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How can SMEs signal their quality and growth orientation to the market? An analysis of the cost of Italian corporate mini-bonds

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Abstract

We examine how small and medium-sized enterprises (SMEs) may signal their quality and growth orientation to the market and the effect on the cost of bond funding, which is often high for unlisted firms and SMEs mainly because of their information opacity and higher riskiness. The paper contributes to the growing European debate on market innovations aimed at facilitating funding for smaller and nonlisted firms, breaking from the prior main focus on the cost for large and listed companies of accessing liquid bond markets. We analyze 220 mini-bonds listed in Italy between 2013 and 2017 to examine determinants of yield spreads. Our explanatory variables are size, age, and tangible assets—all indicators of the firm's information opacity—together with the issuer's growth opportunities, rating availability, and the presence of a guarantee. The findings suggest that tangible assets can ease the asymmetric information and associated monitoring costs for investors, thus reducing the bond yield spread. More significantly, the yield spread depends on the type of investment project financed: risky growth projects are associated with a higher cost of funding

than other types of projects. Under such circumstances, the rating represents an informative instrument for the market in assessing issuers' growth orientation.

1 | INTRODUCTION

One of the most relevant funding concerns for small and medium-sized enterprises (SMEs) is the diversification of their financing sources (Berger & Udell, 2006; Jaffee & Russell, 1976; Stiglitz & Weiss, 1981). Such firms' financial structures are characterized by high dependence on bank loans and very small use of market-based financial instruments (debt- and equity-based securities). SMEs generally face more difficulties in accessing credit than large firms, for reasons including information asymmetry, higher administrative costs for small-scale lending, higher risk perception, and lack of collateral (Beck et al., 2008; Berger & Udell, 2006; Cowling & Mitchell, 2003; Jaffee & Russell, 1976; Stiglitz & Weiss, 1981).

Excessive reliance on bank debt financing exposes SMEs to the risk of credit rationing, especially in turbulent or distressed times such as the 2008 global financial crisis. Indeed, in the aftermath of the 2008 crisis, banks' increased risk aversion and heightened emphasis on borrowers' default risk have hindered SMEs' investment and growth, particularly in Europe (European Central Bank, 2014; Ferrando & Griesshaber, 2011; Ferrando & Ruggieri, 2018). New capital requirements (particularly under Basel III) have forced banks to scale down lending and investment in risky assets; during the current coronavirus pandemic, they must also consider the negative national economic outlook when estimating potential borrowers' probability of default. In this economic climate, SMEs are confronted by more stringent financial constraints (Canton et al., 2013; Casey & O'Toole, 2014; Ferrando & Griesshaber, 2011; Ferrando & Ruggieri, 2018; Holton et al., 2014; Mol-Gomez-Vasquez et al., 2019; Moro et al., 2016). To counter this situation and preserve the possibility of obtaining finance for their businesses, SMEs may react by diversifying their finance sources, relying on not only bank financing but also market-based financing instruments. However, the percentage of firms using debt markets to fund their businesses remains quite low (Daskalakis & Psillaki, 2008; De Jong et al., 2008; Hall et al., 2004; Lawless et al., 2015; Masiak et al., 2019; Moritz et al., 2016; Psillaki & Daskalakis, 2009). This contrasts with larger firms' utilization of bond markets, which have grown significantly in recent years, allowing large firms to achieve more balanced funding diversification (European Commission, 2017, pp. 40–41).

SMEs' difficulties in accessing debt markets have induced national authorities of several European countries to establish specific market segments dedicated to smaller firms. In 2013 the Italian Government created a new asset class named the *mini-bond*, a small-sized bond that can be negotiated in a private placement or traded in a new second-tier market devoted to unlisted firms. Named ExtraMOT PRO and launched within the domestic Borsa Italiana stock exchange, this market has less restrictive requirements for bond issuers than those imposed by the main market.[1] Creating a new specific market segment is an innovative step in facilitating

SMEs' access to market-based instruments, especially for financing growth-oriented projects characterized by a high level of risk. However, there is concern among firms about the cost of new bond issues. Mini-bond issuances are commonly perceived to be rather expensive for unlisted firms and SMEs, mainly because of their higher riskiness (Politecnico di Milano, 2019). Our paper aims to identify how SMEs have used this new market to signal the quality of their investments, with the goal of reducing the cost of new debt issuances and raise the required capital.

In particular, we address the following research questions: Which of a firm's characteristics tend to reduce information opacity in the mini-bond market? Does the kind of investment opportunity financed with the issue's proceeds impact the cost of the mini-bond? Does the offer of a guarantee reduce the cost of the mini-bond for the borrower?

By addressing these questions, our study contributes to the broader discussion of SME bond financing in two ways. First, we offer information to SMEs on how to prepare themselves to achieve a better deal in the market. Second, we indicate how the design and main characteristics of the mini-bond market can influence firms' capacity to signal their quality to potential investors.

The analysis is performed on a sample of 220 bonds issued by 147 nonfinancial firms, using data collected from the start of the Italian ExtraMOT PRO market in February 2013 until the end of December 2017. Our results show that the presence of tangible fixed assets is the most important signal (of those considered in this study) for reducing firms' information opacity and has a stronger impact on yield spread than the presence of a bond guarantee. More significantly, we demonstrate a relationship between the type of project financed by the proceeds and the cost of funding. In particular, issuers declaring in their bond prospectuses to finance risky growth projects (i.e., organic internal growth, growth through mergers, and acquisitions or via international projects) exhibit a statistically significant higher cost of bonds than the issuers that follow alternative steady-state, low-risk oriented strategies (to substitute the assets in place or renegotiate the outstanding corporate financial structure). We investigate the informative role of the credit rating in relationship with the kind of investment projects evaluated. The credit rating signals to investors the higher riskiness of growth projects and, thus, we observe an increase in the yield spread. In this particular bond market, since rating is quite costly for the relatively smaller class of issuers involved, firms choose to avoid soliciting a rating when pursuing low-risk business projects as these strategies are less difficult to evaluate by outside institutional investors and, therefore, it is less important the contribution provided by a credit rating in reducing information asymmetries. In addition, rating solicitation in the mini-bonds market is being largely encouraged by arrangers for riskier or more difficult to evaluate issuers/projects. The arranger may be interested in protecting its own reputational capital when dealing with riskier investment projects pursued by issuers since, similar to a private placement market, the arranger uses reputation capital to guarantee product (bond) quality (Booth & Smith, 1986; Cain et al., 2020). In this way, they can preserve their capability to facilitate future deals in the market.

Our paper makes the following contributions. First, we enrich the growing debate on market innovations implemented in Europe to facilitate the financing of nonlisted firms. Given the dissimilar experiences across European domestic bond markets dedicated to SME debt financing, we investigate how SMEs can reduce the cost of new issues in the context of informationally opaque firms. This objective differentiates our paper from prior research focused mainly on the cost of market-based debt and the role of ratings for large and listed companies accessing vast and very liquid main bond markets (Badoer & James, 2016; Hale &

Santos, 2008; Mizen et al., 2009; Poon, 2003). Second, to the best of our knowledge, our study is among the first to investigate the new Italian second-tier bond market, particularly the cost of bond funding from the borrower's perspective and the role played by the use of proceeds and growth opportunities faced by issuers. This market is open exclusively to institutional investors, with retail and private investors excluded by regulation; it is also characterized by infrequent trading, low turnover and poor liquidity and does not mandate a public credit rating.

These key characteristics of the Italian second-tier bond market—along with its rules, ecosystem, and participants—make this an interesting case for illustrating the circumstances under which highly opaque and unfamiliar first-time SME issuers may enter the capital market funding channel and thereby gain "market visibility." After a period of acclimatization, these firms can potentially leverage multiple forms (even equity forms) of market-based finance. Indeed, access to these markets supports two main goals: it facilitates firms' diversification of funding and gives unlisted SMEs' managers a valuable opportunity to approach capital markets for the first time. These targets are relevant for private firms accessing other European mini-bond markets (Eisele & Nowak, 2018), so our results could also be useful for other European SMEs and unlisted firms.

This paper is organized as follows. Section 2 discusses the study background and relevant literature, and develops our testable hypothesis. Section 3 describes our data set and details the empirical methodology. Section 4 reports the empirical results of the main analysis and robustness tests. Section 5 discusses the study's main implications. Finally, Section 6 concludes.

