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EUROSISTEMA

Questioni di Economia e Finanza

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MISSING INVESTORS IN THE ITALIAN CORPORATE BOND MARKET

by Matteo Accornero, Paolo Finaldi Russo, Giovanni Guazzarotti and Valentina Nigro*

Abstract

We study the allocation of Italian corporate bonds among investors using a unique dataset that matches, for each security, information on the holding sectors with those of the bond and the issuer. Our main findings are the following: i) large companies issue bonds mainly on international markets, whereas smaller firms mainly target domestic markets; ii) in Italy, differently than in economies with more developed bond markets, the role of domestic institutional investors is limited, especially for SMEs' securities, while domestic households hold larger shares of these issues; iii) Italian households hold bonds of financially sounder firms, whereas foreign investors concentrate their holdings in riskier ones; for the other Italian investors we do not find evidence of a significant risk taking attitude. Even if in recent years institutional investors have significantly increased their holdings of Italian SMEs bonds, our findings suggest that the development of this market is still hampered by the limited presence of intermediaries specialized in the subscription of financial instruments issued by smaller, unlisted and riskier firms.

JEL Classification: G10, G23, G32.

Keywords: corporate bond market, risk allocation, corporate bond holders.

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1. Introduction¹

In countries with bank-based financial systems the development of capital markets is an important policy objective as firms' access to alternative funding helps to enhance financial stability and supports long-term investments. The analysis of investors' behavior, along with that of the issuers, could help to understand to what extent supply-side factors are an obstacle to the development of the market and what type of policies may help to overcome them. This paper makes an attempt in this direction by mapping the investments in corporate bonds across the economy. On the basis of a unique dataset which includes security-level information on bond holders, we study how Italian corporate bonds are allocated across sectors and highlight some differences with other European countries. In particular, we analyze how the propensity to hold securities issued by smaller or riskier firms changes across holding sectors.

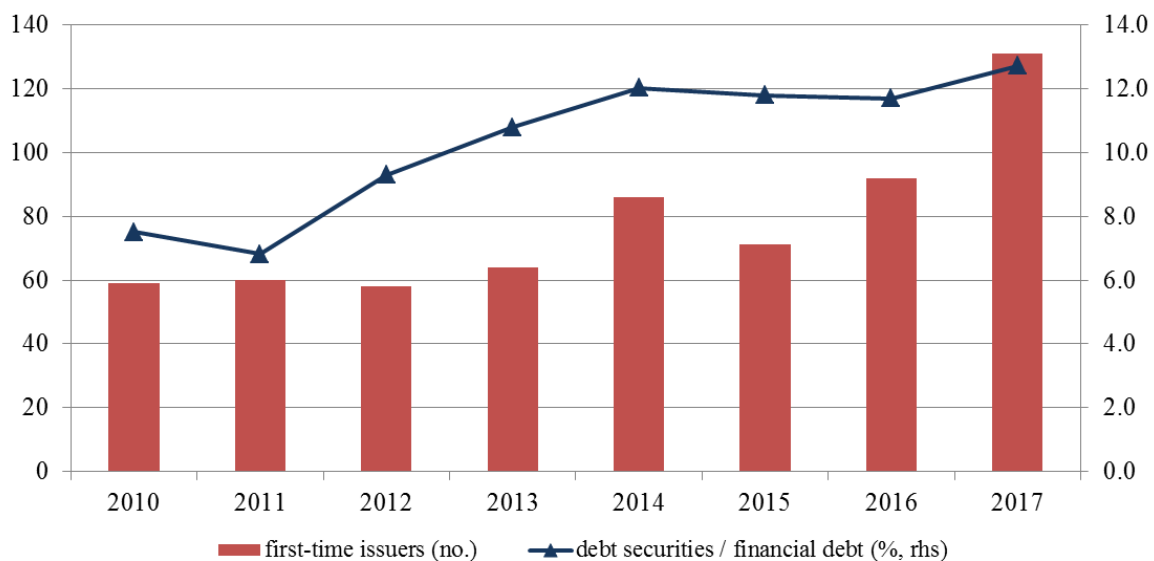
The Italian corporate bond market is a particularly interesting case study. In the past few years, volumes have increased considerably, reaching an annual average of about 30 billion of euros of gross issues, and several medium and large firms have accessed the bond market for the first time (fig. 1). The increase in issuances has been fostered by the tightening in the supply of bank credit at the height of the financial crisis and by low money market rates that induced investors to diversify their portfolios; they were also favored by a new and more favorable tax system for bonds issued by non-listed companies (so-called "minibonds")² as well as, more recently, by the Corporate sector purchase programme (CSPP) implemented by the Eurosystem in June 2016, and by the introduction of long-term individual saving plans. However, in Italy bond markets still play a marginal role with respect to countries with well developed capital markets: in September 2017 bonds accounted for only 12.6 per cent of Italian firms' financial debt; this value was considerably lower than in France, in the United Kingdom and in the United States (respectively, 22, 23 and 42 per cent).

¹ We would like to thank Francesco Columba, Giorgio Gobbi, Silvia Magri, Valerio Vacca and Daniela Venanzi for their comments. The opinions do not necessarily reflect those of the Bank of Italy, the Eurosystem or their staff.

² Decree Law 83/2012, ratified by Law 134/2012, updated the rules for debt security issues (financial bills and bonds) by unlisted companies other than banks and micro-enterprises. For securities listed in regulated markets or held by professional investors, the law removed the limit on the tax deductibility of interest payments and the maximum value of the securities that can be placed (Article 2412 of the Civil Code) and exempted some categories of investor (including banks, companies and non-residents) from the withholding tax. Following these innovations, a new regulated market (Extramot-Pro) for bonds issued by unlisted firms (minibond) was created. From the first placement in November 2012 to the end of December 2017 about 170 firms issued minibonds for a total of 12 billion euros.

The relatively small scale of the Italian corporate bond market with respect to those of France, UK and US reflects several factors, such as the limited number of large and listed firms, the low propensity of national investors to bear liquidity and credit risk, the opaqueness of most firms. Previous papers have studied the Italian corporate bond market focusing on the determinants of the firms' choice to access the market. For instance, Accornero et al. (2015), in line with the results of the international literature,³ show that Italian firms' recourse to the market depends essentially on reputation, transparency towards investors, a sound economic and balance sheet condition, and firms' need to finance new investment.

Figure 1: The Italian corporate bond market
(units and percentage shares)



Source: Bank of Italy.

Notes: First-time bond issuers are non-financial companies that have not issued other bonds in previous years; data referring to 2017 are provisional.

In this paper we focus on the investors' side of the market, studying the role played by different type of investors in relation to the characteristics of the issuing firms and the securities issued.⁴

³ Cfr. Hale and Santos (2008).

⁴ Instead, we do not draw any implication about investors' portfolio risk allocation since corporate bonds generally represent only a limited share of their total financial assets. For example, in 2016 they represented less than 1 per cent of Italian households portfolio.

Our findings indicate that large companies are able to place most of their securities among foreign investors and smaller firms are generally confined to the domestic market. Compared with the French bond market, the most developed in the euro-area, we find that Italian households play a larger role in the placements of bonds while domestic institutional investors, which in France are the main holding sector, play a less important role; these differences are especially large for SMEs' issuances. More interestingly, we find that the role of Italian households, as expected, decreases when securities are characterized by higher credit risk; in these cases households are mostly replaced by foreign investors, not by domestic ones.

On the basis of these results, we argue that the development of the bond market could benefit from a greater presence of specialized investors (such as credit funds) facilitating the issues by SMEs which are not sufficiently transparent and financial sound to tap international markets.

The paper is organized as follows. Section 2 and 3 describe the dataset and present some statistics on the distribution of bonds across holding sectors. Section 4 presents a multivariate analysis on the allocation of credit risk across sectors and section 5 concludes.

2. Data

We built a unique dataset matching for each corporate bond the characteristics of the security (i.e. amount, maturity, interest rate type), data drawn from issuing firm's balance-sheet, and the information on the holding sectors. The sources of these data are the Bank of Italy Securities Database (Anagrafe Titoli), Dealogic, the Centralised Securities Data Base (CSDB) of the ECB, Cerved financial account dataset, and the Securities Holding Statistics by Sector (SHSS) of the ECB.⁵ This last archive, which includes the crucial information on the holding sectors, is based on reports provided since 2013, on a quarterly basis, by banks and other financial intermediaries.⁶

⁵ Specifically, we drew the list of Italian issues and their main characteristics from Anagrafe Titoli and Dealogic (which includes international issues by Italian large groups); CSDB provided the same kind of data on the issues of other European countries; we used Cerved database to collect data on firms' balance-sheets and class of risk; finally SHSS include the crucial information on sectoral holdings. For a limited number of observations, we used also the Italian Business Register Infocamere to complement information about firms' size when it is missing in the Cerved dataset.

⁶ Regulation ECB/2012/24.

As of June 2017, outstanding bond issues by Italian firms were 1,453, amounting to 186 billion. For 958 issues (174 billion) we have information on the holding sectors.⁷ The remaining ones are typically small issues held by private investors without the intermediation of a bank (for instance bonds held by the shareholders of the issuing firm).

