the ECB intervention was limited: corporate bond purchases were restricted to rated bonds, in line with the existing central bank mandate. At the same time, many firms received guaranteed loans in Europe which aimed to stimulate loan markets for smaller firms [Altavilla et al., 2021]. In fact, we can see that within our sample of bond issuers: Table IA.7 in the Internet Appendix shows that 40 to 60% received a guaranteed loan. Strikingly though, this seemed to have been the case across all groups: even rated issuers have a high take up rate, even if slightly lower than unrated firms. It thus seemed that both rated and unrated firms benefited from loan market stimulus, but only rated firms benefited from bond market stimulus.

Table 6 – Firm Financing in 2020, by Rating and Size of Issuers

(a) By rating of issuers

	Total Credit / Lag. Assets (%)	Bond / Lag. Assets (%)	Term Loans / Lag. Assets (%)	Rev., C. Lines / Lag. Assets (%)
Post*NR	2.572***	-0.0641	1.827***	0.809***
	(0.473)	(0.193)	(0.388)	(0.202)
Post*HY	3.677***	0.0970	1.852**	1.727***
	(1.261)	(0.908)	(0.664)	(0.544)
Post*BBB	3.480***	1.960**	0.772**	0.748*
	(0.904)	(0.701)	(0.353)	(0.381)
Post*A	3.130***	2.320***	0.319**	0.490*
	(0.669)	(0.646)	(0.139)	(0.241)
Observations	9676	9676	9676	9676
R^2	0.046	0.014	0.033	0.022
Fixed Effects	GUO	GUO	GUO	GUO

(b) By size of issuers

	Total Credit / Lag. Assets (%)	Bond / Lag. Assets (%)	Term Loans / Lag. Assets (%)	Rev., C. Lines / Lag. Assets (%)
Post*Q1	1.751	-0.784	2.892**	-0.357
	(1.264)	(0.511)	(1.266)	(0.668)
Post*Q2	2.143**	-0.250	2.454***	-0.0611
	(1.026)	(0.459)	(0.800)	(0.307)
Post*Q3	1.711**	-0.595*	1.511**	0.795**
	(0.723)	(0.315)	(0.647)	(0.323)
Post*Q4	3.784***	1.201***	1.118***	1.466***
	(0.477)	(0.292)	(0.231)	(0.247)
Observations	9676	9676	9676	9676
R^2	0.051	0.016	0.036	0.034
Fixed Effects	GUO	GUO	GUO	GUO

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table displays the results from estimating the following specification: $y_{ijt} = \beta_j \times Post_t \times X_j + \alpha_i + \epsilon_{ijt}$ for each firm i and month t, for different credit measures. In the first panel, the measure of heterogeneity X_j is rating categories; in the second panel it is size quartiles. The dependent variables y_{ijt} are constructed as: (i) the aggregate credit of the firm, corresponding to the sum of all outstanding bonds and loans amount; (ii) the total outstanding bond amount of each firm; (iii) the aggregated outstanding term loans amount of each firm; and (iv) the sum of all revolver credit and credit lines of each firm. Each dependent variables from (i) to (iv) is divided by the total assets of the firm in 2019. The *Post* dummy is interacted with an asset quartile categorical variable as an approximation of firm's size based on the end of 2019 values. The frequency of the credit data is monthly. Lagged assets are held constant, corresponding to the total assets of the firm in 2019. The *Post* dummy is equal to one for the period 2020 Q1 until 2020 Q3 and zero for the period 2019 Q2 until 2019 Q4. The sources of this data are the Centralised Corporate Security Database (CSDB) for debt securities issued by non-financial corporations, the euro area credit registry AnaCredit for loans borrowed by non-financial corporations, and Orbis and Capital IQ for the firm's total assets information. Standard errors, in parentheses, are corrected for clustering of the observations at the firm level and at the date level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4 Discussion and Implications

4.1 Connecting the Evidence

These facts are naturally connected. While large issuers can generally benefit from obtaining a credit rating by extending their investor base, we argue that this is less obvious for the issuers we are interested in. First of all, these firms are more likely to issue risky bonds relative to historical issuers. The probability to receive a high-yield rating is thus likely to be significant should they apply to a credit rating agency. Second, their bonds are also likely to be illiquid due to their small float. This combination has important implications.

First, it is well understood that investment mandates of traditional 'buy-and-hold' investors (insurers, pensions) tend to require an investment grade rating. This can explain why they are significantly less important for small unrated issuers in spite of their aggregate importance. This also explain the lack of ECB holdings and lower effects of the bond market stimulus, since ECB corporate bond purchases are restricted to IG-rated bonds. Second, mutual funds are large investors in HY bonds but they tend to prefer large and liquid bonds [Bretscher et al., 2020]. The core of their business model is to offer (relatively) liquid shares, which means assets must be sold (relatively) frequently to meet redemptions. Selling illiquid assets tend to reduce fund performance.

In contrast, (local) non-bank financial intermediaries may be more natural investors because of their ability to handle risk and illiqudity for small unrated borrowers. This is typically the rationale for the emergence of "private debt" and other forms of direct lending [Chernenko et al., 2022, Davydiuk et al., 2020, Block et al., 2023, Jang, 2023]. These lenders are not usually reliant on credit ratings and not subject to the same regulation as traditional banks. Anecdotally, non-banks are thought to play an important role in supporting the unrated European bond market due to their monitoring ability:

Getting an official rating has also held little appeal for [the Finnish company] Kemira, whose bond issuances have proved attractive to investors. The investors in regional markets know their companies well: "When we issue corporate bonds of EUR 100-200 million, a

large part of investors are Finnish institutions, banks and brokers, which have good skills in credit analysis. In Nordic countries, companies are fewer and smaller than elsewhere, so it is possible for investors to gain a very good knowledge of them. The market knows how to price the risk."[37]

Nevertheless, this implies that the size of unrated bond issuance is capped by the restricted investor base. As a company grows and their funding needs increase, having a rating becomes more appealing.[38] Indeed, in the data, large and seasoned issuers are significantly more likely to have a rating, as well as a different investor base. Nevertheless, the fact that we observe very few firms that were unrated at their first issuance obtaining a rating later on during our sample period suggests that it can take many years before a firm decides to get a rating and switch toward traditional bond investors.

4.2 Comparison with Private Debt Markets

At a high level, the main implication of our evidence is that the market we study is to some extent disconnected from the traditional bond market. Instead, it is closer to – and has grown in parallel with – "private debt" markets that have received considerable attention in recent years, especially in the United States.

Both markets mostly serve middle-market firms that are predominantly private and unrated. This is in contrast with the traditional bond market. For instance, firms in our sample of small issuers have comparable size to the sample of U.S. firms borrowing from private lenders in Jang [2023]. These markets also seem to be growing in lockstep, even if

[37] "Why Nordic companies don't worry about ratings", Evli.com, October 9 2017. A complementary reason is related to the fact that obtaining a rating for the first time might involve some amount of fixed costs. In that case, small and new issuers might see some benefits in saving on the cost, work, and management time involved with applying to a large credit rating agency. This is particularly valuable for firms issuing smaller bonds infrequently. Anecdotally, many firms cite this reason for issuing an unrated bond: *Acquiring an official rating is an investment. However, it may not be a beneficial process for all companies, at least for ones that are not regular issuers and whose issue sizes are relatively small. "We wanted to be agile and efficient. If we had gone through the rating process, securing financing would have taken much longer."* [same source]

[38] It is also possible that these first bond issuance held by non-banks facilitate future issuance with more traditional bond investors, for example through a certification effect.

still significantly smaller in Europe. They have both taken off post-GFC, in the wake of weaker bank balance sheets and tighhter regulation. For instance, between 2014 and 2019, bonds outstanding in our sample of firms outside of the top quarter of size have been growing at 12% annually, from 67B€ to 118B€, much faster than the entire market. This is however an order of magnitude lower volume than private debt in the US, which amounts about 1T$ [Jang, 2023].