2 | RELEVANT LITERATURE AND RESEARCH HYPOTHESES

2.1 | Background and relevant literature

Since 1995, major stock exchanges in Europe have structured both their equity and bond markets in specialized segments with a main market (the official market) and a number of second-tier markets dedicated to specific firm categories, mainly unlisted firms and SMEs (Vismara et al., 2012). In particular, these markets are designed for privately owned firms that would not be able (for many reasons) to publicly list in the main market, allowing them to issue equity or bonds under less stringent listing requirements.[2]

The new ExtraMOT PRO market established in 2013 is organized as a multilateral trading facility. This market is open exclusively to institutional investors, so as to avoid exposing uninformed retail/private investors to the heightened risk typical of new asset classes. The volume of trading on the new Italian second-tier market has been very low since its inception (Politecnico di Milano, 2018).[3] Another relevant trait of the new market is that it does not mandate a solicited credit rating, different from other European initiatives where a credit rating is mandatory for non-publicly listed companies (e.g., M:access in the Munich stock exchange, Entry Standard in Frankfurt, and Euronext in France). Other features of the Italian mini-bond market include the absence of a market maker; the arranger's role is mainly facilitating private debt placements to closed-end or private debt funds; and the proceeds being largely devoted to exploiting risky growth opportunities domestically and internationally (as reported for 68% of the mini-bond issues in our sample).[4] Appendix A1 (Panel A) briefly summarizes the main features of the Italian mini-bond market compared to the main corporate bond market (named MOT) regulated by Borsa Italiana stock exchange.

Italy was not the first country to develop initiatives aimed at removing obstacles to SMEs accessing the bond market. For instance, in the United Kingdom, the London Stock Exchange launched the Order Book for Retail Bonds (ORB) in 2010, which offers flexibility in the bond size (from £20 million to £300 million) to accord with the issuer's need, while also allowing the frequent issue of small-size bonds. The ORB is open to retail investors and mandates the presence of a market maker to provide liquidity. At year-end 2018, the ORB market had arranged 115 bond offerings. France has three markets specialized in trading SME bonds: segments B and C of the regulated Euronext market and Euronext Growth, a multilateral trading facility previously named Alternext. Both institutional and retail investors are permitted to access these markets, and a solicited credit rating is mandatory for non-listed issuers. A total of 203 bonds with similar characteristics to mini-bonds were listed on the Euronext second-tier markets at year-end 2018.

Likewise, Germany introduced the opportunity to issue Mittelstand bonds with volumes lower than €100 million in 2010. Stuttgart became the first German stock exchanges to create new market segments on which Mittelstand bonds can be traded. At year-end 2018, the total amount issued was €11 billion. A particular characteristic of these new dedicated markets is that the minimum volume required varies between them. For instance, Frankfurt accepts any size of issue, whereas Stuttgart did not accept issues of less than €25 million. However, after the default of several Mittelstand bonds and the documented loss of capital (Kammler & Röder, 2013), the Stuttgart and Dusseldorf stock exchanges decided to close their new market segments, whereas the other stock exchanges successfully established their Mittelstand bonds segments (Utz et al., 2016). These markets seek a market maker to provide liquidity, feature a coach to financially advise the issuer in the listing process, and mandate a solicited credit rating. One key feature of the German mini-bond markets is that retail investors can directly trade mini-bonds, as in the second-tier markets in the United Kingdom and France. This is a significant difference to the Italian mini-bond market, which only allows institutional investors. Issuers in the Italian mini-bond market are helped by an arranger, who directly connects them with potential investors in a sort of private placement process, while also often providing financial advice. Potential institutional investors (typically private debt or closed-end funds) are expected to hold the bonds until the maturity date (Politecnico di Milano, 2019, p. 58). Therefore, the Italian mini-bond market is highly illiquid, which is a crucial difference from most other European second-tier markets.

From this perspective, the Italian mini-bond market is an interesting laboratory to examine the determinants of firms' costs of issuing bonds in illiquid second-tier markets. Issuers are typically first-timers, and thus highly opaque and inexperienced in raising funds from non-bank lenders. Europe's only other second-tier market similar to the Italian case is Spain's Mercado Alternativo de Renta Fija: opened in 2013 by the Bolsa y Mercados Espanoles, it does not allow retail investors and does not mandate a public rating. Differences between the Italian market and other European mini-bond markets are summarized in Appendix A1 (Panel B).

Research on European second-tier bond markets is still quite scarce. For the Italian bond market, Accornero et al. (2015) show that first-time corporate bond issuers (between 2002 and 2013) were typically large firms, mostly listed on a stock exchange, and predominantly issued bonds to finance growth and/or rebalance maturity mismatches between assets and liabilities. Altman et al. (2018) report that SMEs entered the ExtraMOT PRO not because alternatives were lacking (for instance, owing to credit rationing by banks) but to exploit new advantages, such as easier access to a capital market and debt diversification. They also claim that the market has information asymmetry, which negatively affects the number of investors and small

businesses potentially interested in using this new funding channel. This circumstance is partly confirmed by Grasso & Pattarin (2019) indicating that the rating of mini-bonds issuers did not help investors reduce information asymmetries. Ongena et al. (2019) studied the effects of mini-bond issuances on issuers' financing conditions. They demonstrate that this diversification of funding sources reduces lending rates, thus improving firms' bargaining power with banks. Moreover, they show that these issuances increase the overall amount of external funding and reduce the use of bank credit, thereby boosting diversification. Beyond these studies, the main source of information on market trends are the annual reports of the Politecnico di Milano's Osservatorio Mini-Bond (2018, 2019) and Cerved (Cerved Rating Agency, 2020).

Outside the Italian context, several studies have analyzed the German mini-bond markets (see, in particular, Kammler & Röder, 2013; Mietzner et al., 2018; Utz et al., 2016). More generally, Eisele and Nowak (2018) studied the effects of the introduction of second-tier bond markets for SMEs across larger European countries. They find that these market innovations have meaningfully increased the amount of SME bond financing by around 6%. Furthermore, they highlight a positive complementarity between the introduction of new SME bonds and equity market segments, concluding that equity and bond markets are not substitutes but complementary forms of financing for European SMEs. Unlisted firms and SMEs are more likely to pay the costs of accessing a mini-bond market when they can achieve leverage through multiple forms of market-based finance.

2.2 | Research hypotheses

Based on the literature review, we develop our hypotheses for elucidating how the level of issuer firms' information opacity and the presence of credit ratings, growth opportunities, and guarantees influence the cost of bond financing for SMEs.[5]

SMEs are typically considered as informationally opaque firms (Berger & Udell, 1998; Berger et al., 2001), and the outside stakeholders of small businesses face several information issues. Beyond the well-known asymmetric information problem, whereby insiders are expected to have more information than outsiders about a firm's prospects, prior literature on SME finance (Ang, 1991; Peterson & Rajan, 1994) has also considered the relatively high fixed cost of gathering information for a small transaction; the reduced incentives for third parties, such as outside analysts, to collect information that has a smaller market; and the greater difficulties for small businesses to make their claims credible. For unlisted SMEs, potential investors tend to be more discouraged by the opacity of the SME finance market and their limited exit options. Accordingly, we may expect an SME's high information opacity to negatively affect its cost of mini-bond funding through a higher yield spread.

2.2.1 | Information opacity

Although our empirical sample of mini-bond issuers almost entirely comprises SMEs and unlisted firms, the sample firms have quite different characteristics in term of size, age, and other features that may impact on their level of information opacity. We, therefore, consider a set of three proxies to capture issuers' information opacity: firm size, age, and asset tangibility.

According to the life-cycle paradigm (Berger & Udell, 1998; Carey et al., 1993; La Rocca et al., 2011), firm size is expected to relate positively to financial debt. Larger firms are more

diversified, and hence less likely to face bankruptcy; more profitable, and therefore more likely to use debt as a tax shield; and less informationally opaque, enabling them to issue larger amounts of debt, thus spreading the associated issuing costs. Moreover, private placement funding is more efficient for smaller, little-known firms because satisfying a single investor—a venture capital or private equity fund—minimizes information production costs (Pagano et al., 1998). Finally, consistent with the life-cycle paradigm, larger firms tend to access capital markets more frequently than smaller firms to satisfy their financial needs. In sum, we can expect a negative relationship between size and information opacity, and hence between size and the cost of mini-bond funding.