We dropped 441 issues for which our information on the holding sector covered less than 90 per cent of the total amount issued. These are typically issues mainly placed with investors outside the Euro area, which are not obliged to report to the supervisory authorities. In order to verify that this selection doesn't affect our results, we run the estimates on a wider sample that includes observations with a coverage lower than 90 per cent (see Sect. 4.4). Finally, we dropped 20 issues for which we do not have information on the issuer balance sheet. The final sample includes 497 issues for a total amount of 85 billion.

Table 1 contains some descriptive statistics on both the universe of issues outstanding in June 2017 (first column) and our final sample (last column). Overall, the differences between the two samples are quite limited: in the final sample there are slightly larger issuers and the bonds are more frequently listed and denominated in euro; the average amount issued is significantly higher in the final sample (172 versus 128 million). As we already pointed out, this is due to the fact that large issuances are over-represented in the final sample. Crucially, for the specific aims of the analysis, in the final sample the distribution of holdings among sectors is very similar to that of the issues reported in the SHSS database (column 2).

In terms of number of issues, 56 per cent of bonds in the final sample are issued by large firms,⁸ whereas in terms of outstanding amount they represent 98 per cent of the total. Even if SMEs' bond account for a tiny share of the total issued amount, their analysis is crucial from a policy point of view since these firms meet higher difficulties in diversifying their financing channels; moreover, the differences between the Italian market and more developed ones are mainly explained by the SME segment.

⁷ The CSDB and SHSS database have heterogeneous sources. While CSDB uses also commercial data providers, SHSS uses only reports by financial intermediaries according to Regulation ECB/2012/24. The partial coverage of SHSS depends mainly on the fact that not all intermediaries are required to report.

⁸ In the dataset issuers are defined as SMEs accordingly to the European Commission Recommendation of 6 May 2003: SMEs must have less than 250 persons employed and an annual turnover lower than EUR 50 million, or total assets lower than EUR 43 million. Data on firm size derive from Cerved database or from the Italian Business Register Infocamere. Firms belonging to the major Italian industrial groups are all considered large firms.

Almost all issues are euro-denominated; more than two thirds are fixed rate bonds; the average maturity at issue is about 12 years and the median amount is quite low (15 million). About one third of the issues is listed on a regulated market; about 50 per cent of the issues are placed by firms with sound financial indicators, 23 per cent by vulnerable firms and 28 per cent by riskier ones.⁹

Table 1: Bonds issued by Italian non-financial corporations - 2017 Q2

	All issues	Issues reported in SHSS	Final sample
Number	1,453	958	497
Outstanding amount (bln.)	185.8	173.6	85.5
Holding sector (percentage of total amount)			
Italian banks	-	3.4	3.9
Italian households	-	5.2	5.7
Italian institutional investors	-	16.5	16.3
Italian other investors	-	1.8	1.9
EA investors	-	52.8	53.9
Non-EA investors	-	20.4	18.5
Issuer size (percentage of number of issues) (1)			
SMEs	48.2	38.7	44.1
Large firms	51.8	61.3	55.9
Issuer size (percentage of total amount) (1)			
SMEs	1.9	1.3	1.6
Large firms	98.1	98.7	98.4
Bonds characteristics (percentage of number of issues, if not specified)			
Fixed rate	64.0	69.0	67.6
Floating rate	36.0	31.0	32.4
Non euro	10.5	10.6	5.4
Euro	89.5	89.4	94.6
Non listed	73.5	64.6	68.8
Listed	26.5	35.4	31.2
Average outstanding amount (mln.)	127.9	181.2	172.0
Median outstanding amount (mln.)	7.0	20.0	14.6
Average maturity at issue (years)	11.5	11.1	11.6
Median maturity at issue (years)	10.0	8.0	10.0
Average yield at issue (percentage points)(1)	4.3	4.1	4.4
Median yield at issue (percentage points)(1)	4.2	4.1	4.4
Sound issuers (2)	48.2	44.7	48.5
Vulnerable issuers (2)	23.6	24.4	23.1
Risky issuers (2)	28.2	30.9	28.4

Sources: Bank of Italy, Cerved and ECB (CSDB and SHSS database).

⁹ Risk classes are assigned by Cerved by using a logistic model to estimate a firm's one-year probability of default according to several balance sheet indicators. The z-score takes discrete values, from 1 to 9: 'sound' firms have a score from 1 to 4, 'vulnerable' firms have a score of 5 or 6, and 'risky' firms have higher scores.

Notes: (1) Yields at issue refer to fixed rate issues only. (2) In the first two columns data refer to over 90 per cent of the issues due to missing information.

3. The distribution of securities across holding sectors

In this section we describe the sectoral distribution of corporate debt securities issued by Italian companies. Overall, we find that more than 70 per cent of the Italian corporate bonds (in terms of amount) are held by foreign investors, 16 per cent by Italian non-bank intermediaries, 6 per cent by Italian households and just 4 per cent by Italian banks (tab. 2). The large role of foreign investors is the result of the integration of the euro-area bond market followed to the adoption of the single currency, which spurred competition among underwriting banks and liquidity in the secondary markets (Pagano and von Thadden, 2004; Baele et al., 2004; Zaghini, 2016).

Table 2: Distribution of bonds among holding sectors
(percentages of total amount and millions of euro)

	Total issues			SMEs' issues			Large firms' issues		
	Italian sectors	Foreign sectors	Total	Italian sectors	Foreign sectors	Total	Italian sectors	Foreign sectors	Total
Banks	4.1	5.9	10.1	10.5	1.2	11.7	4.0	6.0	10.1
Institutional investors	16.4	64.3	80.7	24.8	39.7	64.5	16.3	64.7	81.0
Households	5.5	0.4	5.9	19.1	0.0	19.2	5.3	0.4	5.7
Other investors	1.9	1.4	3.3	4.4	0.2	4.6	1.9	1.4	3.3
Total	27.9	72.1	100.0	58.9	41.1	100.0	27.5	72.5	100.0
Amounts (mln.)	24,666	63,650	88,316	768	537	1,305	23,898	63,113	87,011

Sources: Bank of Italy, Cerved and ECB (CSDB and SHSS databases).

3.1. Large versus small issuers

Table 2 shows that the sectoral distribution changes significantly according to the issuers' size. Large firms mostly issue on the international market, while SMEs on the domestic one: the share of SMEs' issues held by foreign investors is 41 per cent, against 72 per cent for large firms. This is consistent with previous studies based on equity markets documenting that foreign investors hold proportionally larger shares of large firms (Kang and Stulz, 1997) and that international equity issues tend to be larger (Gozzi et al., 2015). On the one hand, this evidence can be explained by the fact that the placement of securities by smaller firms in the international market is hampered by high fixed costs, linked for instance to the organization of the underwriting syndicates, as well as by

the higher risk premia generally required by foreign investors because of larger information asymmetries. On the other hand, foreign investors, mainly represented by large institutional investors such as insurance companies and investment funds, prefer to include in their portfolios more liquid securities, which are typically issued by large, and preferably listed, companies.

Italian (non-bank) institutional investors represent the main holding sector among domestic ones, ranging from 16 per cent for large firms' placements to 25 per cent for SMEs. Italian households play a relevant role only in small firms' issues (19 per cent).

3.2. *Recent developments*

The analysis of the changes in the bond holdings between December 2013 (first available data) and June 2017 suggests that in this period the role of households in the Italian bond market has decreased dramatically (from 58 to 19 per cent among SMEs issues and from 15 to 5 per cent among large firms' ones).

Table 3. Holding sectors: 2013 Q4 versus 2017 Q2
(units, billions of euro and percentage shares)

	Outstanding issues		Issued in the previous 18 months	
	2015 Q2	2017 Q2	2015 Q2	2017 Q2
Number of issues	553	517	96	107
Amount issued (bln.)	88.8	88.3	10.3	12.0
SMEs				
Number of issues	279	229	45	53
Amount issued (bln.)	1.1	1.3	0.4	0.5
<i>Shares of total amount</i>				
Banks	20.8	10.5	31.0	6.4
Households	39.7	19.1	8.6	10.2
Non-bank intermediaries	22.4	24.8	33.6	22.4
Other investors	3.0	4.4	4.0	4.0
EA investors	3.8	28.4	3.8	37.1
Non-EA investors	10.2	12.8	19.1	19.9
Large firms				
Number of issues	274	288	51	54
Amount issued (bln.)	87.6	87.0	9.9	11.5
<i>Shares of total amount</i>				
Banks	2.5	4.0	4.2	12.5
Households	9.3	5.3	11.7	2.2
Non-bank intermediaries	9.3	16.3	14.5	15.6
Other investors	1.3	1.9	0.6	0.4
EA investors	56.5	54.0	54.6	51.2
Non-EA investors	21.0	18.5	14.3	18.1

Sources: Bank of Italy, Cerved and ECB (CSDB and SHSS database).