There seem to be a common thread: the rise of new types of non-bank intermediation targeting middle-market, typically private and unrated, borrowers to fill gaps left by traditional lenders. Our evidence shows that their influence extends beyond loan markets and include securities markets in which they seem to fill a gap left by traditional bond investors. In that sense, we uncover a parallel between the rise of private debt markets and this growing segment of new and small issuers in the bond market.

At the same time, we find some important differences that relate to contrasting institutional forms. It is well known for instance that private debt funds are smaller in euro area, while BDC as such do not exist [Becker and Ivashina, 2021].

First, the profile of borrowers tend to differ. Our firms are less profitable. Average profitability for smaller issuers is around 3-4% in Table 2, as opposed to 18% to the sample in Jang [2023]. The share of these firms with negative EBITDA is 17-18%, significantly above the share in Jang [2023]. Note that this is more consistent with Chernenko et al. [2022] that provide clear evidence that in the U.S. some non-bank lend to negative-EBITDA firms typically under-served by banks. Our firms also seem to be in a wide range of industries, while Davydiuk et al. [2020] argue that U.S. private lenders often target innovative and R&D-intensive industries. This is in line with U.S. private lenders often helping to finance buyouts by private equity firms, and that buyout targets tend to tilt towards certain characteristics and sectors. Instead, the market we study seem to be drawing relatively more from the pool of traditional bank borrowers.

Moreover, we observe some differences in lending terms. While U.S. private lenders typically offer floating rate loans, the vas majority of lending in our sample has a fixed

interest rate.[39] This is in fact more similar to the traditional bond market. This implies a different risk-sharing arrangement across the cycle relative to private lenders. Understanding better the origin of this difference is an interesting avenue for future research. Perhaps fixed-rate securities are easier to price and trade. For instance, it is important to remember that traditional bond investors (insurers, bond mutual funds), while significantly smaller, are still active in this market and that they often hold fixed-rate instruments.

Importantly, we show that this market is not driven by the existence of the ECB collateral framework for corporate bonds. Unlike the Federal Reserve, the ECB allows corporate bonds to be pledged to access central bank liquidity [Pelizzon et al., 2024]. This could in principle drive the issuance of these bonds and make them attractive to investors. Our data shows that in fact only a negligible share of the bonds of small and unrated issuers are eligible to be pledged for central bank funding.[40]

Instead, broader institutional factors seem to be responsible for the smaller share of private debt in the Euro Area. The two important proximate causes seem to be that, in the EA, there is (i) less private equity, and (ii) less non-bank lending in general. In the US, the vast majority of direct lending by private lenders is to finance buyouts by private equity sponsors.[41] And unlike in the US, EA banks are also still financing the majority of credit to the real economy. This is concisely summarized by Block et al. [2023]: "European private debt funds rely less on PE deals and compete more with banks."

Of course, these differences have deeper causes. A number of factors have been identified, which can limit the ability of both investors and firms to scale up in the EA relative to the U.S. A fragmented regulatory framework, in particular country-specific bankruptcy and insolvency resolutions, hamper scaling across the continent and require deep national

[39] Average maturity seems somewhat shorter and interest rate somehow lower relative to Jang [2023] or Davydiuk et al. [2020], but these differences are modest and possibly due to differences in firm characteristics and interest rate fixation. In addition, there are also virtually no secured or subordinated bonds even for small issuers.

[40] In addition, only a few selected investors have access to ECB liquidity facilities, typically primary dealers. The share of eligible bonds in our data are: 47% for IG, 1.5% for HY, 14.6% for large unrated, and 2.8% for small unrated.

[41] Block et al. [2023] found that 78% of loans made by the surveyed US private debt funds were used for buyouts, while Jang [2023] found the corresponding share for BDC loans to be 63%.

knowledge. This is particularly important for risky lending in practice[42] and Becker and Ivashina [2021] document a direct relationship between better insolvency systems and the development of private debt markets in Europe. Other factors are likely to play a role. For instance, pension systems relying more on "pay-as-you-go" financing reduce private pension savings and capital markets development [Scharfstein, 2018]. A lack of capital market union also contributes to fragmentation along national lines. At a high-level, the EA also often largely diverges from the US in some key policy areas, including taxation, redistribution, and labor markets.

4.3 Implications

Finally, we discuss implications of our evidence for four key outstanding macro-finance issues and sketch some avenues for future research.

First, the fact that non-bank financial intermediaries are important for small and new issuers blurs the conventional dichotomy between intermediated and capital market funding. Our evidence questions how complete the capital markets transition has been for these issuers. Concretely, classifying bond issuers as not being dependent on intermediaries is likely an oversimplification. More generally, more work is necessary to understand how non-banks interact with traditional banks and create potential alternative sources of contagion and fragility. For example, non-banks might be dependent on banks for funding [Acharya et al., 2024], or banks might underwrite bonds sold to non-banks (unfortunately, we have no data on underwriters for small private issuers).

Second, our evidence can help us better understand the cyclicality of non-bank credit supply. The 2020 crisis made clear the importance of corporate bond investors for financial stability. Most existing work tends to emphasize a dichotomy between two investor classes:

[42] Practitioners often raise this concern as one of the main challenges for private debt in Europe: *"Europe is not a market: there's the difference in legal jurisdictions.... These are real hurdles and won't change anytime soon.... This patchwork nature of multiple jurisdictions makes origination in Europe a real challenge... Local teams matter. Even London-based teams have trouble managing deals on the continent... Options as a lender are very different in Italy versus Spain or France. There's no one standard approach."* Source: A Review of US vs European Direct Lending, Churchill Asset Management, Link.

(destabilizing) mutual funds and (stabilizing) insurers/pension funds, because they hold the largest share of the aggregate bond market in both Europe and the United States. Our evidence that these traditional investors are strikingly smaller for small and new issuers highlights the importance of building a broader framework of bond credit supply and firms' access to credit.

Third, there are potential lessons for the design of credit policies. As bond financing has risen globally, central banks have more readily implemented asset purchases programs targeting corporate bond markets directly. At the same time, policy-makers might have hoped that bond market stimulus would be sufficient to reach all firms with bond market access, leaving programs supporting loan markets to smaller bank-dependent firms. However, (near universal) rating restrictions on asset purchases imply that the effects on the most vulnerable issuers, which tend to be small and unrated, is limited.

Fourth, some of our evidence connects to the underlying risk in non-bank lending. Opacity in particular raises important concerns. Since the vast majority of new and small issuers are small, private, and unrated, any build-up in risky lending in this market might be "invisible" to economists and policy makers, even if they closely track bond market indicators. Relatedly, non-banks intermediaries that hold these bonds are themselves often more lightly supervised than traditional lenders.[43] Concretely, in spite of the significant data effort behind our analysis, there is still plenty we do not know - mostly because of data limitations. For instance, were non-bank intermediaries less destabilizing than mutual funds in 2020 because their liabilities are structured differently? It is worth noting that private debt funds and BDC are close-end funds. This reduces the liquidity mismatch present in typical bond mutual funds and makes direct lenders less exposed to redemption risk and forced sales. Understanding this at a general level for non-banks is an important question for future research.

[43]The SEC recently mandated new reporting requirements for private debt funds in the U.S.; see "SEC Adopts Amendments to Enhance Private Fund Reporting", SEC.gov, May 3rd 2023.

5 Conclusion

This paper presents new evidence on the rise in non-bank lending in the euro area through the lens of new and small issuers of debt securities. Using newly available micro-data on public and private firms, we find that that these issuers are largely disconnected from the traditional bond market. Along some dimensions, this market resembles "private debt markets" whose growth have attracted much attention in recent years, although with some important differences. Better understanding the welfare and policy implications of this evidence is an important avenue for future research.