Firm age has also been considered a key determinant of SMEs′ information opacity. Younger firms depend more heavily on insider financing sources during their start-up and initial growth stages because of their limited established track record (Berger & Udell, 1998), high risk of failure (Huyghebaert & Van de Gucht, 2007), and the liability of "newness"—the difficulties faced by new ventures in accessing the resources they need to grow (Coleman, 2004; Nucci, 1999; Watson & Everett, 1996; Zhang & White, 2016). As firms mature over the course of their business life cycle, they start to establish a track record and acquire the ability to provide collateral. This improves firm creditworthiness and attracts the interest of investors who can provide new funds. In summary, older and established companies should be less informationally opaque and, thus, advantaged in negotiating access to the market and the cost of debt.

Previous literature on debt financing underlines that firm characteristics may affect the choice between banks and markets (Chemmanur & Fulghieri, 1994). In particular, the provision of collateral and the presence of tangible assets (sometimes termed "asset tangibility") should facilitate bond funding as in the case of bank lending, because these factors mitigate borrower default risk (De Jong et al., 2008; Hall et al., 2004). Asset tangibility not only provides scope for pledging collateral to potential investors but can also reduce a borrower′s relative opacity in the assessment of intrinsic lending risks: by lowering the uncertainty of a firm′s creditworthiness, asset tangibility makes firm valuation less difficult. Previous evidence in the information opacity literature shows that investors face substantial information risk stemming from their inability to fully understand firms′ underlying profitability and risk, owing to the inherent complexity of valuing intangible assets (Jin & Myers, 2006; Veldkamp, 2006). As illustrated by Easley et al. (2002) and Easley and O′hara (2004), this information risk may affect asset returns and firms′ cost of capital. Gompers (1995) finds that increases in asset tangibility reduce the monitoring activity of lenders. This is explained by the payoffs of tangible assets being easier to observe. Some sectors (e.g., manufacturing) typically have a greater concentration of tangible assets, whereas intangible assets predominate in other sectors (e.g., computer services; Mac an Bhaird & Lucey, 2010). Studies suggest that firms with lien-free tangible assets may have greater access to debt finance than firms lacking such assets (Chittenden et al., 1996; Jordan et al., 1998; Michaelas et al., 1999; Van der Wijst & Thurik, 1993). Therefore, in the present research setting, we expect asset tangibility to be negatively related with the cost of mini-bond funding. We thus hypothesize:

H1: A firm′s information opacity (proxied by age, size, and tangible assets) is positively associated with the cost of mini-bond funding.

2.2.2 | Rating and growth projects funded by bond proceeds

For our second hypothesis, we study the effect of the relationship between credit rating and issuers growth projects on the yield spread in the Italian second-tier bond market. These two aspects are linked since in the issuer's assessment, the credit rating agency (CRA) evaluates not only the firm's past performances and current financial standing but also the inherent riskiness of growth projects financed. Mini-bonds actually provide a unique source of growth capital, allowing the issuing company to undertake a significant growth strategy. These growth projects can turn out to be quite risky when compared with alternative low-risk or no-growth strategies where the funds are used to substitute the assets in place, renegotiate the outstanding corporate financial structure, or restructure the existing debt.

Previous studies focus mainly on contexts where a credit rating is mandatory for bond issues, as in traditional bond markets (Fulghieri et al, 2014; Jiang et al, 2012; Jorion & Zhang 2007; Matthies, 2013; Zhou, 2001). In Poon's (2003) analysis of solicited and unsolicited ratings, issuers who chose not to ask for rating services from CRAs had weaker financial profiles and consequently avoided soliciting a rating for fear of obtaining a low score. In the context of the Italian mini-bond market, firms might choose not to solicit a rating when pursuing low-risk business projects as these strategies are less difficult to evaluate by outside institutional investors and, therefore, the contribution provided by a credit rating in reducing information asymmetries is less important. Moreover, soliciting of (non-mandatory) ratings is very often driven by the arrangers, which urge issuers with higher-risk investment projects to obtain a credit rating from an independent third party. The arrangers may be interested in protecting their own reputational capital when dealing with riskier issuers: in a private placement market, arrangers use reputational capital to guarantee product (bond) quality, so preserving institution credibility is essential to facilitating future transactions (Booth & Smith, 1986; Cain et al., 2020; Chemmanur & Fulghieri 1994b). Moreover, pursuant to internal asset allocation policy or statutory constraints, institutional investors may need a credit rating for riskier issuers, and those more difficult to evaluate.

Consistent with prior literature, we expect that the rating score affects the yield spread; the higher the rating score, the lower the yield spread (for instance, see Bhojraj & Sengupta, 2003; Chen et al., 2007; Gabbi & Sironi, 2005). However, empirical evidence on the relationship between the use of proceeds and yield spread is less studied. We, then, focus on issuers' growth opportunities, and we test whether the use of proceeds publicly declared by the issuers in their bond prospectuses influences the cost of the bond. As we deal with private, unlisted firms, we cannot use the market to book value ratio variable typically considered in the empirical finance literature as a measure of growth opportunities for listed companies (Billett et al., 2007; Johnson, 2003). For this reason, we believe that the use of proceeds publicly declared by issuers in the mandatory bond prospectuses is the best variable available for unlisted firms to reveal the nature of growth opportunities the issuers are facing. We can expect that risky growth projects should be associated with a higher cost of debt. In fact, issuers that follow a no-growth strategy revealed by its use of proceeds are not adding any incremental riskiness arising from the projects funded by the bond issues.

Accordingly, we hypothesize:

H2a: The growth projects financed by bond proceeds positively influence the cost of the bond.

Moreover, as the risk profile related to the kind of investment financed by the bond proceeds can be better evaluated by a CRA through direct access to the issuer's operations, we study the relationship between credit rating and (risky) growth opportunities.

We, thus, test the following:

H2b: The rating is able to signal (with an increase in bond yield spread) the riskiness of growth projects funded by bond proceeds.

2.2.3 | Guarantee

Finally, our third hypothesis considers the role played in the Italian mini-bond market by the presence of a partial or total guarantee, provided by the bond issuer and specifically included in the bond contract. Beyond credit ratings, the guarantee offered by the borrower is another relevant feature of bond funding that may influence the cost of debt. Prior literature has widely discussed how debt backed by the issuer's guarantee (i.e., secured bonds) helps to reduce lenders' monitoring costs and mitigate their risk (Alderson et al., 2014; Scott, 1977; Stulz & Johnson, 1985).

Previous results on the impact of guarantees on the debt interest rate are mixed. One group of studies finds a positive relationship between collateral and interest rates—that is, interest rates on secured loans are, on average, higher than those on unsecured loans—indicating that riskier borrowers are required to provide more collateral to mitigate the moral hazard problem (Berger & Udell, 1990, 1995; Casolaro et al., 2008; Ono & Uesugi, 2009). Conversely, another group of studies shows a negative relationship between the presence of a guarantee and loan interest rates (Harhoff & Körting, 1998; Jimenez et al., 2006; John et al., 2003). Another literature stream points out that the type of collateral is relevant in detecting this relationship, with personal guarantees showing no systematic effect on interest rates (Calcagnini et al., 2014).

As bond issuers in this special market segment are typically unlisted and little-known borrowers promoting risky growth projects that are difficult to evaluated from outside investors, guarantee provisions could mitigate lenders' risk, thus reducing the cost of the mini-bonds for issuers. For these reasons, we hypothesize:

H3: Secured bonds (with a partial or total guarantee) are associated with lower cost of bonds than unsecured bonds.

3 | DATASET AND METHODOLOGY

3.1 | Sample and descriptive statistics

To construct our data set, we downloaded information from the Borsa Italiana website on bonds listed on the second-tier market ExtraMOT PRO. We hand-collected data on mini-bond offerings from bond prospectuses from the starting date of the market in 2013 to the end of December 2017. Only nonfinancial companies are considered because the balance sheet information of financial and nonfinancial companies are not easily comparable. We obtained a

comprehensive data set of 220 bonds with information regarding size, coupon rate, maturity date, credit ratings, call options, and guarantees. The data set was then matched with accounting information about the issuers collected from Bureau van Dijk's Aida database. We used the last available accounting information (financial report) before the date of the bond issue for all firms. Our data set includes 220 offerings from 147 nonfinancial firms, with a total volume of €7.3 billion.