Correspondingly, the holding shares of Italian institutional investors have increased markedly both for SMEs and large firms' issues while those of foreign investors have increased only for SMEs (table 3, columns 1 and 2). These changes hold even when looking only at new issues (securities issued in the eighteen months preceding the two dates; columns 3 and 4), which are less affected by past investment choices. These variations in portfolio holdings may be the consequence of both low interest rates - which might have spurred the search for higher-yielding assets by institutional investors more than that of households, given the smaller degree of sophistication of the latter - and the new investment opportunities offered by the minibond market.

3.3. *A comparison with the French and the German bond markets*

In this section we analyze the differences in the sectoral composition of bonds holdings between Italy and other European bond markets; we consider only French and German bond markets that are the larger ones in term of volumes among those of euro area countries. The French market is the largest, with 660 billion of bonds' outstanding amount in June 2017, more than four times the size of the Italian market (153 billion) and 3.5 times that of the German one (188 billion). Differently from the previous section, here we use the amount of the issue as a proxy to separate issues by large and smaller firms, as information on firm size is not available for foreign issuers.¹⁰ Table 4 shows data on bondholders, using a threshold for the issue size of 35 million euros to split the sample between large companies and SMEs.¹¹

In all countries larger issues are mainly placed among foreign investors and smaller ones among domestic investors, but these differences are more evident in Italy than in other countries. In particular, the share of Italian large issues held by foreign investors (71 per cent) is markedly higher than in France and Germany (51 and 61 per cent respectively; table 4, panel b). The wide differences with France is mostly due to the lower share of bonds held by Italian and German institutional investors (due either to their comparatively low development or to their low propensity to invest in corporate bonds); the difference between Italy and Germany also reflects the more prominent role of German banks in the subscription of large corporate bonds.

¹⁰ Moreover, in this part of the analysis, the nationality of the bond issuer is that of the issuer legal entity and not of the underlying industrial group since we haven't this information for foreign firms.

¹¹ The threshold corresponds to the highest value in the Italian SME sample and to the third decile in the large firm sample.

Among small size issues, instead, the share of bonds held by domestic investors is high in all countries (around 70 per cent for Italy and Germany, more than 80 per cent in France; table 4, panel a). Nevertheless, the distribution among domestic sectors is very heterogeneous. The role of households is larger in Italy and Germany, whereas the holding shares of institutional investors are markedly higher in France. This evidence for Italian and German SMEs' issues points to a limited presence of specialized institutional investors that would be more capable to assess, monitor and manage investment risk compared with households.¹²

In order to check the robustness of the 35 million threshold, we have replicated the cross-country analysis also for issues of lower amounts: we find that the role of Italian banks is the highest among issues from 15 to 35 million (see table A1 in the appendix), while Italian households play an abnormally large role among very small issues (from 0 to 15 millions).¹³

Table 4. Holding sectors in some euro area countries
(percentage shares based on outstanding amounts)

<i>Panel a: Small size issues (≤ 35 mln.)</i>			
	Germany	France	Italy
Domestic investors	70.7	81.2	68.7
<i>Banks</i>	6.2	8.1	14.4
<i>Households</i>	23.6	0.1	17.1
<i>Institutional investors</i>	14.2	69.8	33.1
<i>Other investors</i>	26.7	3.1	4.1
Foreign investors	29.3	18.8	31.3
Total	100.0	100.0	100.0

<i>Panel b: Large size issues (> 35 mln.)</i>			
	Germany	France	Italy
Domestic investors	38.6	48.9	29.2
<i>Banks</i>	9.6	3.2	3.8
<i>Households</i>	10.6	0.1	5.9
<i>Institutional investors</i>	15.7	44.1	17.4
<i>Other investors</i>	2.7	1.4	2.1
Foreign investors	61.4	51.1	70.8
Total	100.0	100.0	100.0

Source: SHSS database.

¹² The role of institutional investors is large also in other countries with highly developed financial systems. According to the US Flow of Funds statistics, in 2016 institutional investors (insurers, investment funds and pension funds) account for more than 71 per cent of the US domestic market for US and foreign corporate bonds, while households for only 9 per cent. Flow of funds statistics regarding United Kingdom indicate that in 2016 institutional investors and banks accounted for approximately 94 per cent of total holdings of foreign and domestic bonds, while households for less than 1 per cent.

¹³ A possible explanation for this large households' share could be that family ownership of firms is far more common in Italy than in other countries and that for family owners bond revenues could provide a fiscal advantage with respect to dividends.

4. Does the propensity to take credit risk change across investors?

Investors' capacity, or willingness, to assume counterparts' credit risk is crucial for the development and the functioning of the bond market. Therefore, it is important to analyse the role played by each sector in the placement of riskier securities.

We split bond issues according to three classes of issuers' credit risk¹⁴. For each class, table 5 shows the distribution of bond holdings among the five sectors (Italian banks, Italian institutional investors, Italian households, other domestic investors, and foreign investors). Among both SMEs' and large firms' issuances, the holding shares of Italian households are lower in case of risky issuers. On the contrary professional investors, being presumably more able to manage credit risk, tend to subscribe higher shares of risky issuers: for foreign investors this evidence emerges both among SMEs and large firms' issues, whereas for Italian banks and institutional investors the results are less clear-cut and limited to SMEs' placements.

Table 5 : Sectoral distribution of securities by issuers' class of risk
(average holding shares)

	SMEs			Large firms		
	Sound	Vulnerable	Risky	Sound	Vulnerable	Risky
Banks	7.1	6.5	12.0	6.2	9.3	5.9
Households	61.6	40.5	32.5	16.5	11.7	5.3
Institutional investors	21.2	24.0	30.9	22.8	20.9	16.0
Other investors	5.1	8.0	7.1	1.5	2.4	0.4
Foreign investors	5.0	21.0	17.5	53.0	55.7	72.4

Sources: Bank of Italy, Cerved and ECB (CSDB and SHSS databases).

4.1. A multivariate analysis

To control for the confounding effects of other characteristics of securities and issuer companies we estimate the following multivariate model:

¹⁴ See footnote 8 for definition of risk classes. With the aim of capturing the effective risk borne by each sector balance sheet data refer to the last year available in the Cerved dataset (in most cases 2016) before our reference date (June 2017). This choice reflects the hypothesis that investors adjust their holdings according to changes in borrowers' financial and economic conditions.

$$E(\text{SHARE}_j / X) = \Phi(\alpha + \beta \text{CREDIT_RISK}_j + \delta \text{CONTROLS}_j),$$

where $E(\text{SHARE}_j / X)$ is the conditional mean of the share of the issue j held by a sector given the predictors X , and Φ is a normal standardized distribution.

CREDIT_RISK is a vector including proxies for the issuer's credit risk. We use two different specifications. In the first we include balance-sheet indicators of leverage, profitability and interest expenses burden¹⁵, which measure the ability of the firm to bear the debt burden; in the second we substitute these variables with two dummies based on Cerved scores which are equal to 1 when the issuer is classified, respectively, as vulnerable or risky.¹⁶ As a robustness check, we also estimate a specification which includes the yield spread between the corporate bond and the 5-year German Government bond, which is a more forward-looking proxy of credit risk.¹⁷ This last specification implies a drastic reduction in the number of observations, as we can only use the subsample of fixed rate bonds.

CONTROLS is a vector of control variables which includes characteristics of both the issuer and the securities. Specifically, it includes: the logarithm of sales, which is a proxy for the firm's size; the logarithm of the amount issued, a proxy for the market liquidity; the original maturity (in years) and a dummy for fixed rate bonds, that capture the interest rate risk. In all the specifications we also include dummies that identify the year of the issuance and the issuers' economic sector. Tables A2 and A3 present, respectively, some descriptive statistics of the variables included in the model and their correlation matrix.

We use a fractional probit model (Papke, Wooldridge, 1996; Gallani et al., 2015) that allows us to control for the bounded range of the dependent variable (the share of the issued amount that varies between 0 and 1) and provides robust estimates with respect to the distribution of the dependent variable (the distribution is concentrated at the extremes). We estimate jointly five

¹⁵ Leverage is computed as the ratio of financial debt on the sum of financial debt and equity; profitability is proxied by the ratio of earnings before interest, taxes and depreciations on total assets (EBITDA); the ratio of interest expenses on EBITDA should capture the effects of the cost of debt.

¹⁶ We also estimated a model that includes both the balance-sheet indicators and the dummies based on the Cerved score. Results (not presented) are qualitatively unchanged, but the value of the coefficients (and sometime their significance) become slightly lower, coherently with the fact that the Cerved score is a summary indicator of the firms' balance sheet characteristics.

¹⁷ The relationship between spread and risk is not clear in the empirical literature: Longstaff et al. (2005) find that the majority of corporate spread is due to the default risk, while Huang and Huang (2012) show that credit risk accounts for a high fraction of spreads only for high-yield bonds.

equations - one for each holding sector (Italian banks, Italian households, Italian institutional investors, foreign investors and Italian residual sectors) – to take into account the fact that the sum of their share is equal to one. Results for the whole sample and for the subsamples of SMEs and large firms are reported in tables A4 to A6 (the results for the residual sector are not reported in the tables).