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Internet Appendix

IA.1 Additional Figures and Tables

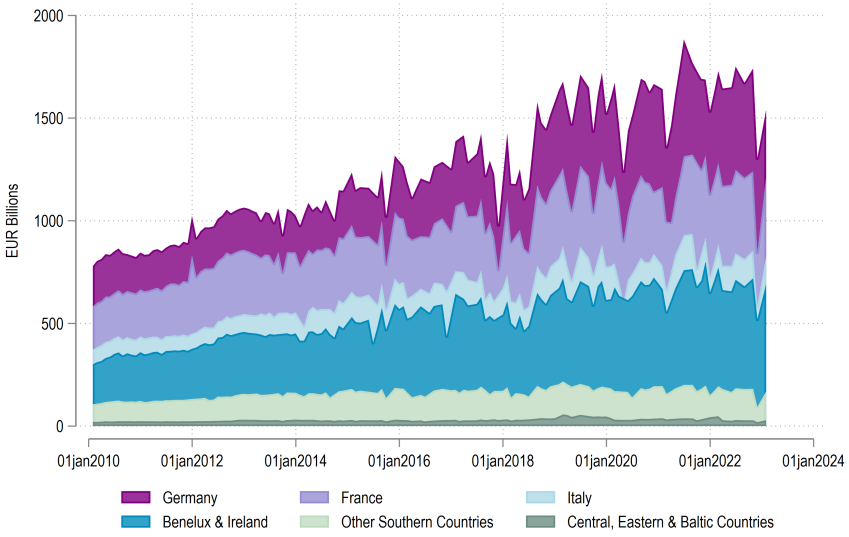


Figure IA.1 – Aggregate Growth of the euro area Corporate Bond Market: Across Countries

This figure shows the aggregate level of bonds in the euro area for non-financial corporations from 2010 to 2021 Q4 from the the Corporate Securities Database of the Eurosystem. All debt securities issued by subsidiaries of non-financial corporates are summed. Data are at the quarterly level. Data are corrected for inflation, and reported in billions €. "Other Southern Countries" include: CY, ES, GR, MT, PT. "Central, Eastern and Baltic Countries" include: AT, EE, FI, LT, LV, SI, SK.

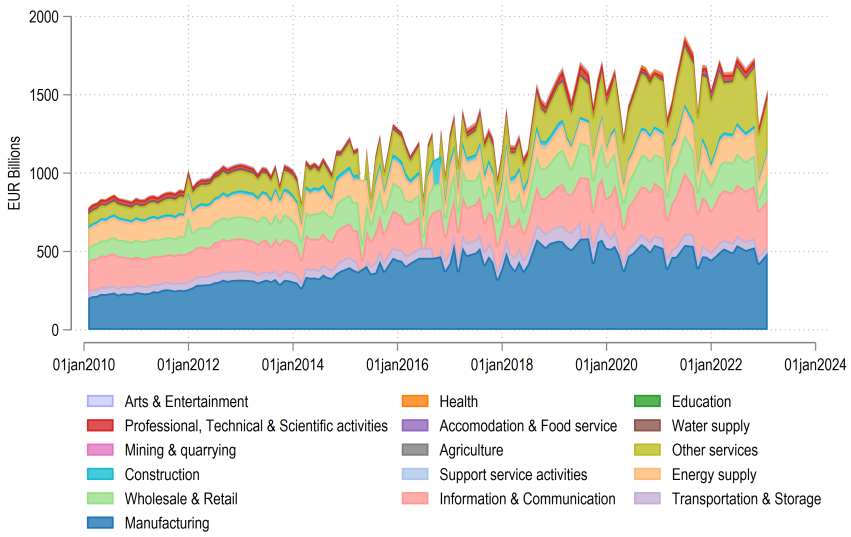


Figure IA.2 – Aggregate Growth of the euro area Corporate Bond Market: Across Sectors

This figure shows the aggregate level of bonds in the euro area for non-financial corporations from 2010 to 2021 Q4 from the the Corporate Securities Database of the Eurosystem. All debt securities issued by subsidiaries of non-financial corporates are summed. Data are at the quarterly level. Data are corrected for inflation, and reported in billions €.

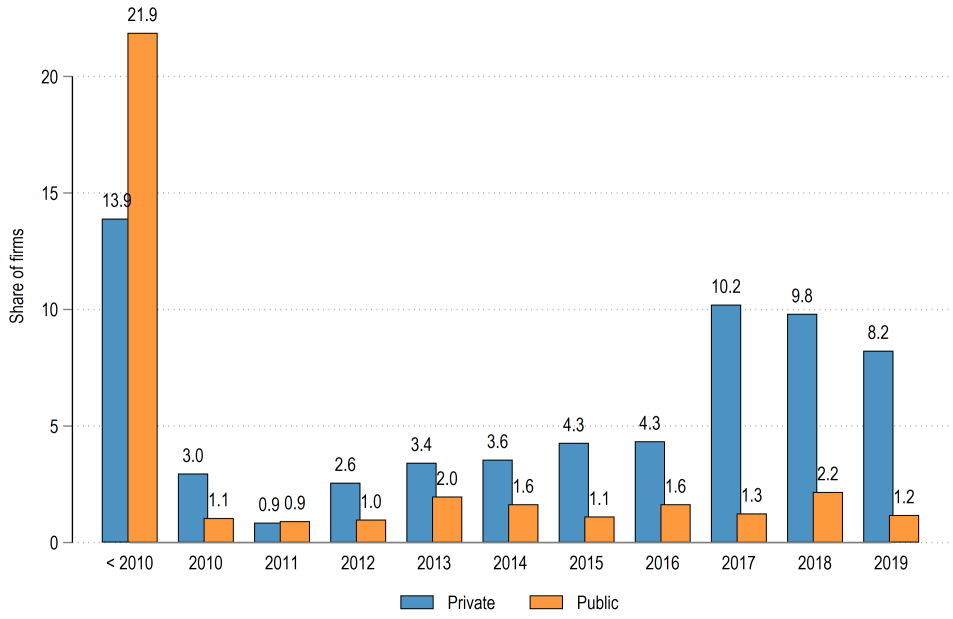


Figure IA.3 – Euro Area Bond Market Entry, % of Total Issuers

This figure presents the share of number of public and private issuers per year from 2010 to 2021 over the total number of bond issuers in the Eurozone for the entire period. All firms represent the whole sample of firms included in the analysis, with positive bond outstanding between the period 2018 to 2021. In each year, new issuers are defined as firms that issue bonds for the first time in that year. The first year of issuance was obtained by combining Capital IQ and Centralised Securities Database (CSDB): it corresponds to the earliest issue year one could identify for any subsidiary or branch within the group structure of firms in the sample, i.e. for any group, the date of issuance - either identified directly using the variable *date of issuance* from CSDB or first year with non-zero bond volume outstanding in Capital IQ - which corresponds to the earliest issuance date across all entities within the group is kept. Bonds in Capital IQ correspond to the sum of Senior and Subordinated Bonds. Bonds in CSDB correspond to debt securities, where we exclude commercial paper.