Table 1 presents descriptive statistics of the bond offerings sample. The average bond has a size of €33 million, a half-yearly coupon with an annual rate of 5.44% (all bond offerings in our sample are issued at par value), and an initial time to maturity of more than 5 years. Furthermore, 30% of the bonds are secured, and 34% are scored by a CRA. Sixty-eight percent of the issuers declare in the bond prospectuses to use mini-bonds for funding growth projects (i.e., organic internal growth, growth through mergers and acquisitions, or via international projects). Both the range of coupon rates and the range of issue sizes are wide, as depicted by the standard deviations of those variables in Table 1.

Table 2 breaks down our sample into four groups according to the size of the principal bond issue to provide a more detailed description of the issuers' characteristics using selected

TABLE 1 Descriptive statistics of bonds listed on the *ExtraMot-Pro* mini-bond market

	Average	Std. dev.	Min.	Median	Max.	#obs
Continuous variables						
Size (€/million)	33.26	85.98	0.10	5.00	499.73	220
Coupon rate	5.44%	1.57%	0.04%	5.50%	10.50%	220
Time to maturity (days)	2031	1537	107	1828	7286	220
Percentage						
Dichotomous variables						
Yearly coupon	30.45					220
Half-yearly coupon	60.45					220
Quarterly coupon	8.64					220
Monthly coupon	0.46					220
Rated	34.09					220
Investment grade	13.18					220
Speculative grade	20.91					220
Guarantee	30.00					220
Growth (use of proceeds)	68.47					198

Note: Descriptive statistics of the mini-bonds. For continuous variable: size refers to the issue principal size in €/millions; for coupon rates, we take the first coupon at the date of issuance in case of floating rate offerings; time to maturity is the number of days between the date of issuance and the maturity date. Dichotomous variable are defined as follows: Yearly—half-yearly—quarterly—monthly coupon refers to the percentage of bonds with that coupon frequency; rating equals one if the issuer solicited a rating from a CRA, zero otherwise. For investment grade and speculative grade dummies see definition in Appendix B1. Guarantee equals one if the bond is secured, zero otherwise; while growth (use of proceeds) equals one if the proceeds are used for growth investments, zero otherwise.

Abbreviation: CRA, credit rating agency.

TABLE 2 Selected issuers financial ratios by size categories of bond offerings

	Issuer's size	D/E ratio	Debt to banks over sales	Debt over EBITDA	ROI	EBITDA over sales	Interest coverage ratio
Issue over €100 million							
Average	389	1.46	30.14	2.19	8.83	22.56	3.62
Std. Dev.	*0.69*	*3.33*	*26.94*	*1.56*	*7.57*	*13.44*	*1.84*
Between €50 and 100 million							
Average	130	0.74	30.77	1.2	3.53	11,00	13.44
Std. Dev.	*2.76*	*0.76*	*51.67*	*1.58*	*3.18*	*26.93*	*19.25*
Between €10 and 50 million							
Average	104	1.49	43.04	7.9	5.87	14.76	6.58
Std. Dev.	*1.58*	*1.31*	*22.4*	*20.27*	*5.47*	*10.79*	*7.57*
Under €10 million							
Average	34	2.17	38.03	5.07	9.81	14.71	6.64
Std. Dev.	*1.36*	*2.42*	*21.45*	*12.57*	*7.45*	*14.65*	*11.19*
All sample							
Average	56	1.94	37.54	5.07	9.13	15.32	6.5
Std. Dev.	*1.57*	*2.34*	*22.42*	*13.18*	*7.39*	*14.00*	*10.07*

Note: Selected issuers financial ratios split by the size categories of bond principal values (issues size over €100 million, between €50 and 100 million, between €10 and 50 million, under €10 million). Issuer's size refers to firm sales in €/millions; D/E ratio represents the debt over equity ratio; ROI is net operating income over total assets; the interest coverage ratio is the ratio between EBITDA and interest expenses; other ratios are self-explanatory. All financial ratios are computed using the last available issuers' financial report data before the date of the bond issuance. Averages and standard deviations (in italic) are displayed.

financial ratios. This classification is also useful because bond offerings in the bottom two categories by principal size display homogeneous characteristics.

Table 2 reveals some important insights. First, as may be expected, larger firms issue larger bonds. Second, issuers on the ExtraMOT PRO market have high levels of bank debt, which indicates that they are seeking funds through a different channel to traditional forms of bank lending. Third, firms that issue larger bonds are generally less indebted than issuers of smaller bonds, as shown by their debt-to-equity ratio and debt-to-EBITDA ratio. In other words, issuers of mid-size and small bonds are relatively more indebted than issuers of large bonds.

Table 3 presents descriptive statistics on credit ratings. The majority of solicited ratings are from local CRAs (CRIF Ratings and Cerved), whereas the Big Three international CRAs (S&P, Moody's, and Fitch) collectively rated 36 bonds (48% of solicited ratings). This may be attributable to the cheaper services of domestic CRAs, and is similar to the trend observed in the German mini-bond markets (Mietzner et al., 2018). As expected, the median score for bonds on the ExtraMOT PRO market is close to the boundary between investment and speculative grade. Finally, while almost two-thirds of bonds were scored by a CRA in 2013, the first year of

TABLE 3 Descriptive statistics on solicited credit ratings

Panel A					
Agency	# of ratings	Frequency	Lowest	Median	Highest
Cerved rating agency SPA	31	14.09%	B2.2	B1.1	A2.2
CRIF rating	8	3.64%	B	BB	BBB+
Fitch ratings	3	1.36%	B	B+	BBB
Moody's	24	10.91%	B3	B2	B1
Standard & Poor's	9	4.09%	B	B	BB−
No rating	145	65.91%			
Total	220	100%			
Panel B					
Year of emission	Rated bonds	Unrated bonds	Total		
2013	16	9	25		
	64.00%	36.00%	100.00%		
2014	16	36	52		
	30.77%	69.23%	100.00%		
2015	10	23	33		
	30.30%	69.70%	100.00%		
2016	13	43	56		
	23.21%	76.79%	100.00%		
2017	20	34	54		
	37.04%	62.96%	100.00%		
Total	75	145	220		
	34.09%	65.91%	100.00%		

Note: Descriptive statistics of credit ratings. Panel A shows for each credit rating agency: the lowest. The median (defined as the score that separates the lowest half and the highest half of the score distribution of a specific agency) and the highest rating. Panel B shows the distribution of rating with respect to the year of emission (percentages in italic with respect to the total number of issues in each year).

the market, fewer than 40% of newly issued bonds in each subsequent year were rated (Table 3, Panel B).

3.2 | Method and variables

The main goal of our analysis is to examine the determinants of mini-bond yield spreads at the date of issuance. To do this, we use issuers' firm-specific information (size, age, and tangible assets as indicators of information opacity, as well as performance metrics and use of bond proceeds) and bond characteristics (coupon rate, maturity date, rating availability, and presence of a guarantee).