The results reported in Table A4 show a negative and significant correlation between issuers' credit risk and households' holdings (col. 6): the estimated coefficients of the two dummies *D_VULNERABLE* and *D_RISKY* are significantly (and increasingly) lower than zero, confirming the evidence of the univariate analysis. On the opposite, foreign investors tend to hold higher share of riskier borrowers (the estimated coefficient of *D_RISKY* is positive; col. 8). As for Italian institutional investors and banks, we do not find significant correlations with issuers' credit risk: only the coefficients of coverage ratio and profitability index, respectively for the two sectors, are significantly positive. In the two models for Italian households and foreign investors, the coefficient of the spread over the 5-year German Government bond shows the same sign and significance of the dummies that proxy for credit risk (table A7). As expected, its inclusion reduces the value and the significance of the coefficients of the risk dummies. In the model including separately firms' balance-sheet variables (leverage, profitability, interest expenses burden) we don't find any significant effects. This may be due to the presence of non-linear effects which are not taken into account by this specification, differently from the one based on the Cerved score.¹⁸

As for the control variables, our estimates show a positive correlation between the holdings of foreign investors and the size of the issuer (*LOGSALES*, a proxy of reputation and transparency) or the issued amount (*LOGVOL* which, once we control for firm size, could be considered a proxy for the market liquidity).¹⁹ On the contrary the correlations of the same variables with the holding shares of Italian households are significantly negative. We find opposite results between the foreign investors and the Italian households sectors also in the coefficient of the dummy that identifies securities with fixed interest rates: this kind of issuances is preferred by households, whereas

¹⁸ Regression results based on quartile dummies for each of the balance-sheet variables confirm overall the results obtained with the specification based on the Cerved score. Specifically, households' holdings are lower for issuers' in the top quartiles of leverage distribution; foreign investors' holdings tend to be more relevant for more risky issuers (i.e. firms in the lower quartiles of profitability). Results are available on request.

¹⁹ Note that sales and the amount issued are positively correlated (72 per cent; table A3). The sign and the value of the estimated coefficients remain substantially unchanged when we include the two variables one by one.

foreign investors tend to hold floating interest rate securities. Bond maturity display a significant (negative) correlation only with banks' holdings.

Overall the results indicate that Italian households tend to limit their exposure to credit risk by selecting financially sounder issuers, but they take up more liquidity and interest rate risk. Foreign investors, instead, compound higher holdings of securities issued by riskier borrowers with lower holdings of more liquid and floating rate securities. For Italian institutional investors we do not find evidence of a significant risk taking attitude.

4.2. *Controlling for issuer's size*

The large difference in the sectoral distribution of bonds issued by large and small firms, showed in Section 3, suggests to test the robustness of our results by analyzing separately the issues in the two size buckets. The correlation between risk and holdings shares might change across market segments (specifically, between private placements and public market), depending on the role played by the sector in the placement process. In public placements, issues are generally of a large amount and are placed with many arm's length investors which have limited access to the information on the borrower and therefore prefer to invest in liquid and less risky securities. In this market, banks or other specialized intermediaries usually play the role of lead arrangers or underwriters which help to distribute the securities among investors and, if needed, retain a residual share of riskier issues, which are more difficult to place. In the case of private placements, instead, issues of a smaller size are subscribed (and frequently held up to maturity) by one or few professional investors which have the expertise to directly evaluate and manage the credit risk of the investment. In both the public and private markets the role of households is marginal as they generally do not have the expertise to invest directly in this asset class.

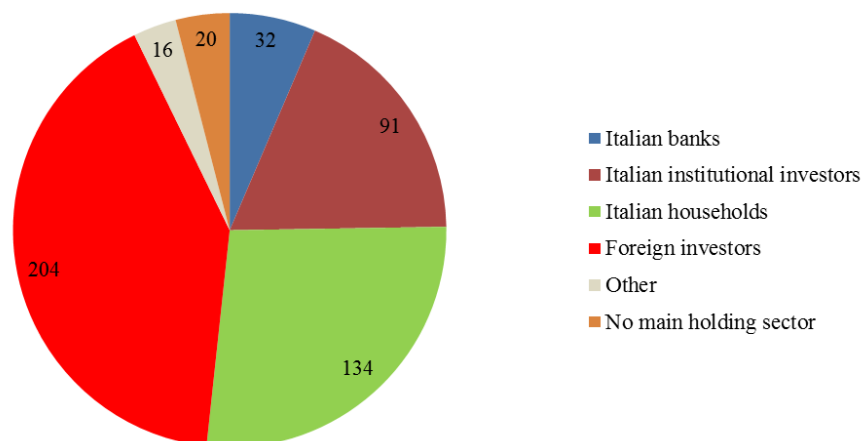
The results obtained for the total sample are substantially confirmed in the two subsamples of SMEs and large firms. In the subsample of smaller issuers (Table A5) credit risk is negatively correlated with the holdings of Italian households (column 6) and positively correlated with the holdings of foreign investors (column 8). Among large firms' issues results for households are weaker (the coefficients of the two dummies based on the Cerved score are negative but no more significant) while those for foreign investors are confirmed (Table A6). Again, for Italian banks and institutional investors we do not find significant correlation between holding shares and borrowers' risk.

4.3. *Controlling for uneven allocation of issues*

In this section we address the fact that issues tend to be allocated for the most part to a single sector. Figure 2, grouping issues according to the main holding sector (defined as the sector that holds more than 50% of the outstanding bonds), shows that over a total of 497 issues only 20 are quite evenly distributed among sectors. Among the remaining, 204 are held for the most part by foreign investors, 134 by domestic households, 91 by domestic institutional investors, and 32 by banks.

A consequence of this segmentation is that the distribution of holding shares is concentrated at the extremes, with many zeroes and ones. Although the fractional probit model used in the previous section should provide robust estimates with respect to the distribution of the dependent variable, we further control for the robustness of our results using a probit model where the dependent variable is equal to one when the bond issue is “mainly” placed in a given sector and zero otherwise. This model requires an arbitrary discretization of the continuous dependent variable to define the main holding sector. Our dependent variable is equal to one when more than 50 per cent of the issued amount is held by a single sector. The results of the probit model, shown in table A8, essentially confirm those of our baseline model.²⁰

Figure 2. Corporate bond issues by main holding sector
(number of issues)



Sources: Bank of Italy, Cerved and ECB (CSDB and SHSS databases).

Notes: The main holding sector is defined as the sector that holds more than 50 per cent of the outstanding bonds.

²⁰ We also check our results by using different definition of the main holding sector (with holding thresholds at 0, 25, and 75 per cent). When the threshold reduces some coefficients loose significance (specifically, leverage and profitability) but their signs do not change. Results are available upon request.

4.4. *Controlling for sample selection*

The fact that we had to drop many issues for which the information on the holding sector is not complete may have induced a sample selection bias in our estimates. Indeed, holdings may be intermediated by custodians not belonging to the SHS reporting population (such as extra-UE MFIs or financial firms); in this case, for a specific security, the total amount reported in SHS may be lower than the outstanding amount.

In order to verify the robustness of our results with respect to the choice to drop these observations from our database, we run our tests on a sample that includes also issues with a coverage between 40 and 90 per cent of the total issued amount (which we had dropped in the main analysis). Since the lack of information is likely dependent on the intermediation by non-domestic entities, the fraction of outstanding amount not reported in SHS has been imputed to foreign investors. The size of the estimation sample increases from 479 to 730 observations and the coverage of the market in terms of outstanding amount increases from 46 to 72 per cent.

Tables A9-A11 in the appendix show that all the main results are confirmed. Specifically, both for SMEs and large firms issues, we find a negative correlation between household holdings and issuers' credit risk and a positive correlation for foreign investors.

5. **Conclusions**

The analysis reported in this paper represents one of the first attempts to map corporate bond holdings by sector. It focuses on Italian issuers and is based on a unique dataset that matches, per each security, data on issuers, bonds and investors. We analyze how the allocation of securities varies along with the characteristics of the bonds and the issuers – especially their credit risk. Our objective is to shed some light on the role played by the different type of investors in the functioning and development of the corporate bond market.

First, we find that large and more transparent companies place a high share of their bonds among foreign investors, whereas smaller and/or opaque firms are mainly confined to the domestic market. This difference reflects both demand and supply factors: on the one side smaller firms are less able to bear the relevant fixed costs of issuances on international markets; on the other side,

foreign investors prefer to underwrite issuances by large firms, which are easier to assess and generally entail lower liquidity risk.

Second, the comparison with the French bond market, the most developed in the euro-area, shows that Italian households play a more important role, at the expense of other institutional investors which in France are the main holding sector; this difference is especially wide for SMEs.

Third, we find that the allocation of bonds across sectors changes along with the issuer's credit risk. Specifically, Italian households tend to subscribe higher shares of issues placed by financially sounder firms, whereas foreign investors concentrate their investments in bonds of vulnerable and risky issuers. For other sectors we do not detect any significant correlation between holding shares and issuers' risk.