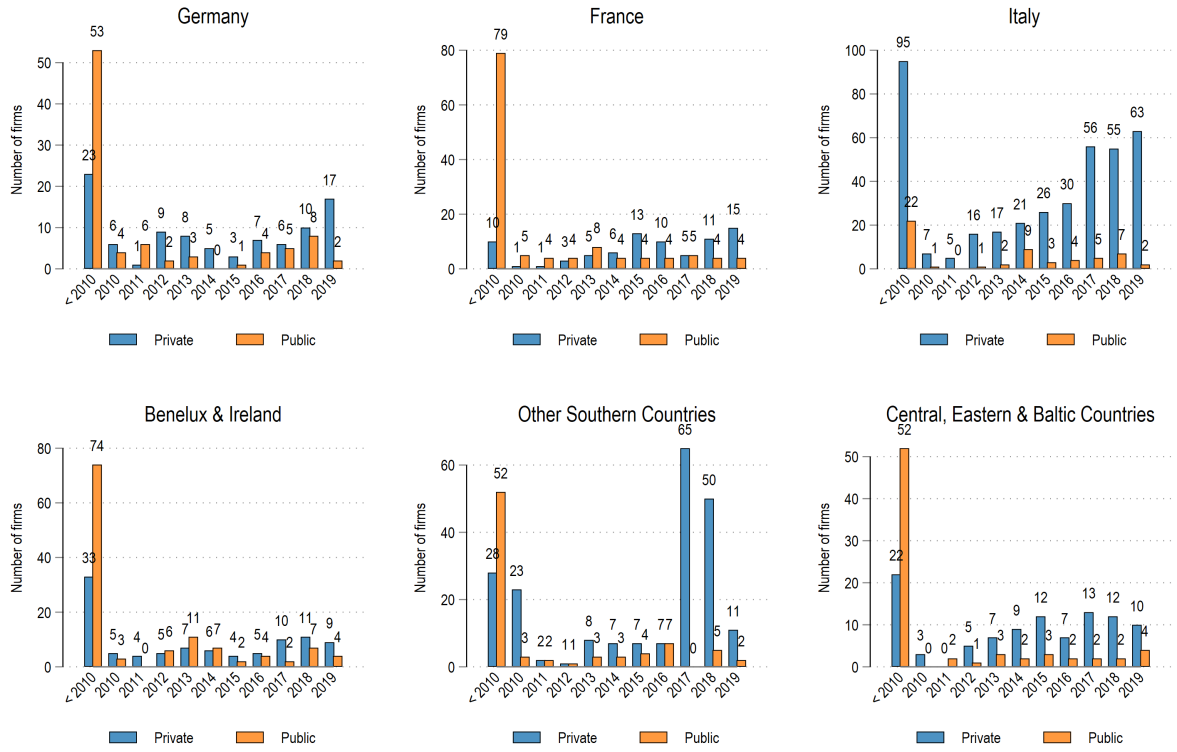


Figure IA.4 – Euro Area Bond Market Entry: Across Countries

This figure presents the total number of public and private issuers from 2010 to 2021, broken down by countries and regions. All firms represent the whole sample of firms included in the analysis, with positive outstanding bonds between the period of 2018 to 2021. In each year, new issuers are defined as firms that issue bonds for the first time in that year. The first year of issuance was obtained by combining Capital IQ and Centralised Securities Database (CSDB), which corresponds to the earliest issue year one could identify for any subsidiary or branch within the group structure of firms in the sample, that is, for any group, as well as the date of issuance - either identified directly using the variable *date of issuance* from CSDB or first year with non-zero bond volume outstanding in Capital IQ - which corresponds to the earliest issuance date across all entities within the group is kept. Bonds in Capital IQ correspond to the sum of Senior and Subordinated Bonds. Bonds in CSDB correspond to debt securities, where we exclude commercial paper. "Other Southern Countries" include: CY, ES, GR, MT, PT. "Central, Eastern and Baltic Countries" include: AT, EE, FI, LT, LV, SI, SK.

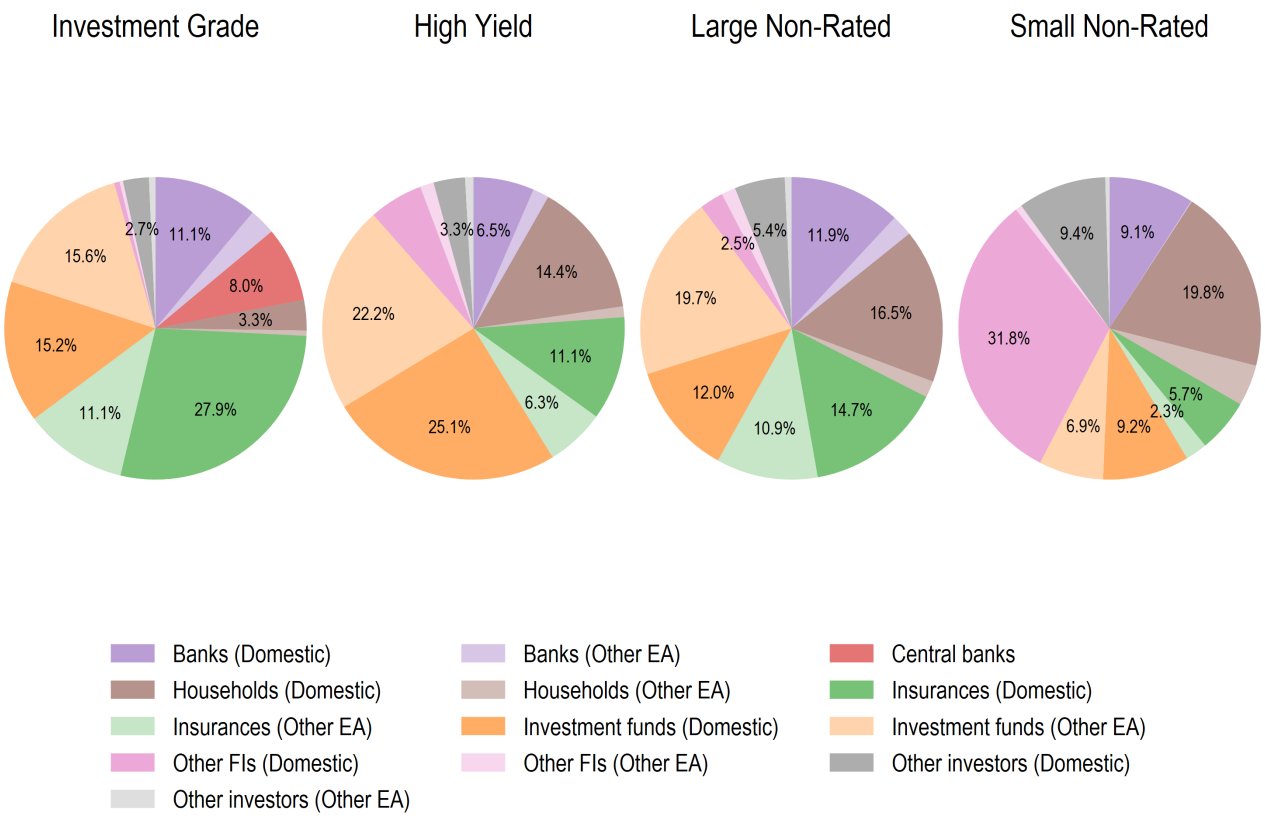


Figure IA.5 – Bond Investor Composition, 2019Q4: Domestic vs Other EA Investors

The figure presents the investor composition of the bonds issued by euro area non-financial corporations in 2019Q4, depending on whether the firms have a rating as of 2019Q4 and, for the unrated firms, if they have an asset size above (large) or below (small) the median of the sample at the end of 2019Q4. The source of this data is ECB Securities Holding Statistics per Sector (SHSS). Investor holdings are labeled as Domestic if located in the same country as the issuer. Otherwise they are labeled as Other EA.