For our empirical analysis, we employ ordinary least squares regressions to estimate beta coefficients, using yield spread as the dependent variable and combinations of the explanatory variables as independent variables in four different specifications (described in more detail in Section 4.1). Yield spread is defined as the difference between the bond offering yield and the risk-free rate at the date of the issue for bonds with the same duration. We use the AAA-rated euro area government bonds as the risk-free rate, taken from the ECB euro area yield curves.[6] Thus, the yield spread computation is based on the primary market, as the mini-bond secondary market information (i.e., market prices) cannot be considered reliable owing to the market's substantial illiquidity.[7] The basic structure of our regression is as follows:

$$
\begin{aligned}
\text{Yield Spread} &= \alpha + \beta_1 \text{Size} + \beta_2 \text{Age} + \beta_3 \text{Asset Tangibility} + \beta_4 \text{Rated} + \beta_5 \text{Guarantee} \\
&+ \beta_6 \text{Growth (use of proceeds)} + \sum_k \gamma_k \text{Control Variables} + \sum_j \gamma_j \text{Industry}_j \\
&+ \sum_z \gamma_z \text{Year}_z + \delta \text{Multiple issues} + \epsilon,
\end{aligned}
\tag{1}
$$

where *Size* (log of firm sales), *Age* (the number of years since the firm's creation), and *Asset Tangibility* (the ratio of tangible assets to total assets) are variables used to test hypothesis 1 (H1) discussed in Section 2.2 concerning issuers' information opacity, and *Rated*, *Growth (use of proceeds)* and *Guarantee* represent factors to test our H2 and H3. The dummy variable *Rated* equals one if a solicited rating is available and zero otherwise. In other models, we test the effects of investment-grade and speculative-grade ratings separately. For the dummy variable *Growth (use of proceeds)*, we hand-collect the information on the use of proceeds publicly declared by issuers in each bond prospectus: the dummy is equal to one if the use of proceeds is directed to organic (domestic) growth projects, growth through mergers and acquisitions projects or international growth projects, and zero otherwise (mainly, debt restructuring, working capital funding, and others use of proceeds).[8] The dummy variable *Guarantee* equals one if the bond is secured (with any form of partial or total guarantee provided by the borrower), and zero otherwise. We consider as controls the following set of variables that might impact on the cost of bond offerings: bond time to maturity, issuer current ratio, issuer interest rate coverage; and issuer EBIT/sales ratio. We also add industry and year dummies and a dummy variable equals one in case of multiple issues from the same firm and zero otherwise.

Table 4 presents descriptive statistics and the correlation matrix for variables used in the empirical analysis. A summary description of the variables is provided in Appendix B1.

4 | EMPIRICAL RESULTS

4.1 | Main analysis

Table 5 shows the results for five models. To test H1, we consider three firm-specific variables capturing issuers' information opacity: *Size*, *Age*, and *Asset Tangibility* (the ratio of tangible fixed assets to total assets). *Size* and *Age* do not influence the cost of a mini-bond issue (*Age* is statistically significant only in model 1 [column 1]), whereas *Asset Tangibility* has a highly statistically significant association with cost: firms with a higher tangible fixed assets ratio have a lower yield spread. Specifically, an increase of 1% in the tangible assets ratio reduces the yield spread by nearly 0.02%. This ratio is an effective indicator of firm information opacity: as

TABLE 4 Descriptive statistics on OLS regression continuous variables

Panel A

	Average	Std. dev.	Min.	Max.	#obs.
Continuous variables					
Yield spread	0.05	0.01	0.00	0.10	220
Size	17.69	1.57	13.01	20.92	220
Age	24.89	18.61	2	138	220
Time to maturity (days)	2031	1537	107	7286	220
Current ratio	1.25	0.47	0.51	3.26	220
Interest coverage ratio	6.5	10.06	−0.33	92.75	220
EBIT over sales	15.43%	73.20%	−30.22%	60.47%	220
Asset tangibility	22.61%	21.07%	0.05%	90.42%	220

Panel B

Correlations	Yield spread	Size (log of sales)	Age	Time to maturity (days)	Current ratio	Interest coverage ratio	EBIT over sales	Tangible/TA
Yield spread	1							
Size	0.1487	1						
Age	−0.0532	0.2424	1					
Time to maturity (days)	−0.4043	0.0888	−0.1302	1				
Current ratio	−0.1700	−0.1341	0.0062	−0.0297	1			

TABLE 4 (Continued)

Panel B — *Correlations*

	Yield spread	Size (log of sales)	Age	Time to maturity (days)	Current ratio	Interest coverage ratio	EBIT over sales	Tangible/TA
Interest coverage ratio	−0.165	−0.1189	−0.0245	0.1188	−0.0268	1		
EBIT over sales	−0.2111	−0.2715	−0.1371	0.2050	−0.0250	−0.0231	1	
Asset tangibility	−0.3359	−0.021	0.0359	0.3364	−0.1831	0.0341	−0.0788	1

Note: Panel A: Descriptive statistics for continuous variables used in the quantitative analysis: average, standard deviation, minimum and maximum. The variable Time to maturity is reported in days. For a complete definition of all variables, see Appendix B1. Panel B: shows the correlation matrix.

Abbreviation: OLS, ordinary least squares.

TABLE 5 Output of the OLS regression

Dependent variable: Yield spread (difference between the bond offering yield and the yield to maturity of Euro area AAA government bonds) (%)					
Specification	1	2	3	4	5
Main variables					
Size	0.053	−0.048	−0.051	−0.095	−0.060
	0.081	*0.085*	*0.088*	*0.096*	*0.098*
Age	−0.010**	−0.006	−0.007	−0.004	−0.005
	0.005	*0.005*	*0.005*	*0.005*	*0.006*
Asset tangibility	−0.018***	−0.019***	−0.014**	−0.018***	−0.017***
	0.005	*0.005*	*0.007*	*0.005*	*0.005*
Investment grade		0.075	0.080	0.013	
		0.255	*0.257*	*0.0262*	
Speculative grade		0.987***	0.966***	0.980***	
		0.299	*0.290*	*0.306*	
Guarantee			0.076	0.162	0.363
			0.237	*0.237*	*0.268*
Growth (use of proceeds)				0.913***	0.577*
				0.270	*0.302*
Rated					−0.241
					0.355
Growth*Rated					0.920**
					0.406
Control variables					
Time to maturity	−0.0004***	−0.0004***	0.0004***	−0.0005***	−0.0004***
	0.0001	*0.0001*	*0.0001*	*0.0001*	*0.0001*
Current ratio	−0.636**	−0.716***	−0.722***	−0.787**	−0.783***
	0.259	*0.265*	*0.271*	*0.305*	*0.295*
Interest coverage ratio	−0.020***	−0.014*	−0.014**	−0.024	−0.030
	0.007	*0.007*	*0.007*	*0.020*	*0.020*
Ebit/Sales	−0.004***	−0.004***	−0.004***	−0.006	−0.007
	0.001	*0.001*	*0.001*	*0.013*	*0.014*
Constant	5.782***	7.117***	7.179***	7.572***	7.264***
	1.510	*1.537*	*1.601*	*1.806*	*1.832*
Industry controls	Yes	Yes	Yes	Yes	Yes
Year controls	Yes	Yes	Yes	Yes	Yes

TABLE 5 (Continued)

Dependent variable: Yield spread (difference between the bond offering yield and the yield to maturity of Euro area AAA government bonds) (%)				
Specification	1	2	3	4	5
Multiple issues control	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.4533	0.4921	0.4924	0.5180	0.5074
# of observations	220	220	220	198	198

Note: The output of the OLS regressions. The dependent variable is the yield spread for all the specifications. Standardized beta coefficient and robust standard errors (in italic) are showed (Significance level: ***1%; **5%; *10%). For a complete definition of all variables see Appendix B1. In all specifications, we include industry and year dummies and control for multiple issues, which is a dichotomous variable equal to 1 if the issue is a part of a series of issues of the same firm, zero otherwise.

Abbreviation: OLS, ordinary least squares.

Gompers reports, higher asset tangibility reduces information asymmetry because tangible assets' payoffs are easier to observe. Consequently, a higher tangible assets ratio reduces lenders' monitoring activity. We, therefore, confirm H1 only for asset tangibility, and not for firm size and age.

Model 2 confirms that the rating score affects the yield spread. The beta coefficient is not statistically significant for investment-grade issues but is positive and statistically significant for speculative-grade issues. Specifically, the yield cost is 0.99% higher, on average, for speculative-grade issues than for other issues.

Model 3 analyzes the influence of a bond issue guarantee. The results show that secured bonds do not have statistically significantly lower yield spreads than unsecured bonds. This indicates that investors do not consider the presence of a guarantee to reduce the risk that should be priced into a bond. H3 is, therefore, not confirmed. We elaborate on this not intuitive result in Section 5.

In model 4 we show that the use of proceeds seems to be able to affect the cost of the issue. When the mini-bond issuers pursue (risky) growth projects, the yield spread is 0.91% higher than for issuers with low-risk (no-growth) projects. This confirms our H2a, that is, the nature of the growth strategies financed with bond proceeds matters. In model 5 we analyze the relationship between rating and growth projects. Our results display that rated bonds with growth projects present a yield spread 0.92% higher than bonds with unrated growth projects. Meanwhile, the rated bonds with a no-growth use of proceeds do not show a significantly different yield spread than unrated ones (see the coefficient of variable *Rated* in model 5). Consequently, the rating is able to capture growth projects riskiness through an increase in bond yield spread. These results are statistically significant and, thus, confirm H2b.