All in all, our results suggest that the growth of the Italian market for SMEs bonds could be partly hampered by the low development of non-bank intermediaries, especially intermediaries with an adequate expertise to evaluate smaller, more opaque and riskier issuers and directly negotiate with the borrowers the conditions of the financing contract.

The limited role of this class of investors reflects in higher holdings of households, especially for SMEs issuances. However, recent developments, specifically the decrease in the holding shares of Italian households and the rise in those of institutional investors, suggest that the market is increasingly able to match SMEs financing needs.

Relevant policy implications can be drawn from our results. The development of the Italian corporate bond market would greatly benefit from a larger role of non-bank institutional investors specialized in the assessment and evaluation of non-financial firms, especially smaller ones. A larger involvement of specialized investors could also be achieved with a reduction of information asymmetries, by stimulating firms' transparency and standardizing information delivered to market participants.

Recent policy interventions both at the national and European level could reinforce this process. One of the main objectives of the Capital Market Union, for instance, is to facilitate cross-border investments through the harmonization of rules and practices. In particular, in order to support the development of markets for SMEs the Capital Market Union aims at increasing the transparency and the comparability of the balance-sheets of European SMEs by setting up a pan-European information system and standardizing the data across jurisdictions.

At the national level, the introduction of “Individual Saving Plans” (PIR, Piani Individuali di Risparmio) at the end of 2017 is already stimulating the supply of professional services by intermediaries specialized in financial instruments issued by Italian firms. At the end of 2017 the number of PIR-compliant funds equalled 64, mostly equity and balanced funds, and their assets amounted to 15 billions euros. Due to constraints required by the law, more than [70] per cent of their portfolio is allocated in financial instruments issued by Italian firms (both shares and bonds); the average size of these firms, though quite high, is lower than that of the firms whose securities are held by other kind of funds.²¹

²¹ See Bank of Italy (2018).

References

- Accornero, M., G. Guazzarotti, P. Finaldi Russo, and V. Nigro, 2015, *First-time corporate bond issuers in Italy*, Bank of Italy, Occasional Paper 269.
- Baele, L., A. Ferrando, P. Hördahl, E. Krylova, and C. Monnet, 2004, *Measuring financial integration in the euro area*, ECB Occasional Paper 14.
- Bank of Italy, 2018, *Financial stability report*, n.1.
- Coval, J. D., and T. J. Moskowitz., 1999, *Home bias at home: Local equity preference in domestic portfolios*, The Journal of Finance 54, 2045-2073.
- Gallani S., R. Krishnan and J. Wooldridge, 2015, *Applications of fractional response model to the study of bounded dependent variables in accounting research*, Harvard Business School Accounting & Management Unit, Working Paper 16-016.
- Gozzi, J. C., R. Levine, M. Peria and S. Schmukler, 2015, *How firms use corporate bond markets under financial globalization*, Journal of Banking & Finance 58, 532-551.
- Hale, G. and J. Santos, 2008, *The decision to first enter the public bond market: The role of firm reputation, funding choices and bank relationships*, Journal of Banking & Finance 32, 1928-1940.
- Huang, J. and M. Huang, 2012, *How much of the corporate-treasury yield spread is due to credit risk?*, Review of Asset Pricing Studies 2.2, 153-202.
- Kang, J., and R. M. Stulz, 1997, *Why is there a home bias? An analysis of foreign portfolio equity ownership in Japan*, Journal of Financial Economics 46, 3-28.
- Longstaff, F. A., S. Mithal, and E. Neis, 2005, *Corporate yield spreads: Default risk or liquidity? New evidence from the credit default swap market*, The Journal of Finance 60, 2213-2253.
- Pagano, M., and E. von Thadden, 2004, *The European bond markets under EMU*, Oxford review of economic policy 20, 531-554.
- Papke, L. and J. Wooldridge, 1996, *Econometric methods for fractional response variables with an application to 401 (k) plan participation rates*, Journal of Applied Econometrics 11(6), 619-632.
- Zaghini, A., 2016, *Fragmentation and heterogeneity in the euro-area corporate bond market: Back to normal?*, Journal of Financial Stability 23, 51-61.

Appendix

Table A1. Sectoral holdings of corporate corporate bonds, by country of issuers
(percentages, units and millions of euro)

Class of issues' amount	Percentage shares based on held amounts						Issues				
	Banks	Households	Institutional investors	Other	Foreign investors	Total	No.	%	outstanding amount (ml.)	%	
	ITALY										
< 5 ml.	9.9	51.6	21.6	3.9	13.0	100.0	191	41.1	367	0.5	
5 - 15 ml.	12.8	16.6	47.3	8.1	15.1	100.0	54	11.6	536	0.8	
15 - 25 ml.	19.6	11.0	38.3	0.3	30.8	100.0	22	4.7	432	0.6	
25 - 35 ml.	14.8	0.0	26.4	0.0	58.7	100.0	19	4.1	567	0.8	
> 35 ml.	3.8	5.9	17.7	1.8	70.8	100.0	179	38.5	69,308	97.3	
	FRANCE										
< 5 ml.	5.8	0.4	77.6	2.7	13.4	100.0	209	11.3	729	0.2	
5 - 15 ml.	6.6	0.1	73.2	1.4	18.7	100.0	390	21.0	4,122	1.3	
15 - 25 ml.	10.3	0.0	67.9	2.9	18.9	100.0	213	11.5	4,400	1.4	
25 - 35 ml.	7.9	0.0	67.1	5.0	20.0	100.0	129	6.9	3,944	1.3	
> 35 ml.	3.2	0.1	44.7	0.8	51.1	100.0	916	49.3	297,403	95.8	
	GERMANY										
< 5 ml.	11.0	37.2	3.6	19.0	29.1	100.0	100	16.5	313	0.3	
5 - 15 ml.	9.6	19.5	15.7	25.8	29.5	100.0	143	23.6	1,487	1.6	
15 - 25 ml.	4.4	23.9	11.5	28.5	31.7	100.0	77	12.7	1,636	1.8	
25 - 35 ml.	2.9	24.7	21.4	25.4	25.7	100.0	36	6.0	1,099	1.2	
> 35 ml.	9.6	10.6	15.7	2.7	61.4	100.0	249	41.2	86,256	95.0	

Source: SHSS database. Note: differently from other statistics in this work, the nationality of the bond issuer is related to that of the single issuer legal entity and not of the industrial group. The data refer to the issues for which our information on the holding sector covered more than 90 per cent of the outstanding amount.

Table A2. Descriptive statistics of variables included in the model

Variables	Full sample					SMEs					Large firms				
	Obs.	Mean	Std. Dev.	Min	Max	Obs.	Mean	Std. Dev.	Min	Max	Obs.	Mean	Std. Dev.	Min	Max
<i>ITALIAN BANKS (SHARE %)</i>	497	7.5	23.8	0	100	219	8.5	26.2	0.0	100.0	278	6.7	21.7	0.0	100.0
<i>ITALIAN HOUSEHOLDS (SHARE %)</i>	497	27.5	41.9	0	100	219	46.2	47.4	0.0	100.0	278	12.8	29.6	0.0	100.0
<i>ITALIAN INSTITUTIONAL INVESTORS (SHARE %)</i>	497	22.7	36.3	0	100	219	25.2	41.4	0.0	100.0	278	20.7	31.7	0.0	100.0
<i>FOREIGN INVESTORS (SHARE %)</i>	497	38.6	43.6	0	100	219	13.5	32.7	0.0	100.0	278	58.3	41.0	0.0	100.0
<i>SPREAD</i>	322	3.4	2.3	-4	13	123	3.9	2.6	-3.6	10.1	199	3.2	2.0	-3.5	12.9
<i>LEV (%)</i>	479	55.2	22.4	4	106	206	56.2	24.6	5.1	106.2	273	54.5	20.7	3.8	103.8
<i>PROF (%)</i>	495	5.6	4.5	-3	16	219	5.2	4.9	-3.0	15.8	276	5.9	4.0	-3.0	15.8
<i>INTEREST COV</i>	491	5.6	7.4	-3	34	217	6.0	8.5	-2.7	34.1	274	5.2	6.4	-2.7	34.1
<i>D_SOUND (%)</i>	497	48.5	50.0	0	100	219	39.3	48.9	0.0	100.0	278	55.8	49.8	0.0	100.0
<i>D_VULNERABLE (%)</i>	497	23.1	42.2	0	100	219	27.9	44.9	0.0	100.0	278	19.4	39.6	0.0	100.0
<i>D_RISKY (%)</i>	497	28.4	45.1	0	100	219	32.9	47.1	0.0	100.0	278	24.8	43.3	0.0	100.0
<i>LOGVOL</i>	497	9.8	2.5	4	15	219	7.8	1.3	4.5	11.6	278	11.4	1.9	5.9	14.7
<i>MAT</i>	497	11.6	7.5	1	64	219	11.4	7.4	1.0	35.0	278	11.7	7.6	1.0	64.0
<i>D_FIX (%)</i>	497	67.6	46.8	0	100	219	58.0	49.5	0.0	100.0	278	75.2	43.3	0.0	100.0
<i>LOGSALES</i>	485	11.2	3.7	-9	18	209	8.3	1.9	0.7	12.4	276	13.5	3.2	-9.2	18.0

Notes: The first four variables are the shares of a bond issue held by each sector; SPREAD is the spread of the redemption yield at issue of the bond over the yield of the German Bund; LEV is the issuer' leverage (computed as the ratio of financial debt on the sum of financial debt and equity); PROF is a profitability index (the ratio of EBITDA on total assets); INTEREST COV is the ratio of EBITDA on interest expenses; D_SOUND, D_VULNERABLE and D_RISKY are dummies based on Cerved scores which are equal to 1 when the issuer is classified, respectively, as sound, vulnerable and risky; LOGVOL is the amount issued in logarithm; MAT is the original maturity in years; D_FIX is a dummy for fixed rate bonds; LOGSALES is the logarithm of sales of the issuer.