Table IA.1 – Share of Private, Rated and New Issuers by Size, Across Country

	(1) Germany					(2) France					(3) Italy					(4) Benelux and Ireland					(5) Other Southern Countries					(6) Central, Eastern, and Baltic Countries				
	Q1	Q2	Q3	Q4	All	Q1	Q2	Q3	Q4	All	Q1	Q2	Q3	Q4	All	Q1	Q2	Q3	Q4	All	Q1	Q2	Q3	Q4	All	Q1	Q2	Q3	Q4	All
A_i(%)	2.17	.	.	10.98	5.41	.	.	.	15.45	11.97	.	.	.	1.75	0.20	5.26	9.09	9.09	10.94	9.95	.	1.25	3.03	2.60	1.94	2.78	.	.	1.79	1.15
BBB_i(%)	2.17	.	2.94	29.27	14.05	.	.	.	23.64	18.31	.	.	.	21.05	2.40	5.26	.	.	32.03	21.99	.	.	1.52	24.68	7.75	2.78	.	.	21.43	7.47
HY_i(%)	.	.	2.94	24.39	11.35	.	.	7.41	18.18	15.49	.	.	3.85	15.79	2.80	.	18.18	3.03	20.31	15.18	2.86	.	4.55	23.38	8.53	2.78	.	.	12.50	4.60
NR_i(%)	95.65	100.00	94.12	35.37	69.19	100.00	100.00	92.59	42.73	54.23	100.00	100.00	96.15	61.40	94.60	89.47	72.73	87.88	36.72	52.88	97.14	98.75	90.91	49.35	81.78	91.67	100.00	100.00	64.29	86.78
$New_Issuers_i$(%)	93.18	82.61	50.00	29.69	58.28	100.00	66.67	69.23	34.44	43.80	88.59	84.76	78.91	39.22	79.67	77.78	44.44	59.38	37.62	46.88	97.14	78.75	55.56	35.00	64.29	88.57	80.00	55.32	25.00	58.79
$Private_Issuers_i$(%)	84.09	69.57	53.12	26.56	53.37	.	33.33	30.77	24.44	25.62	95.30	93.90	87.50	58.82	89.02	94.44	66.67	62.50	19.80	39.38	94.29	88.75	79.37	25.00	71.01	91.43	71.43	53.19	25.00	56.97

This table shows, by country, the share of the following subcategories of issuers in our sample according to all categories used in our analysis: (i) size, (ii) rating, (iii) issuance history, and (iv) private/public status of the firm. The table first breaks our sample between quartiles of total assets. Quartiles are fixed and calculated only once with total assets values for the year 2019. Additionally, each quartile is further broken down between four rating categories: Unrated (NR) for the groups without a rating from S&P, Moody's, or Fitch; High Yield (HY) for all group ratings below 9; BBB for all groups rated between 9 and 11; and Investment Grade (IG), which includes all ratings of 12 and above. Ratings data are obtained from the Corporate Securities database (CSDB) collected by the Eurosystem and harmonized on a scale from 0 to 18 before defining rating subgroups. We identify the share of new issuers in our dataset by collecting information on the first year of issuance of bonds for each group on Capital IQ and/or CSDB. New issuers correspond to any groups that first issued a bond during and/or after 2010. Last, we differentiate between private and public issuers, where public firms are identified via the existence of the ISIN of a public stock in Orbis and/or Capital IQ. The data are expressed in %. "Other Southern Countries" include: CY, ES, GR, MT, PT. "Central, Eastern and Baltic Countries" include: AT, EE, FI, LT, LV, SI, SK.