Each model includes a set of control variables. The effect of time to maturity on yield spread is negative and highly statistically significant (at the 1% level). This conflicts with the positive relationship usually described in the mainstream financial literature. Our result can be explained by the high proportion of speculative-grade bonds in our sample. According to the seminal work of Merton (1974), speculative-grade bonds are very risky at issuance but more likely than investment-grade bonds to improve with longer maturity and less likely to worsen. Therefore, the yield spread can be lower for speculative bonds with a longer period to maturity.

The interest coverage ratio, current ratio, and EBIT/sales provide information about issuers' ability to meet their financial obligations. The beta coefficients of all these variables are

negative and statistically significant, indicating that higher values of these ratios are associated with lower yield spreads.[9]

4.2 | Robustness tests

We perform several robustness checks to validate our results. First, we estimate our models considering only first-time issuers on the ExtraMOT PRO market. Second, we analyze the full sample with additional variables representing issue- and issuer-specific information and the government bonds yield spread in the euro area (measured as the difference in yields between 10-year Italian government bonds and equivalent German government bonds). Third, we use a nonlinear approach to estimate if the effect of asset tangibility on yield spread is nonlinear, namely stronger (or weaker) for lower values of asset tangibility.

4.2.1 | First-time issuers

One of the main concerns regarding our analysis is the problem of multiple issues. The full data set comprises 220 mini-bonds issued by 147 nonfinancial firms. In the empirical section, we controlled for whether a firm has already issued a mini-bond on the second-tier market. To validate our results, we rerun the main regressions on a subsample of first-time bond offerings.

The results in Table 6 confirm the findings of the main analysis. One notable difference is the reduction in the explanatory power of the current ratio (which has stronger statistical significance in Table 5). Our findings suggest that, for first-time issuers, the interest coverage ratio is more relevant than the current ratio in explaining yield spread. Intuitively, for first-time unlisted issuers who may be highly opaque and unfamiliar to potential investors, it is more important to offer assurances on the ability to repay short-term obligations (as demonstrated by a high-interest coverage ratio) than to display high liquidity (by a high current ratio).

4.2.2 | Other control variables

Besides firms' industry, multiple bond issues, and time fixed effects, we need to consider firm-specific accounting information reflecting issuers' ability to repay lenders and generate cash flows, which are typically the main variables that professional investors take into account. Therefore, following previous literature (Bhojraj & Sengupta, 2003; Chen et al., 2007; Helwege & Turner, 1999), we add variables for callable bonds and debt-to-equity ratio. *Callable* is a dummy variable that equals one if the bond is callable, and zero otherwise. Callable covenants are typically associated with higher bond yields, so we expect a positive beta coefficient. Whereas the main analysis used financial ratios that define the issuer's ability to meet payments, we now control for the firm's level of indebtedness using the debt-to-equity ratio. We expect this ratio to be positively correlated with yield spread.

Yield spreads could be affected by macroeconomic trends and expectations. Therefore, we also control for the difference in yields between 10-year Italian bonds and 10-year German bonds, which proxies for the market expectation of Italian sovereign risk. Yield spread on corporate bonds can be affected by the overall perceived sovereign risk of the country.

TABLE 6 Output of the robustness tests on first-time issuers

Dependent variable: Yield spread (difference between the bond offering yield and the yield to maturity of Euro area AAA government bonds) (%)				
Specification	1	2	3	4
Main variables				
Size	−0.030	−0.081	−0.080	−0.137
	0.090	0.091	0.093	0.111
Age	−0.009*	−0.007	−0.007	−0.006
	0.005	0.005	0.005	0.006
Asset tangibility	−0.019***	−0.019***	−0.018***	−0.015**
	0.006	0.006	0.006	0.006
Investment grade		0.05	0.045	0.060
		0.316	0.325	0.346
Speculative grade		0.834**	0.841**	0.872**
		0.348	0.343	0.346
Guarantee			−0.036	0.121
			0.310	0.332
Growth (use of proceeds)				0.675**
				0.329
Control variables				
Time to maturity	−0.0003***	−0.0003***	−0.0003***	−0.0004***
	0.0001	0.0001	0.0001	0.0001
Current ratio	−0.441*	−0.463*	−0.461*	−0.472
	0.267	0.271	0.276	0.321
Interest coverage ratio	−0.038***	−0.032***	−0.032***	−0.045**
	0.009	0.009	0.009	0.018
Ebit/Sales	−0.004***	−0.004***	−0.004***	−0.021
	0.001	0.001	0.001	0.016
Constant	7.422***	7.809***	7.790***	8.642***
	1.662	1.697	1.747	2.071
Industry controls	Yes	Yes	Yes	Yes
Year controls	Yes	Yes	Yes	Yes
Adjusted R²	0.5246	0.5526	0.5527	0.5714
# of observations	147	147	147	134

Note: The output of the OLS regressions only for the subsample of first-time issues. The dependent variable is the yield spread for all the specifications. Standardized beta coefficient and robust standard errors (in italic) are showed (Significance level: ***1%; **5%; *10%). For a complete definition of all variables, see Appendix B1. In all specifications, we include industry and year controls.

Abbreviation: OLS, ordinary least squares.

Table 7 reports the results of the robustness check regressions with the full sample. These results reported in columns 1–4 are very similar to in the findings of the main analysis (Model 5 in Table 5). We do not find statistically significant results for the added variables. Callable bonds, representing 67% of the sample, are not associated with significantly different yield spreads compared to noncallable bonds (Model 1). The level of indebtedness does not significantly affect yield spread, which likely reflects this information being already captured by the basic model's main variables (Model 2). Moreover, market expectations of the country's sovereign risk do not appear to affect mini-bond yield spreads (Model 3).

We also want to better understand the role of asset tangibility in reducing the firm's information opacity. To test whether the effect of asset tangibility on yield spread is nonlinear, we estimate the following model:

$$
\begin{aligned}
Yield\ &Spread \\
&= \alpha + \sum_n \beta_n Main\ Variables + \lambda_1 Asset\ Tangibility\,(above\ median) \\
&\quad + \lambda_2 Asset\ Tangibility\,(below\ median) + \sum_k \gamma_k Control\ Variables + \sum_j \gamma_j Industry_j \\
&\quad + \sum_z \gamma_z Year_z + \delta\ Multiple\ issues + \epsilon,
\end{aligned}
\tag{2}
$$

Where *Main Variables* are the relevant variables discussed so far; *Asset Tangibility (above median)* is the product between *Asset Tangibility* and a dummy variable equal to one if the firm's level of *Asset Tangibility* is above the median of the distribution, and zero otherwise; *Asset Tangibility (below median)* is the product between *Asset Tangibility* and a dummy variable equal to one if the firm's level of *Asset Tangibility* is below the median, zero otherwise. Model 5 in Table 7 shows that the two new variables have different coefficients: the effect of *Asset Tangibility* is more negative for firms below the median value than for those above the median. In other words, firms with a low level of tangible assets might benefit more (in terms of a reduction in yield spreads) from an increase in asset tangibility relative to firms with a high level of tangible assets.

4.2.3 | Rated bonds and growth opportunities

For the robustness checks concerning the relationship between rated bonds and growth opportunities, we run a *t* test analysis on the difference in means between issuers with growth opportunities and no-growth issuers (and between rated and unrated bonds). Table 8 interestingly reports that issuers who use mini-bonds for funding growth projects seem to be financially and economically sound compared to other mini-bonds issuers. In particular, they are larger, less indebted (in terms of debt to equity ratios), with higher interest coverage ratio and higher asset tangibility than no-growth issuers. In sum, growth-oriented issuers are less opaque and with a healthier financial position. Regarding the characteristics of the issues, growth-oriented issuers provide less guarantee, and their bond offerings display much longer time to maturity, revealing the "patient capital" feature required by the underlying growth projects. Since these growth-oriented issuers are less risky when just considering past performances and current financial standing, the higher associate cost of the bond we have detected in our main regression analysis can be only explained by the inherent riskiness of future growth involved in the projects funded by the bond proceeds. In other words, it is the (risky) growth project per se that has a positive impact on the cost of the bond, which is properly captured by the credit rating when the bond is rated.