Table A3. Correlation matrix between variables included in the model

	<i>ITALIAN BANKS (SHARE)</i>	<i>ITALIAN HOUSEHOLDS (SHARE)</i>	<i>ITALIAN INSTITUTIONAL INVESTORS (SHARE)</i>	<i>FOREIGN INVESTORS (SHARE)</i>	<i>SPREAD</i>	<i>LEV</i>	<i>PROF</i>	<i>INTEREST COV</i>	<i>D_SOUND</i>	<i>D_VULNERABLE</i>	<i>D_RISKY</i>	<i>LOGVOL</i>	<i>MAT</i>	<i>D_FIX</i>	<i>LOGSALES</i>
<i>ITALIAN BANKS (SHARE)</i>	1.00														
<i>ITALIAN HOUSEHOLDS (SHARE)</i>	-0.20	1.00													
<i>ITALIAN INSTITUTIONAL INVESTORS (SHARE)</i>	-0.15	-0.35	1.00												
<i>FOREIGN INVESTORS (SHARE)</i>	-0.22	-0.53	-0.37	1.00											
<i>SPREAD</i>	0.08	-0.10	-0.02	0.04	1.00										
<i>LEV</i>	0.00	-0.09	-0.02	0.10	0.13	1.00									
<i>PROF</i>	0.01	0.00	0.06	-0.01	-0.07	0.04	1.00								
<i>INTEREST COV</i>	0.07	0.15	0.03	-0.18	-0.16	-0.36	0.57	1.00							
<i>D_SOUND</i>	-0.04	0.12	-0.01	-0.06	-0.13	-0.52	-0.02	0.27	1.00						
<i>D_VULNERABLE</i>	0.01	-0.01	0.00	-0.02	0.02	0.11	0.00	-0.07	-0.53	1.00					
<i>D_RISKY</i>	0.04	-0.13	0.02	0.08	0.12	0.47	0.02	-0.23	-0.61	-0.35	1.00				
<i>LOGVOL</i>	-0.02	-0.55	-0.06	0.63	-0.15	0.03	0.02	-0.16	-0.02	0.00	0.02	1.00			
<i>MAT</i>	-0.10	0.06	0.14	-0.09	-0.37	0.00	0.08	0.02	-0.01	-0.09	0.10	-0.05	1.00		
<i>D_FIX</i>	-0.06	-0.06	-0.04	0.13	.	0.09	0.12	-0.04	-0.14	0.18	-0.01	0.27	-0.11	1.00	
<i>LOGSALES</i>	-0.02	-0.42	-0.04	0.49	-0.15	-0.02	0.26	-0.02	0.03	-0.06	0.02	0.72	0.03	0.25	1.00

Notes: The first four variables are the shares of a bond issue held by each sector; SPREAD is the spread of the redemption yield at issue of the bond over the yield of the German Bund; LEV is the issuer' leverage (computed as the ratio of financial debt on the sum of financial debt and equity); PROF is a profitability index (the ratio of EBITDA on total assets); INTEREST COV is the ratio of EBITDA on interest expenses; D_SOUND, D_VULNERABLE and D_RISKY are dummies based on Cerved scores which are equal to 1 when the issuer is classified, respectively, as sound, vulnerable and risky; LOGVOL is the amount issued in logarithm; MAT is the original maturity in years; D_FIX is a dummy for fixed rate bonds; LOGSALES is the logarithm of sales of the issuer.

Table A4. Multivariate fractional response model – Full sample
(average partial effects; the dependent variable is the share of outstanding bonds held by a given sector)

	Italian banks	Italian households	Italian institutional investors	Foreign investors	Italian banks	Italian households	Italian institutional investors	Foreign investors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>LEV</i>	0.028 (0.054)	-0.061 (0.070)	-0.053 (0.080)	0.082 (0.078)				
<i>INTEREST COV</i>	0.004** (0.002)	0.000 (0.003)	-0.001 (0.003)	-0.004 (0.003)				
<i>PROF</i>	-0.173 (0.423)	-0.116 (0.425)	1.114** (0.463)	-0.797 (0.522)				
<i>D_VULNERABLE</i>					0.011 (0.032)	-0.076** (0.038)	-0.002 (0.039)	0.040 (0.043)
<i>D_RISKY</i>					0.025 (0.030)	-0.129*** (0.036)	0.028 (0.039)	0.074* (0.042)
<i>LOGVOL</i>	-0.003 (0.007)	-0.050*** (0.010)	-0.010 (0.010)	0.065*** (0.009)	-0.002 (0.006)	-0.063*** (0.007)	-0.021** (0.008)	0.088*** (0.008)
<i>MAT</i>	-0.006** (0.003)	0.006 (0.004)	0.002 (0.003)	0.003 (0.003)	-0.005** (0.003)	0.006** (0.003)	0.002 (0.002)	0.002 (0.003)
<i>D_FIX</i>	-0.040 (0.028)	0.107*** (0.031)	-0.012 (0.037)	-0.077** (0.039)	-0.041 (0.027)	0.098*** (0.032)	0.019 (0.038)	-0.086** (0.040)
<i>LOGSALES</i>	0.001 (0.007)	-0.020** (0.008)	-0.002 (0.009)	0.025** (0.010)	0.000 (0.005)	-0.010* (0.005)	0.009 (0.007)	0.004 (0.007)
<i>Share average</i>	0.078	0.271	0.235	0.384	0.078	0.275	0.231	0.381
<i>Observations</i>		463				479		

Notes: Standard errors are in parentheses; * p<0.10, ** p<0.05, *** p<0.01. Note: LEV is the issuer' leverage (computed as the ratio of financial debt on the sum of financial debt and equity); PROF is a profitability index (the ratio of EBITDA on total assets); INTEREST COV is the ratio of gross operating profit to interest expenses; D_VULNERABLE and D_RISKY are two dummies based on Cerved scores which are equal to 1 when the issuer is classified, respectively, as vulnerable and risky; LOGVOL is the amount issued in logarithm; MAT is the original maturity in years; D_FIX is a dummy for fixed rate bonds; LOGSALES is the logarithm of sales of the issuer. In all specifications we also include dummies that identify the time period of the issues and the issuers' economic sector.

Table A5. Multivariate fractional response model – SMEs subsample
(average partial effects; the dependent variable is the share of outstanding bonds held by a given sector)

	Italian banks	Italian households	Italian institutional investors	Foreign investors	Italian banks	Italian households	Italian institutional investors	Foreign investors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>LEV</i>	-0.115 (0.074)	-0.001 (0.132)	-0.034 (0.119)	0.137** (0.065)				
<i>INTEREST COV</i>	-0.006 (0.004)	0.007 (0.006)	0.002 (0.005)	-0.007 (0.008)				
<i>PROF</i>	0.476 (0.453)	-0.914 (0.783)	0.864 (0.743)	0.090 (0.714)				
<i>D_VULNERABLE</i>					-0.025 (0.050)	-0.115 (0.075)	0.028 (0.067)	0.087* (0.050)
<i>D_RISKY</i>					0.036 (0.048)	-0.186** (0.075)	0.078 (0.065)	0.066 (0.045)
<i>LOGVOL</i>	0.006 (0.014)	-0.088*** (0.029)	0.025 (0.027)	0.064*** (0.015)	0.003 (0.012)	-0.079*** (0.026)	0.012 (0.024)	0.063*** (0.021)
<i>MAT</i>	-0.006 (0.006)	0.015** (0.007)	0.000 (0.005)	0.006* (0.003)	-0.008 (0.007)	0.011* (0.007)	-0.000 (0.005)	0.007* (0.004)
<i>D_FIX</i>	-0.092** (0.036)	0.166*** (0.057)	-0.054 (0.053)	-0.050 (0.035)	-0.068** (0.032)	0.134** (0.062)	-0.023 (0.057)	-0.050 (0.045)
<i>LOGSALES</i>	0.038** (0.017)	-0.032 (0.020)	-0.004 (0.017)	-0.000 (0.012)	0.038*** (0.014)	-0.043** (0.019)	0.024 (0.016)	-0.010 (0.014)
<i>Share average</i>	0.094	0.462	0.267	0.121	0.090	0.462	0.260	0.128
<i>Observations</i>		195				208		

Notes: Standard errors are in parentheses; * p<0.10, ** p<0.05, *** p<0.01. Note: LEV is the issuer' leverage (computed as the ratio of financial debt on the sum of financial debt and equity); PROF is a profitability index (the ratio of EBITDA on total assets); INTEREST COV is the ratio of gross operating profit to interest expenses; D_VULNERABLE and D_RISKY are two dummies based on Cerved scores which are equal to 1 when the issuer is classified, respectively, as vulnerable and risky; LOGVOL is the amount issued in logarithm; MAT is the original maturity in years; D_FIX is a dummy for fixed rate bonds; LOGSALES is the logarithm of sales of the issuer. In all specifications we also include dummies that identify the time period of the issues and the issuers' economic sector.