Table IA.2 – Summary Statistics across Type of Issuers - Size, Across Country

	(1) Germany					(2) France					(3) Italy					(4) Benelux and Ireland					(5) Other Southern Countries					(6) Central, Eastern and Baltic Countries				
	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
Total Assets (Mlns EUR)	13.36	73.80	387.9	34202.8	18948.2	17.80	87.91	433.7	26394.5	21465.2	15.93	72.29	414.5	15365.6	2810.8	86.73	69.75	587.8	19420.4	13171.6	28.52	69.39	421.8	13946.6	4372.9	15.83	69.47	479.3	9437.8	3752.3
	(8.452)	(28.15)	(225.0)	(53757.1)	(43355.4)	(0)	(30.23)	(191.8)	(38988.1)	(36551.3)	(10.14)	(32.34)	(266.8)	(34470.4)	(15440.6)	(488.7)	(35.13)	(282.6)	(31520.7)	(27342.1)	(78.38)	(33.18)	(248.9)	(24484.3)	(14889.9)	(8.660)	(34.68)	(260.4)	(18632.1)	(12330.2)
Bond Share (in %)	56.20	55.44	39.07	60.00	54.86	39.58	33.41	38.89	57.23	53.43	28.67	20.00	24.04	36.33	25.67	46.07	59.96	54.45	72.83	66.22	16.75	16.92	27.41	52.05	28.92	27.95	32.84	25.55	44.28	34.30
	(39.79)	(39.31)	(33.00)	(32.66)	(35.88)	(37.63)	(26.07)	(31.18)	(36.70)	(36.38)	(29.41)	(22.27)	(25.16)	(35.81)	(27.79)	(36.27)	(33.44)	(37.47)	(36.13)	(37.50)	(26.06)	(28.16)	(32.55)	(33.28)	(33.75)	(33.82)	(36.36)	(32.50)	(32.97)	(34.64)
Total Credit / Assets (in %)	27.07	24.77	45.71	21.37	26.90	27.50	11.42	34.08	24.34	25.70	34.75	38.14	34.75	27.94	34.72	35.04	22.47	22.86	23.97	24.37	27.24	24.51	25.69	27.96	26.11	30.70	29.02	30.88	19.90	26.17
	(31.67)	(27.58)	(26.60)	(17.09)	(24.31)	(17.82)	(19.41)	(21.73)	(16.08)	(17.74)	(28.01)	(26.54)	(21.87)	(13.58)	(24.13)	(32.39)	(23.66)	(18.60)	(17.81)	(19.72)	(28.92)	(22.79)	(22.86)	(15.76)	(22.25)	(30.59)	(27.02)	(22.85)	(13.03)	(22.03)
Profitability (EBITDA / Assets) (in %)	4.576	0.0395	5.357	6.966	5.959	-12.25	3.071	7.731	7.665	7.433	0.532	4.209	5.139	6.268	4.306	7.053	-5.232	3.340	8.551	6.834	7.144	7.134	5.516	8.622	7.149	5.824	3.726	8.026	7.698	6.752
	(13.15)	(20.37)	(5.667)	(4.902)	(8.204)	(0)	(3.469)	(7.314)	(4.442)	(5.249)	(30.90)	(8.296)	(3.282)	(2.872)	(13.63)	(9.141)	(19.15)	(6.386)	(5.479)	(7.857)	(17.00)	(6.915)	(6.483)	(5.444)	(8.345)	(5.042)	(6.511)	(6.480)	(5.254)	(6.174)
Negative EBITDA indicator	0.307	0.227	0.0927	0.0361	0.0879	1	0.100	0.0812	0.00991	0.0295	0.177	0.198	0.0320	0	0.103	0.118	0.225	0.184	0.0248	0.0717	0.0912	0.105	0.106	0.0386	0.0829	0.161	0.308	0.0514	0.0299	0.109
	(0.463)	(0.421)	(0.290)	(0.187)	(0.283)	(0)	(0.304)	(0.274)	(0.0991)	(0.169)	(0.382)	(0.399)	(0.176)	(0)	(0.304)	(0.323)	(0.420)	(0.388)	(0.156)	(0.258)	(0.288)	(0.306)	(0.308)	(0.193)	(0.276)	(0.370)	(0.462)	(0.221)	(0.171)	(0.312)
Cash / Assets (in %)	7.636	9.680	9.229	6.598	7.452	5.246	16.00	13.14	8.732	9.596	8.426	6.748	6.662	6.347	6.916	6.837	9.277	10.90	7.356	8.069	5.463	4.933	5.437	9.126	6.452	3.144	5.389	6.191	7.054	6.185
	(11.08)	(10.38)	(8.867)	(4.615)	(7.108)	(0)	(6.680)	(10.03)	(5.999)	(7.059)	(9.728)	(7.541)	(5.347)	(3.394)	(6.752)	(7.384)	(8.907)	(13.19)	(5.402)	(7.931)	(5.334)	(6.303)	(7.073)	(7.585)	(7.079)	(4.656)	(6.144)	(5.991)	(5.630)	(5.891)
Fixed Assets / Assets (in %)	44.48	41.34	44.62	52.80	48.73	4.752	42.89	39.85	38.17	38.30	43.71	41.37	50.53	54.50	47.04	66.14	43.69	48.73	43.23	46.31	42.68	52.89	64.08	46.93	53.09	57.79	59.67	55.20	45.16	52.79
	(25.83)	(24.58)	(28.71)	(27.62)	(27.63)	(0)	(30.21)	(28.28)	(27.93)	(28.09)	(26.01)	(23.29)	(21.25)	(19.86)	(23.14)	(15.50)	(33.00)	(29.74)	(29.80)	(29.66)	(25.84)	(17.59)	(17.96)	(32.56)	(25.26)	(26.98)	(23.63)	(26.58)	(28.60)	(27.41)
Bond Remaining Maturity (in years)	3.211	3.435	5.490	5.854	4.994	2.680	1.768	3.675	6.140	5.587	3.715	4.619	5.351	6.101	4.865	9.755	3.344	3.610	6.228	5.863	1.286	2.258	3.680	6.750	4.293	3.604	4.659	2.797	3.547	3.596
	(2.659)	(1.580)	(6.024)	(7.715)	(6.301)	(0.202)	(1.831)	(1.597)	(5.649)	(5.236)	(2.764)	(3.559)	(3.539)	(5.825)	(3.918)	(7.724)	(1.533)	(1.962)	(3.558)	(4.126)	(1.810)	(4.099)	(5.427)	(13.56)	(9.365)	(5.813)	(13.05)	(2.499)	(3.166)	(6.862)
Volume Share of Fixed Coupon Bonds (in %)	84.50	100	87.29	95.91	92.79	100	100	91.50	92.57	92.69	55.37	56.56	61.17	82.84	62.12	63.89	99.84	86.70	95.39	91.90	100	88.33	89.57	91.35	91.07	97.27	73.52	93.80	98.31	92.14
	(35.63)	(0)	(29.67)	(15.04)	(23.07)	(0)	(0)	(27.97)	(17.99)	(19.40)	(48.58)	(48.23)	(47.07)	(34.00)	(46.83)	(44.36)	(1.414)	(32.54)	(16.18)	(24.07)	(0)	(31.93)	(27.35)	(22.06)	(24.44)	(16.36)	(43.98)	(24.17)	(7.782)	(25.95)
Volume Share of Senior Bonds (in %)	86.83	80.94	93.03	99.76	94.21	.	100	90.91	98.39	97.76	100	99.56	99.71	92.58	98.52	31.71	100	93.29	97.19	94.57	100	97.30	98.06	98.56	98.42	79.01	98.73	99.13	99.54	97.45
	(33.88)	(38.96)	(21.08)	(3.834)	(22.42)	(.)	(0)	(28.91)	(8.440)	(11.90)	(0)	(6.656)	(4.737)	(22.80)	(10.77)	(47.11)	(0)	(21.91)	(13.86)	(20.69)	(0)	(16.33)	(13.82)	(11.20)	(11.98)	(40.98)	(6.689)	(6.060)	(4.876)	(14.60)
Volume Share of Unsecured Bonds (in %)	93.94	100	95.45	99.58	97.94	.	100	96.91	99.35	99.13	99.06	95.98	98.74	99.56	98.04	48.15	100	97.58	99.13	97.77	73.79	100	92.49	99.03	97.01	100	89.10	99.00	99.89	97.85
	(22.31)	(0)	(20.88)	(5.927)	(13.61)	(.)	(0)	(17.40)	(5.338)	(7.402)	(9.640)	(19.66)	(11.17)	(6.652)	(13.88)	(50.92)	(0)	(11.50)	(6.144)	(12.78)	(41.02)	(0)	(20.88)	(5.047)	(13.51)	(0)	(31.26)	(4.654)	(0.748)	(13.70)
Bond Yield at Offering (in %)	6.736	5.411	3.392	1.078	3.076	6.335	3.907	3.157	0.894	1.175	4.337	4.278	3.729	1.838	3.701	3.491	4.225	3.037	1.076	1.679	4.910	3.218	27.50	1.592	6.637	5.024	5.169	2.643	1.874	2.849
	(4.618)	(2.006)	(1.735)	(1.089)	(3.250)	(.)	(0.941)	(1.947)	(0.955)	(1.337)	(2.150)	(2.065)	(1.645)	(1.675)	(2.089)	(1.073)	(2.758)	(2.215)	(1.207)	(1.878)	(1.049)	(1.974)	(86.08)	(1.516)	(38.11)	(3.850)	(2.690)	(1.846)	(1.337)	(2.456)
Interest Rate on All Loans (in %)	2.667	1.946	2.109	1.628	1.956	11.65	12.29	4.740	2.701	3.364	2.459	2.140	1.723	1.500	1.995	3.916	1.346	1.708	1.658	1.860	2.851	3.164	2.738	1.935	2.682	3.584	2.804	1.859	1.316	2.062
	(1.887)	(1.723)	(1.088)	(1.554)	(1.621)	(26.41)	(21.93)	(7.198)	(4.548)	(6.755)	(1.268)	(1.157)	(1.002)	(1.138)	(1.189)	(10.60)	(1.070)	(2.051)	(3.017)	(4.211)	(3.699)	(3.999)	(2.813)	(1.865)	(3.228)	(3.296)	(1.533)	(1.071)	(0.757)	(1.681)
Interest Rate on Term Loans (in %)	2.533	2.932	2.198	1.682	2.024	3.167	2.534	2.168	1.851	1.923	2.379	2.073	1.706	1.463	1.941	4.982	1.652	1.298	1.494	1.670	1.571	1.591	1.802	1.785	1.699	2.595	2.740	1.875	1.412	1.945
	(1.657)	(1.523)	(1.078)	(2.103)	(1.881)	(1.936)	(2.073)	(2.796)	(3.727)	(3.560)	(1.180)	(1.175)	(0.942)	(1.156)	(1.156)	(13.95)	(1.037)	(1.169)	(3.483)	(4.595)	(0.796)	(0.835)	(1.188)	(1.814)	(1.269)	(1.346)	(1.311)	(1.017)	(0.776)	(1.170)
Observations	1855					1526					4013					1975					3250					1860				

The table reports means and standard deviations (in brackets) of the main variables of interest for issuers of our sample, broken down by quartiles of total assets. Quartiles are fixed and calculated only once with total assets values for the year 2019. Interest rates are volume weighted. The sample and summary statistics for this table are limited to EA non-financial bond issuers with positive bond outstanding in 2018–2019. "Other Southern Countries" include: CY, ES, GR, MT, PT. "Central, Eastern and Baltic Countries" include: AT, EE, FI, LT, LV, SI, SK.

Table IA.3 – Summary Statistics by Rating Categories

	(1) A and above	BBB	HY	NR	Total
Total Assets (Mlns EUR)	62574.5	32924.6	8543.5	1491.0	8988.8
	(67962.5)	(37543.7)	(12768.0)	(4096.7)	(26173.7)
Bond Share (in %)	79.33	76.99	70.86	28.84	39.70
	(25.83)	(25.67)	(29.83)	(32.03)	(36.73)
Total Credit / Assets (in %)	23.93	26.56	31.80	28.55	28.34
	(16.30)	(15.66)	(24.10)	(23.61)	(22.62)
Profitability (EBITDA / Assets) (in %)	8.158	9.377	7.143	5.401	6.216
	(4.627)	(4.500)	(5.734)	(10.53)	(9.475)
Negative EBITDA indicator	0.0446	0.00744	0.0296	0.107	0.0839
	(0.207)	(0.0860)	(0.170)	(0.309)	(0.277)
Cash / Assets (in %)	6.072	7.477	8.899	7.155	7.288
	(4.164)	(5.524)	(6.443)	(7.505)	(7.067)
Fixed Assets / Assets (in %)	40.51	42.71	50.76	49.43	48.30
	(27.58)	(30.58)	(28.27)	(25.66)	(26.74)
Bond Remaining Maturity (in years)	8.209	7.141	5.771	4.057	4.855
	(6.069)	(5.818)	(11.95)	(4.793)	(6.123)
Volume Share of Fixed Coupon Bonds (in %)	92.33	94.93	90.50	77.89	82.88
	(18.43)	(13.34)	(25.73)	(40.10)	(35.34)
Volume Share of Senior Bonds (in %)	99.77	97.62	99.57	96.04	96.96
	(1.989)	(12.66)	(3.473)	(18.35)	(15.78)
Volume Share of Unsecured Bonds (in %)	99.94	98.52	96.07	97.94	97.98
	(0.763)	(10.70)	(17.32)	(13.37)	(12.97)
Bond Yield at Offering (in %)	0.384	0.544	1.977	4.527	3.196
	(0.437)	(0.481)	(1.313)	(17.43)	(13.93)
Interest Rate on All Loans (in %)	1.500	1.900	2.469	2.366	2.281
	(2.021)	(4.710)	(3.389)	(3.082)	(3.298)
Interest Rate on Term Loans (in %)	1.240	1.743	2.149	1.891	1.861
	(2.356)	(4.481)	(2.269)	(1.746)	(2.323)
Observations	14479				