TABLE 7 Output of the robustness tests

Dependent variable: Yield spread (difference between the bond offering yield and the yield to maturity of Euro area AAA government bonds) (%)					
Specification	**1**	**2**	**3**	**4**	**5**
Main variables					
Size	−0.061	−0.058	−0.054	−0.052	−0.035
	0.099	*0.101*	*0.096*	*0.099*	*0.096*
Age	−0.005	−0.005	−0.005	−0.005	−0.006
	0.006	*0.006*	*0.006*	*0.006*	*0.006*
Asset tangibility	−0.017***	−0.017***	−0.018***	−0.017***	
	0.005	*0.005*	*0.005*	*0.005*	
Rated	−0.242	−0.252	−0.221	−0.235	−0.253
	0.355	*0.368*	*0.354*	*0.355*	*0.355*
Guarantee	0.362	0.361	0.391	0.386	0.294
	0.238	*0.240*	*0.244*	*0.245*	*0.244*
Growth	0.591*	0.582*	0.621**	0.652**	0.610**
	0.32	*0.304*	*0.282*	*0.301*	*0.3*
Growth*Rated	0.930**	0.937**	0.887**	0.922**	0.913**
	0.405	*0.422*	*0.395*	*0.410*	*0.408*
Asset tangibility (above median)					−0.021***
					0.005
Asset tangibility (below median)					−0.062**
					0.025
Control variables					
Time to maturity	−0.0004***	−0.0004***	−0.0005***	−0.0005***	−0.0004***
	0.0001	*0.0001*	*0.0001*	*0.0001*	*0.0001*
Current ratio	−0.788***	−0.771**	−0.826***	−0.821***	−0.756***
	0.293	*0.299*	*0.305*	*0.306*	*0.288*
Interest coverage ratio	−0.030	−0.029	−0.026	−0.025	−0.031
	0.021	*0.021*	*0.021*	*0.022*	*0.021*
Ebit/Sales	−0.007	−0.007	−0.009	−0.009	−0.008
	0.014	*0.014*	*0.014*	*0.014*	*0.014*
Additional control					
Callable	0.06			0.104	
	0.218			*0.211*	

(Continues)

TABLE 7 (Continued)

Dependent variable: Yield spread (difference between the bond offering yield and the yield to maturity of Euro area AAA government bonds) (%)					
Specification	**1**	**2**	**3**	**4**	**5**
Debt/equity ratio		0.007		0.009	
		0.036		*0.036*	
Spread bond/bund			0.524	0.552	
			0.485	*0.480*	
Constant	7.234***	7.185***	6.311***	6.112***	7.111***
	1.848	*1.946*	*1.958*	*2.082*	*1.861*
Industry controls	Yes	Yes	Yes	Yes	Yes
Year controls	Yes	Yes	Yes	Yes	Yes
Multiple issues controls	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.5076	0.5075	0.5127	0.5135	0.5163
# of observations	198	198	198	198	198

Note: The output of the robustness check regressions. (1)–(4): We gradually added additional firm-specific and issue-specific information (A callable dummy, the issuers' Debt to Equity ratio, the spread between Italian versus German government 10 years bonds). In specification (5), we use two variables (Asset tangibility above and below the median) to detect if the effect of tangible assets is nonlinear. Standardized beta coefficient and robust standard errors (in italic) are showed (Significance level: ***<1%; **<5%; *<10%). For a complete definition of all variables see Appendix B1. In all specifications, we include industry and year dummies and control for multiple issues, which is a dichotomous variable equal to 1 if the issue is a part of a series of issues of the same firm, zero otherwise.

Table 9 provides additional evidence that rated bonds have a higher yield cost because issuers are pursuing growth projects. In particular, t tests on rated and unrated bonds reveal that rated bonds are more associated with growth projects than unrated bonds (see the last row in Panel A).[10] Besides, rated bonds are issued by firms that are larger (in terms of sales) and less indebted (in terms of both the debt-to-equity and debt-to-sales ratios) but have a lower interest coverage ratio and lower profitability (measured by return on investment). The fact that large firms tend to solicit a rating is intuitive, as credit ratings are particularly costly for SMEs relative to large companies and because SMEs issue smaller bond offerings.

We also test for differences in mean values of main firm- and issue-specific characteristics in the rated bonds subsample between issuers of high-rated bonds (investment grade) and issuers of low-rated bonds (speculative grade). As reported in Table 9, Panel B, our findings suggest (unsurprisingly) that firms with a high-interest coverage ratio and firms with a low debt-to-sales ratio obtained better rating scores.

5 | DISCUSSION

This study provides an empirical investigation of the cost of Italian mini-bond offerings listed between 2013 and 2017 in the *ExtraMOT PRO*, Italy's new second-tier bond market for unlisted firms. The Italian case offers an interesting illustration of the circumstances under which highly opaque and unfamiliar first-time SME issuers may enter a capital market and gaining

TABLE 8 *t* tests on the use of proceeds

	Growth		No-growth			
	Average	Std. Err.	Average	Std. Err.	Null hypothesis	Difference
Debt/Equity ratio	1.707	0.156	2.673	0.409	Rejected	Negative***
Size	17.938	0.12	17.375	0.208	Rejected	Positive***
Interest coverage ratio	6.566	0.587	4.488	0.355	Rejected	Positive***
Debt over sales	2.59	0.861	1.844	0.683	Not rejected	NS
ROI	9.164	0.59	8.529	1.004	Not rejected	NS
EBIT/Sales	10.025	1.019	6.917	1.31	Rejected	Positive**
Age	23.818	1.529	26.516	2.442	Not rejected	NS
Asset tangibility	25.769	1.969	17.128	2.03	Rejected	Positive***
Size of the issue	28	5.9	21.9	8.4	Not rejected	NS
Time to maturity (days)	2493	128	952	138	Rejected	Positive***
Guarantee	26.28	3.77	34.38	5.98	Not rejected	NS

Note: Means and standard errors of issuers' financial information accordingly to the use of proceeds. The null hypothesis column tells if the null hypothesis of equal means is rejected or not. The difference column shows if the difference in the means between growth projects use of proceeds = 1 and no-growth use of proceeds = 0 is positive or negative and the significance level (*10%; **5%; ***1%; NS = the difference is not statistically different from zero).

"market visibility." After a period of acclimatization, such firms may become able to leverage multiple (even equity) forms of market-based finance. In this context, our findings provide useful suggestions to such firms on how to signal their quality to the market and thereby lower their cost of funding.

First, the study shows that firm age and size do not directly impact on the cost of issues. This means that, in this specific market segment dedicated to SMEs and unlisted firms, younger and smaller firms are not considered (all else equal) riskier than older and larger firms. However, the extent of tangible fixed assets is found to influence a firm's information opacity and, therefore, bond cost. Notably, the marginal effect of an increase in tangible assets on the bond cost is higher for firms that start with a low level of tangible assets. Unlike tangible assets, the presence of a bond guarantee does not seem to significantly affect the mini-bond cost. These two results are interesting: the role of tangible assets resembles that in a typical bank-lending relationship, while the finding that a guarantee does not affect yield spreads represents an important difference to the main bond market for large and listed firms (Stulz & Johnson, 1985). This latter aspect could also reflect the specific Italian context, where timeframes involved in legal enforcement are quite long, thus limiting the effectiveness of a guarantee (Bongini et al., 2021). Another plausible explanation is that a guarantee in the Italian mini-bond market may reduce the expected loss in case of bond default but cannot alone lessen the perceived probability of default, which directly impacts on the cost of debt. We suggest three reasons for this: (i) bond guarantees are mostly provided by the entrepreneur personally, backed by their individual wealth, and thus constitute a type of guarantee previously found to have no impact on the cost of debt (Calcagnini et al., 2014); (ii) mini-bonds issuers rated as investment grade are all placed at the lower end of the rating class spectrum as the perceived probability of default is quite high, even for less risky issues; and (iii) as shown in Table 9, bond guarantees