Table A6. Multivariate fractional response model – Large firms subsample
(average partial effects; the dependent variable is the share of outstanding bonds held by a given sector)

	Italian banks	Italian households	Italian institutional investors	Foreign investors	Italian banks	Italian households	Italian institutional investors	Foreign investors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>LEV</i>	-0.015 (0.068)	-0.072 (0.079)	0.233** (0.116)	-0.128 (0.133)				
<i>INTEREST COV</i>	0.007*** (0.002)	-0.002 (0.003)	0.010* (0.005)	0.007 (0.007)				
<i>PROF</i>	-0.519 (0.479)	0.543 (0.422)	-0.457 (0.604)	-0.236 (0.772)				
<i>D_VULNERABLE</i>					0.007 (0.051)	-0.041 (0.042)	-0.019 (0.051)	0.041 (0.070)
<i>D_RISKY</i>					-0.030 (0.037)	-0.057 (0.038)	-0.031 (0.048)	0.127** (0.062)
<i>LOGVOL</i>	0.010 (0.008)	-0.034*** (0.008)	-0.046*** (0.012)	0.062*** (0.016)	0.005 (0.008)	-0.046*** (0.008)	-0.043*** (0.012)	0.083*** (0.014)
<i>MAT</i>	-0.004 (0.004)	0.003 (0.002)	-0.002 (0.003)	0.004 (0.004)	-0.003 (0.003)	0.002 (0.002)	-0.001 (0.003)	0.002 (0.004)
<i>D_FIX</i>	-0.021 (0.037)	0.034 (0.028)	0.047 (0.052)	-0.039 (0.064)	-0.015 (0.042)	0.045 (0.031)	0.054 (0.051)	-0.090 (0.064)
<i>LOGSALES</i>	-0.005 (0.009)	-0.034*** (0.011)	0.023** (0.011)	0.023 (0.019)	-0.006 (0.006)	-0.005 (0.004)	0.021* (0.011)	-0.006 (0.011)
<i>Share average</i>	0.066	0.132	0.212	0.575	0.069	0.131	0.209	0.576
<i>Observations</i>		268				271		

Notes: Standard errors are in parentheses; * p<0.10, ** p<0.05, *** p<0.01. Note: LEV is the issuer' leverage (computed as the ratio of financial debt on the sum of financial debt and equity); PROF is a profitability index (the ratio of EBITDA on total assets); INTEREST COV is the ratio of gross operating profit to interest expenses; D_VULNERABLE and D_RISKY are two dummies based on Cerved scores which are equal to 1 when the issuer is classified, respectively, as vulnerable and risky; LOGVOL is the amount issued in logarithm; MAT is the original maturity in years; D_FIX is a dummy for fixed rate bonds; LOGSALES is the logarithm of sales of the issuer. In all specifications we also include dummies that identify the time period of the issues and the issuers' economic sector.

Table A7. Multivariate fractional response model – Full sample
(average partial effects; the dependent variable is the share of outstanding bonds held by a given sector)

	Italian banks	Italian households	Italian institutional investors	Foreign investors	Italian banks	Italian households	Italian institutional investors	Foreign investors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>SPREAD</i>	0.007* (0.004)	-0.013** (0.006)	-0.016* (0.009)	0.018** (0.009)	0.004 (0.004)	-0.024*** (0.007)	-0.009 (0.008)	0.030*** (0.009)
<i>LEV</i>	-0.051 (0.050)	-0.118 (0.078)	-0.045 (0.091)	0.215** (0.096)				
<i>INTEREST COV</i>	0.004* (0.002)	-0.001 (0.003)	0.001 (0.004)	-0.003 (0.003)				
<i>PROF</i>	-0.233 (0.417)	0.339 (0.465)	0.227 (0.470)	-0.500 (0.540)				
<i>D_VULNERABLE</i>					-0.005 (0.026)	-0.075** (0.036)	0.018 (0.044)	0.048 (0.044)
<i>D_RISKY</i>					-0.001 (0.025)	-0.049 (0.043)	-0.031 (0.044)	0.053 (0.045)
<i>LOGVOL</i>	0.001 (0.007)	-0.034*** (0.012)	0.001 (0.011)	0.037*** (0.011)	0.007 (0.007)	-0.071*** (0.009)	0.024** (0.010)	0.044*** (0.011)
<i>MAT</i>	-0.002 (0.002)	-0.004 (0.004)	0.008*** (0.003)	0.005 (0.003)	-0.001 (0.002)	0.001 (0.002)	0.004* (0.002)	-0.002 (0.002)
<i>LOGSALES</i>	0.000 (0.006)	-0.022** (0.009)	-0.016* (0.009)	0.039*** (0.011)	-0.006 (0.005)	-0.010 (0.008)	-0.023*** (0.008)	0.040*** (0.009)
<i>Share average Observations</i>	0.059	0.260	0.218	0.428	0.061	0.257	0.220	0.428
		303				310		

Notes: Standard errors are in parentheses; * p<0.10, ** p<0.05, *** p<0.01. Note: SPREAD is the spread of the redemption yield at issue of the bond over the yield of the German Bund; LEV is the issuer' leverage (computed as the ratio of financial debt on the sum of financial debt and equity); PROF is a profitability index (the ratio of EBITDA on total assets); INTEREST COV is the ratio of gross operating profit to interest expenses; D_VULNERABLE and D_RISKY are two dummies based on Cerved scores which are equal to 1 when the issuer is classified, respectively, as vulnerable and risky; LOGVOL is the amount issued in logarithm; MAT is the original maturity in years; D_FIX is a dummy for fixed rate bonds; LOGSALES is the logarithm of sales of the issuer. In all specifications we also include dummies that identify the time period of the issues and the issuers' economic sector.

Table A8. Probit model – Full sample*(average partial effects; the dependent variable is a dummy for holding more than 50 per cent of the outstanding bonds)*

	Italian banks	Italian househol ds	Italian institutio nal investors	Foreign investors	Italian banks	Italian househol ds	Italian institutio nal investors	Foreign investors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>LEV</i>	0.027 (0.053)	-0.078 (0.100)	-0.093 (0.087)	0.100 (0.085)				
<i>INTEREST COV</i>	0.006*** (0.002)	0.003 (0.004)	-0.001 (0.003)	-0.007** (0.003)				
<i>PROF</i>	-0.528 (0.397)	-0.224 (0.592)	0.502 (0.484)	-0.417 (0.579)				
<i>D_VULNERABLE</i>					0.015 (0.036)	-0.043 (0.040)	-0.049 (0.046)	0.043 (0.047)
<i>D_RISKY</i>					0.024 (0.033)	-0.150*** (0.038)	-0.040 (0.042)	0.088* (0.046)
<i>LOGVOL</i>	-0.004 (0.008)	-0.091*** (0.016)	-0.033*** (0.013)	0.073*** (0.011)	-0.001 (0.007)	-0.076*** (0.008)	-0.038*** (0.010)	0.094*** (0.008)
<i>MAT</i>	-0.003 (0.002)	0.007** (0.003)	0.005* (0.003)	-0.001 (0.003)	-0.003 (0.002)	0.006*** (0.002)	0.004 (0.003)	-0.002 (0.003)
<i>D_FIX</i>	-0.068** (0.028)	0.135*** (0.042)	-0.090** (0.036)	-0.065* (0.039)	-0.067** (0.027)	0.077** (0.031)	-0.068* (0.036)	-0.060 (0.040)
<i>LOGSALES</i>	-0.003 (0.007)	-0.023* (0.013)	-0.002 (0.010)	0.027** (0.011)	-0.005 (0.006)	-0.009* (0.005)	0.001 (0.007)	0.009 (0.007)
<i>Share average</i>	0.073	0.357	0.188	0.416	0.073	0.266	0.186	0.412
<i>Observations</i>	426	345	469	469	439	485	485	485

Notes: Standard errors are in parentheses; * p<0.10, ** p<0.05, *** p<0.01. Note: SPREAD is the spread of the redemption yield at issue of the bond over the yield of the German Bund; LEV is the issuer' leverage (computed as the ratio of financial debt on the sum of financial debt and equity); PROF is a profitability index (the ratio of EBITDA on total assets); INTEREST COV is the ratio of gross operating profit to interest expenses; D_VULNERABLE and D_RISKY are two dummies based on Cerved scores which are equal to 1 when the issuer is classified, respectively, as vulnerable and risky; LOGVOL is the amount issued in logarithm; MAT is the original maturity in years; D_FIX is a dummy for fixed rate bonds; LOGSALES is the logarithm of sales of the issuer. In all specifications we also include dummies that identify the time period of the issues and the issuers' economic sector.