The table reports mean and standard deviation (in brackets) of the main variables of interests for our sample of EA non-financial issuers in 2019, broken down by ratings. All variables are reported on a monthly basis. Interest rates are volume weighted. Sources for Ratings are Moody's, Fitch and SP, and combine bond- and issuer-level ratings.

	mean	sd	p10	p25	p50	p75	p90	count
A and above	0.053	0.135	0.000	0.000	0.010	0.045	0.129	1594
BBB	0.051	0.116	0.000	0.004	0.017	0.045	0.121	1302
High Yield	0.049	0.136	0.000	0.000	0.002	0.033	0.121	554
Large Non-Rated	0.050	0.175	0.000	0.000	0.002	0.025	0.089	577
Small Non-Rated	0.032	0.128	0.000	0.000	0.000	0.010	0.073	245
Observations	4272							

Table IA.4 – Distribution of ownership changes by rating

This table reports the distribution of the statistics of the Euclidian distance constructed for each bond between its ownership vector in 2019q4 relative to 2019q3. A bond's ownership vector is defined as the holdings shares across investor sectors available in the SHS data. By construction, bonds that are not traded across sectors have a distance of zero.

Table IA.5 – Bonds Investors Composition in 2019Q4: Cross-Sectional Regressions, Domestic vs other EA investors

	IC & PF (Domestic)	IC & PF (Other EA)	Inv. funds (Domestic)	Inv. funds (Other EA)	Other FI (Domestic)	Other FI (Other EA)	Banks (Domestic)	Banks (Other EA)	Central Bank	Households (Domestic)	Households (Other EA)	Other (Domestic)	Other (Other EA)
Q1	-0.0556***	-0.0993***	-0.0257*	-0.0901***	0.0809***	-0.00403	0.0365***	-0.0500***	-0.00344	0.155***	-0.0199	0.0687***	-0.0435**
	(0.0135)	(0.0229)	(0.0139)	(0.0263)	(0.00625)	(0.0148)	(0.00930)	(0.0187)	(0.0146)	(0.00959)	(0.0185)	(0.00472)	(0.0195)
Q2	-0.0249**	-0.0669***	-0.0251**	-0.0429*	0.0877***	-0.0161	0.0206***	-0.0434***	0.00448	0.0727***	-0.00431	0.00426	-0.0228
	(0.0114)	(0.0193)	(0.0118)	(0.0222)	(0.00529)	(0.0125)	(0.00786)	(0.0158)	(0.0123)	(0.00811)	(0.0156)	(0.00399)	(0.0165)
Q3	-0.0259***	-0.0397***	-0.0229***	-0.0426***	0.0239***	-0.00483	0.0303***	-0.0140	0.000932	0.0533***	0.0266**	0.00522*	-0.0108
	(0.00816)	(0.0138)	(0.00840)	(0.0159)	(0.00378)	(0.00896)	(0.00562)	(0.0113)	(0.00881)	(0.00579)	(0.0112)	(0.00285)	(0.0118)
Private	-0.00209	0.00437	0.0143***	-0.00640	0.0212***	-0.0137***	0.0134***	-0.0124**	0.00787*	0.00251	-0.0261***	-0.00574***	-0.0268***
	(0.00434)	(0.00735)	(0.00447)	(0.00845)	(0.00201)	(0.00476)	(0.00299)	(0.00600)	(0.00469)	(0.00308)	(0.00594)	(0.00152)	(0.00628)
HY	-0.0304***	-0.0175**	0.0421***	0.0353***	0.0117***	0.00299	-0.0137***	-0.0101	-0.0628***	-0.00627*	-0.0163**	0.000281	-0.0110
	(0.00464)	(0.00786)	(0.00478)	(0.00905)	(0.00215)	(0.00510)	(0.00320)	(0.00642)	(0.00502)	(0.00330)	(0.00636)	(0.00162)	(0.00672)
NR	0.0183***	-0.0142	-0.0123**	-0.0391***	0.0119***	-0.0158***	0.0343***	-0.0288***	-0.0629***	0.0584***	0.0310***	0.0238***	-0.0371***
	(0.00556)	(0.00942)	(0.00573)	(0.0108)	(0.00258)	(0.00611)	(0.00383)	(0.00769)	(0.00601)	(0.00395)	(0.00762)	(0.00194)	(0.00805)
Observations	18390	18390	18390	18390	18390	18390	18390	18390	18390	18390	18390	18390	18390
R^2	0.005	0.003	0.009	0.006	0.062	0.002	0.022	0.005	0.016	0.070	0.004	0.032	0.007

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table displays the results from estimating a cross-sectional regression of the investor holding shares of bonds on firms' characteristics, after classifying the investors between 2 groups: domestic investors, where the investors are domiciled in the same country as the bond issuer, and other EA investors, where the investors are domiciled in a different country than the bond issuer's. Specifically, size dummies, a variable equal to one if the firm is private, and rating categorical variables are included. The dependent variables are constructed as the share of each firm's total outstanding bonds held by each investor type. For this table data from only 2019Q4 are included. The source of this data is the Securities Holdings Statistics by Sector (SHSS) for debt securities issued by non-financial corporations. Standard errors, in parentheses, are corrected for clustering of the observations at the firm level. p $<$ 0.10, p $<$ 0.05, p $<$ 0.01

Table IA.6 – Herfindahl-Hirschman concentration index (HHI)

(a) Security level

	mean	sd	p10	p25	p50	p75	p90	count
High Yield	0.625	0.231	0.347	0.441	0.573	0.825	0.995	666
Investment Grade	0.597	0.267	0.260	0.352	0.543	0.861	0.993	3056
Large Non-Rated	0.649	0.268	0.296	0.426	0.582	0.960	1.000	629
Small Non-Rated	0.734	0.254	0.394	0.503	0.785	1.000	1.000	279
Observations	4630							

(b) Firm level

	mean	sd	p10	p25	p50	p75	p90	count
High Yield	0.447	0.157	0.285	0.329	0.414	0.508	0.684	74
Investment Grade	0.347	0.193	0.208	0.238	0.278	0.355	0.657	149
Large Non-Rated	0.565	0.266	0.264	0.351	0.500	0.800	1.000	263
Small Non-Rated	0.707	0.255	0.376	0.500	0.678	1.000	1.000	178
Observations	664							

This table displays the statistics of the Herfindahl-Hirschman concentration index (HHI) in the cross-section. Panel A reports estimations at the security level and panel B reports estimations at the firm parent level. For this estimation, the holdings of the eight investor categories (banks, central banks, households, insurance & pension funds, investment funds, other financial intermediaries, other investors, and rest of the world) in December 2019 were used.