Table A9. Multivariate fractional response model – Full sample with imputation*(average partial effects; the dependent variable is the share of outstanding bonds held by a given sector)*

	Italian banks	Italian households	Italian institutional investors	Foreign investors	Italian banks	Italian households	Italian institutional investors	Foreign investors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>LEV</i>	0.082* (0.045)	-0.111** (0.054)	-0.014 (0.065)	0.039 (0.062)				
<i>INTEREST COV</i>	0.004** (0.002)	0.004* (0.002)	-0.001 (0.003)	-0.006** (0.002)				
<i>PROF</i>	-0.643** (0.324)	-0.207 (0.325)	0.959*** (0.368)	-0.202 (0.385)				
<i>D_VULNERABLE</i>					0.004 (0.025)	-0.098*** (0.028)	0.008 (0.033)	0.055* (0.033)
<i>D_RISKY</i>					0.022 (0.024)	-0.131*** (0.027)	0.013 (0.031)	0.081*** (0.031)
<i>LOGVOL</i>	-0.014*** (0.005)	-0.041*** (0.008)	-0.012 (0.008)	0.073*** (0.007)	-0.011** (0.005)	-0.055*** (0.006)	-0.020*** (0.007)	0.090*** (0.007)
<i>MAT</i>	-0.004* (0.002)	0.004 (0.003)	0.003* (0.002)	0.003 (0.002)	-0.003* (0.002)	0.004 (0.003)	0.003 (0.002)	0.002 (0.002)
<i>D_FIX</i>	0.007 (0.023)	0.080*** (0.025)	-0.020 (0.029)	-0.081*** (0.030)	-0.001 (0.022)	0.078*** (0.025)	0.006 (0.029)	-0.089*** (0.030)
<i>LOGSALES</i>	0.005 (0.005)	-0.023*** (0.006)	0.001 (0.007)	0.016** (0.008)	0.003 (0.004)	-0.015*** (0.005)	0.011* (0.006)	0.000 (0.006)
<i>Share average</i>	0.093 0.082*	0.240 -0.111**	0.241 -0.014	0.395 0.039	0.092 0.004	0.246 -0.098***	0.237 0.008	0.393 0.055*
<i>Observations</i>			707				730	

Notes: Standard errors are in parentheses; * p<0.10, ** p<0.05, *** p<0.01. Note: LEV is the issuer' leverage (computed as the ratio of financial debt on the sum of financial debt and equity); PROF is a profitability index (the ratio of EBITDA on total assets); INTEREST COV is the ratio of gross operating profit to interest expenses; D_VULNERABLE and D_RISKY are two dummies based on Cerved scores which are equal to 1 when the issuer is classified, respectively, as vulnerable and risky; LOGVOL is the amount issued in logarithm; MAT is the original maturity in years; D_FIX is a dummy for fixed rate bonds; LOGSALES is the logarithm of sales of the issuer. In all specifications we also include dummies that identify the time period of the issues and the issuers' economic sector.

Table A10. Multivariate fractional response model – SMEs subsample with imputation
(average partial effects; the dependent variable is the share of outstanding bonds held by a given sector)

	Italian banks	Italian households	Italian institutional investors	Foreign investors	Italian banks	Italian households	Italian institutional investors	Foreign investors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>LEV</i>	0.104 (0.080)	-0.121 (0.110)	-0.033 (0.100)	0.039 (0.063)				
<i>INTEREST COV</i>	-0.004 (0.004)	0.012*** (0.004)	0.002 (0.004)	-0.014* (0.007)				
<i>PROF</i>	0.053 (0.541)	-1.005 (0.644)	0.899 (0.610)	0.575 (0.583)				
<i>D_VULNERABLE</i>					-0.035 (0.041)	-0.205*** (0.063)	0.050 (0.058)	0.151*** (0.040)
<i>D_RISKY</i>					0.079 (0.053)	-0.271*** (0.058)	0.094* (0.052)	0.089** (0.036)
<i>LOGVOL</i>	0.024* (0.013)	-0.081*** (0.023)	-0.001 (0.022)	0.064*** (0.011)	0.024** (0.011)	-0.075*** (0.020)	-0.013 (0.018)	0.066*** (0.013)
<i>MAT</i>	-0.004 (0.004)	0.007 (0.006)	0.010** (0.004)	0.001 (0.003)	-0.007* (0.004)	0.007 (0.005)	0.008** (0.004)	0.001 (0.003)
<i>D_FIX</i>	-0.047 (0.039)	0.179*** (0.050)	-0.047 (0.047)	-0.100*** (0.033)	-0.033 (0.036)	0.145*** (0.050)	-0.012 (0.048)	-0.092** (0.036)
<i>LOGSALES</i>	0.040*** (0.014)	-0.051*** (0.015)	0.003 (0.014)	0.003 (0.010)	0.039*** (0.011)	-0.059*** (0.013)	0.023* (0.013)	-0.002 (0.011)
<i>Share average Observations</i>	0.115	0.454	0.241	0.137	0.109	0.458	0.232	0.145
		268				287		

Notes: Standard errors are in parentheses; * p<0.10, ** p<0.05, *** p<0.01. Note: LEV is the issuer' leverage (computed as the ratio of financial debt on the sum of financial debt and equity); PROF is a profitability index (the ratio of EBITDA on total assets); INTEREST COV is the ratio of gross operating profit to interest expenses; D_VULNERABLE and D_RISKY are two dummies based on Cerved scores which are equal to 1 when the issuer is classified, respectively, as vulnerable and risky; LOGVOL is the amount issued in logarithm; MAT is the original maturity in years; D_FIX is a dummy for fixed rate bonds; LOGSALES is the logarithm of sales of the issuer. In all specifications we also include dummies that identify the time period of the issues and the issuers' economic sector.

Table A11. Multivariate fractional response model – Large firms subsample with imputation
(average partial effects; the dependent variable is the share of outstanding bonds held by a given sector)

	Italian banks	Italian households	Italian institutional investors	Foreign investors	Italian banks	Italian households	Italian institutional investors	Foreign investors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>LEV</i>	0.021 (0.071)	-0.060 (0.061)	0.160* (0.096)	-0.091 (0.099)				
<i>INTEREST COV</i>	0.005** (0.002)	0.001 (0.003)	0.002 (0.004)	-0.001 (0.004)				
<i>PROF</i>	-0.491 (0.380)	0.137 (0.349)	0.087 (0.470)	-0.201 (0.556)				
<i>D_VULNERABLE</i>					0.039 (0.033)	-0.056** (0.023)	-0.021 (0.039)	0.024 (0.045)
<i>D_RISKY</i>					-0.000 (0.028)	-0.041 (0.025)	-0.057 (0.035)	0.095** (0.042)
<i>LOGVOL</i>	-0.019*** (0.006)	-0.027*** (0.006)	-0.034*** (0.009)	0.085*** (0.010)	-0.020*** (0.006)	-0.037*** (0.006)	-0.033*** (0.009)	0.093*** (0.009)
<i>MAT</i>	-0.004 (0.003)	0.002 (0.002)	0.000 (0.002)	0.003 (0.002)	-0.003 (0.002)	0.002 (0.002)	0.000 (0.002)	0.003 (0.002)
<i>D_FIX</i>	0.038 (0.029)	0.009 (0.024)	-0.018 (0.037)	-0.045 (0.045)	0.032 (0.029)	0.020 (0.025)	-0.004 (0.036)	-0.067 (0.045)
<i>LOGSALES</i>	0.001 (0.006)	-0.019*** (0.007)	0.011 (0.009)	0.009 (0.013)	-0.002 (0.006)	-0.002 (0.004)	0.013* (0.007)	-0.009 (0.008)
<i>Share average</i>	0.079	0.110	0.242	0.553	0.081	0.109	0.241	0.553
<i>Observations</i>		439				443		

Notes: Standard errors are in parentheses; * p<0.10, ** p<0.05, *** p<0.01. Note: LEV is the issuer' leverage (computed as the ratio of financial debt on the sum of financial debt and equity); PROF is a profitability index (the ratio of EBITDA on total assets); INTEREST COV is the ratio of gross operating profit to interest expenses; D_VULNERABLE and D_RISKY are two dummies based on Cerved scores which are equal to 1 when the issuer is classified, respectively, as vulnerable and risky; LOGVOL is the amount issued in logarithm; MAT is the original maturity in years; D_FIX is a dummy for fixed rate bonds; LOGSALES is the logarithm of sales of the issuer. In all specifications we also include dummies that identify the time period of the issues and the issuers' economic sector.