	Q1	Q2	Q3	Q4	All Firms
A	0	0	0	22	22
A (%)	*0.00*	*0.00*	*0.00*	*57.89*	*48.89*
BBB	1	0	0	48	49
BBB (%)	*100.00*	*0.00*	*0.00*	*46.15*	*46.67*
HY	0	0	4	30	34
HY (%)	*0.00*	*0.00*	*80.00*	*43.48*	*45.33*
NR	253	285	246	152	936
NR (%)	*56.22*	*60.38*	*54.18*	*54.29*	*56.52*
New issuers	241	259	206	110	816
New issuers (%)	*55.92*	*61.37*	*55.38*	*49.77*	*56.43*
Private issuers	238	255	191	96	780
Private issuers (%)	*57.77*	*62.50*	*57.19*	*63.16*	*59.72*

Table IA.7 – Number of Firms and Share of Private, Rated, & New Issuers by Size which Received a Public Loan Guarantee during Covid

This table shows the number of firms of the following subcategories of issuers which also received a public loan guarantee during Covid: (i) size, (ii) rating, (iii) issuance history, and (iv) private/public status of the firm. The table first breaks our sample between quartiles of total assets. Quartiles are fixed and calculated only once with total assets values for the year 2019. Additionally, each quartile is further broken down between four rating categories: Unrated (NR) for the groups without a rating from S&P, Moody's, or Fitch; High Yield (HY) for all group ratings below 9; BBB for all groups rated between 9 and 11; and Investment Grade (IG), which includes all ratings of 12 and above. Ratings data are obtained from the Corporate Securities database (CSDB) collected by the Eurosystem and harmonized on a scale from 0 to 18 before defining rating subgroups. We identify the share of new issuers in our dataset by collecting information on the first year of issuance of bonds for each group on Capital IQ and/or CSDB. New issuers correspond to any groups that first issued a bond during and/or after 2010. Last, we differentiate between private and public issuers, where public firms are identified via the existence of the ISIN of a public stock in Orbis and/or Capital IQ. The share of firms which received a public loan guarantee is expressed in % and calculated as the total number of firms within a given category (size * rating/new issuers/private firms) that received a public loan guarantee between March 2020 and December 2020, over the total number of firms in that specific category. Public loan guarantees are identified in AnaCredit as loan guarantees granted by Government institutions, as well as any institutions which implemented the public guarantee programs of Euro area governments during Covid (e.g. KfW for Germany)

IA.2 New Bond Issuance and Firms' Balance Sheet

How do new issuers use the funds? An important question is whether bonds simply replace loans in a pattern of pure debt substitution, and we thus investigate changes in new issuers' balance sheets. We construct a firm-level panel of companies in the Eurozone that covers information on firm's balance sheet and debt structure. The main time period spans 2002 to 2018. We gather information about both public and private firms, and restrict attention to non-financial corporations. The public firms panel is constructed by merging two main data sources: Capital IQ and Compustat Global. We also construct a private bond issuers panel by merging balance sheet data from Orbis with bond issuance from Centralized Securities Database (CSDB) maintained by the ECB.

To understand the evolution of the debt and assets more precisely, we run a dynamic regression analysis. For this analysis, we use only the new issuers and the time window of [-3, +5] years from the first issuance. We use D_t time dummies and run the following specification:

$$y_{i,t} = \sum_{t=-3}^{5} \beta_t \left(D_t\right) + \alpha_i + \alpha_t \tag{2}$$

We chose the year before issuance as reference date. The specification includes firm and year fixed effects to capture any firm- or year-specific characteristics. The dynamic evolution of debt for new issuers is presented in Figure IA.6.

Panel (A) shows that for public new issuers total debt increases up to 50% after issuance compared to its pre-issuance level and remains significantly higher for the years after issuance. Bank loans decreases by approximately 10% compared to pre-issuance level, suggesting that new issuers substitute only partially bank loans with bonds. The level of bonds remains high and stable for the five years after the issuance, consistent with the fact that firms do not dramatically adjust their bonds in a short time period. Panel (B) shows very similar dynamics for private issuers, with an even larger drop in non-bond debt.

Figure IA.7 presents the dynamic evolution of firms' assets that follows a bond issuance. Panel (A) shows that public new issuers grow in size by expanding their assets by 15% on

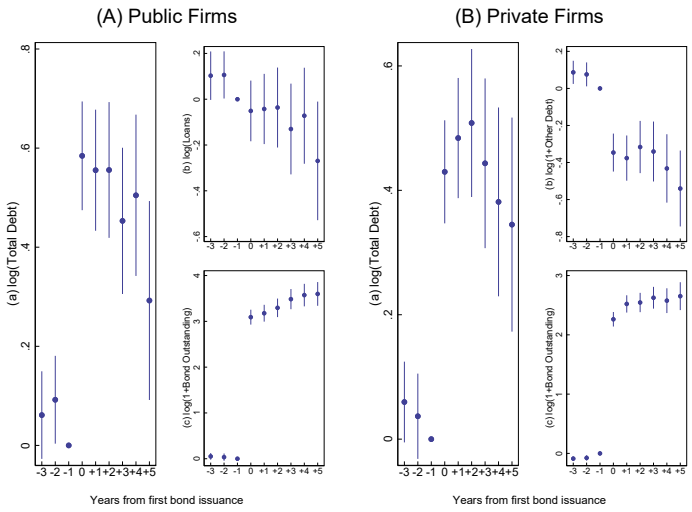


Figure IA.6 – Debts' Dynamics

The figures show the coefficients and the 95% confidence intervals obtained through fixed-effects regressions. Panel (A) and (B) include only public new issuers and private new issuers, respectively. The points are the coefficients resulting from regressing the (A-a, B-a) logarithm of total debt, (A-b) logarithm of loans, (B-b) logarithm of 1 plus other debt, calculated as difference between total debt and bonds, and (A-c, B-c) logarithm of 1 plus bond outstanding, on time dummies for a window of [-3, +5] years from the first issuance. Year and firm fixed effects are included. Standard errors are clustered at the firm level. Each line crossing a point represents the confidence interval for that coefficient.

average, consistent with limited loan substitution. We also observe that cash rises significantly the year after the issuance but drops in the later years. On the other hand, investment in long-term assets appears to be consistent over the years as firms grow. Panel (B) shows a similar pattern for private firms, with two differences. First, investment is significantly larger: long-term assets grow by about 30%. Second, cash levels grow relatively more and do not revert nearly as fast.

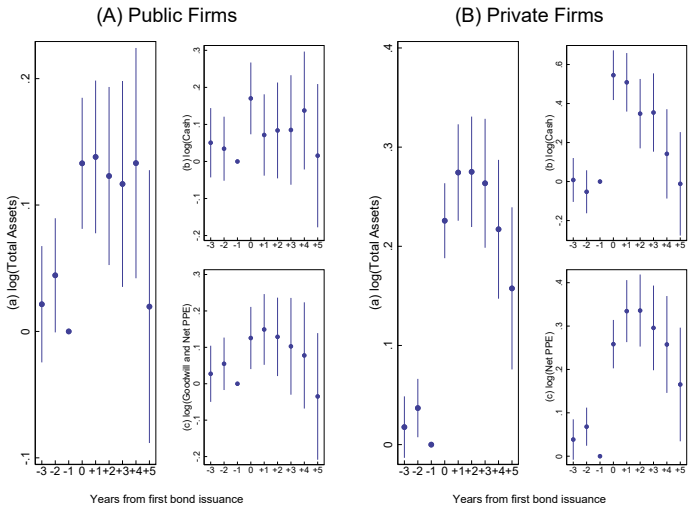


Figure IA.7 – Assets' Dynamics

The figures show the coefficients and the 95% confidence intervals obtained through the fixed-effects regressions. Panel (A) and (B) include only public new issuers and private new issuers, respectively. The points are the coefficients resulting from regressing the (A-a, B-a) logarithm of total assets, (A-b, B-b) logarithm of cash, (A-c) logarithm of the sum of goodwill and net ppe, and (B-c) logarithm of net ppe, on time dummies for a window of [-3, +5] years from the first issuance. Year and firm fixed effects are included. Standard errors are clustered at the firm level. Each line crossing a point represents the confidence interval for that coefficient.