TABLE 9 *t* Tests on credit rating

Panel A rating availability

	Rated bonds		Unrated bonds		Null hypothesis	Difference
	Average	Std. Err.	Average	Std. Err.		
Debt/Equity ratio	1.62	0.29	2.1	0.19	Rejected	Negative*
Size	18.82	0.18	17.27	0.11	Rejected	Positive***
Interest coverage ratio	4.71	0.4	7.43	1.06	Rejected	Negative*
Debt over sales	1.7	0.28	3.34	1.15	Not rejected	NS
ROI	8.05	0.84	9.7	0.62	Rejected	Negative*
EBIT/Sales	7.26	1.08	9.17	0.91	Rejected	Negative*
Age	24.01	2.16	25.34	1.55	Not rejected	NS
Asset tangibility	19.3	2.16	24.32	1.83	Rejected	Negative**
Size of the issue	80.6	14.5	8.24	1.67	Rejected	Positive***
Time to maturity (days)	2044	66	2024	154	Not rejected	NS
Guarantee	41.33	5.72	24.14	3.67	Rejected	Positive***
Growth (use of proceeds)	78.13	5.21	63.5	4.13	Rejected	Positive**

Panel B rating score

	Investment grade		Speculative grade		Null hypothesis	Difference
	Average	Std. Err.	Average	Std. Err.		
Debt/Equity ratio	1.68	0.17	1.58	0.47	Not rejected	NS
Size	18.2	0.29	19.2	0.21	Rejected	Negative***
Interest coverage ratio	5.88	0.81	3.97	0.39	Rejected	Positive**
Debt over sales	1.31	0.3	1.95	0.42	Not rejected	NS
ROI	8.47	1.27	7.78	1.12	Not rejected	NS
EBIT/Sales	7.95	1.4	6.82	1.52	Not rejected	NS
Age	26.28	3.06	22.59	2.95	Not rejected	NS
Asset tangibility	20.08	3.1	18.8	2.96	Not rejected	NS
Size of the issue	13.3	3.74	125	21.3	Rejected	Negative***
Time to maturity	1809	140	2193	52	Rejected	Negative***
Guarantee	17.24	7.14	56.5	0.74	Rejected	Negative***
Growth (use of proceeds)	82.14	7.37	75	7.32	Not rejected	NS

Note: Panel A: Means and standard errors of issuers' financial information accordingly to the availability of rating. The null hypothesis column tells if the null hypothesis of equal means is rejected or not. The difference column shows if the difference in the means between issuers of rated bonds = 1 and issuers of unrated bonds = 0 is positive or negative and the significance level (*10%; **5%; ***1%; NS, the difference is not statistically different from zero). Panel B: Means and standard errors in the subsample of rated bonds, according to the rating score dummy. The null hypothesis column tells if it is rejected or not. The difference column shows if the difference in the means between high rating (investment grade) and low rating (speculative grade) is positive or negative and the significance level (*10%; **5%; ***1%; NS, the difference is not statistically different from zero).

are strongly associated with riskier bonds and are more frequent for bonds rated as speculative than for investment-grade bonds.

Our findings suggest that a firm with a high level of tangible fixed assets is better able to signal its quality to the market, in terms of its capacity to repay the debt. Firms with no tangible fixed assets or high levels of intangible assets, for example, because of the sector in which they operate, must instead signal their creditworthiness with strong past financial results. Another key consideration is that the mini-bonds in our sample are mostly aimed at stimulating growth in SMEs' capital expenditures: they provide growth capital for projects that are riskier and more difficult for outsiders to evaluate compared to capital allocated to other purposes, such as funding assets in place. Given these circumstances, we can expect asset tangibility to lessen information asymmetry problems because their payoffs are easier to observe, thus reducing the monitoring activity of lenders (Gompers, 1995).

A second important result concerns the role of future growth funded by the bond proceeds and its relationship with the credit rating.[11] Our results show that how issuers use (or not) mini-bonds for funding future growth projects matters: the yield spread is significantly higher for issuers funding growth projects, and this higher cost is reflected in the credit rating. Moreover, because issuers funding growth projects are less opaque and financially healthier than no-growth issuers, the higher bond cost they obtain can be directly linked to the risk profile of the growth project funded by the issue proceeds. This result adds new insights to the previous literature on solicited rating (Poon, 2003), whereby financially weaker firms tend to avoid soliciting a credit rating as they fear obtaining a low score. In our context where the rating is relatively costly for the class of SME issuers involved, firms may choose to avoid soliciting a rating when pursuing low-risk (or no-growth) business projects as these strategies are less difficult to evaluate by outside institutional investors and, therefore, the contribution provided by a credit rating in reducing information asymmetries becomes less crucial.

In the Italian mini-bond market, where only institutional investors are involved, and a rating is not mandatory, rating solicitation is largely encouraged by arrangers for riskier or more difficult to evaluate issuers and their growth projects. Moreover, because professional investors tend to hold Italian mini-bonds in their portfolio until maturity, they typically evaluate and select prospective issuers before the actual listing on the dedicated market, which is often among the last steps in issuing firms' fundraising process. Basically, institutional investors have the professional skills to evaluate in-house a prospective issuer's creditworthiness and risk of default. By doing so, these investors can also assess the contribution of each new mini-bond purchased to the risk-return profile of their overall investment portfolio (in a typical private equity/debt fund business model). For these reasons, the Italian mini-bond market is roughly equivalent to a private placement of debt.

6 | CONCLUSIONS

Our study provides new evidence on which factors influence the mini-bonds cost for SMEs and unlisted firms that have chosen to finance their businesses using the specialized, second-tier Italian bond market.

The presence of tangible fixed assets is revealed as the most important attribute for reducing firms information opacity and has a significant impact on yield spread while the presence of a bond guarantee was not able to reduce the cost of debt. More importantly, we find that the use of proceeds for funding growth projects significantly increases the cost of bonds as issuers that follow a no-growth

strategy do not observe a comparable rise in the yield spread. Issuers appear to be aware that mini-bonds provide a unique source of growth capital, allowing the issuing firms to undertake significant growth projects that are quite risky when compared with alternative low-risk or no-growth strategies where the funds are used to substitute the assets in place or restructure the existing debt. Thus, smaller and more opaque issuers that constitute the funding demand in this market must expect to sustain a higher cost from using mini-bonds compared to a standard bank loan, which actually could be more difficult to negotiate for this group of borrowers. Regarding the credit rating, our results show that when the bond is rated, the higher bond cost associated with growth projects funded by the issue proceeds is incorporated in the credit rating.

Our results are relevant to investors, mini-bond issuers, and policy makers. While informed (professional) investors should be able to distinguish high- and low-quality issuers, even without the information provided by a rating, our results show that when investing in bonds issued by firms pursuing growth projects, the rating is fundamental as it conveys additional information on the riskiness of these growth-oriented firms. On the other hand, unrated mini-bonds are often issued by firms that might choose to not solicit a rating since they pursue conservative, no-growth strategies which are less difficult to evaluate from outside institutional investors and not only because they fear obtaining a low score being less financially sound as discussed in previous literature.

SMEs that plan to issue mini-bonds should be aware that strong economic and financial fundamentals, as well as tangible fixed assets, can signal their creditworthiness to the market and do so more effectively than age, size, or offering a specific guarantee on the bond contract. As mini-bonds are normally aimed at funding long-term risky growth projects, bond guarantees and a public credit rating serve to increase the probability of obtaining funds from an institutional investor but do little to alleviate the cost of debt. Hence, in this market setting, it is the nature of growth projects funded by the bond issue that could increase the cost of funding for this riskier class of private, unlisted firms. Therefore, potential issuers must be ready to disclose more transparently their growth strategy orientation even through soliciting a credit rating.

For policy makers, our findings confirm the importance of allowing only institutional investors to participate in illiquid market segments of domestic capital markets. When capital markets are not sufficiently mature or developed, private and retail investors can find it difficult to bear the higher riskiness of a new asset class such as mini-bonds, mainly when market liquidity is absent.

A deterioration of investor trust, often caused by the participation of uninformed private investors reliant entirely on public credit ratings to reduce the information gap, will most likely have a negative impact on this young and promising alternative instrument of SME financing. This has already been seen in Germany, where some mini-bond market segments open to retail investors have closed down (Utz et al., 2016). However, while still in its infancy, this industry has demonstrated strong potential to reduce the existing funding gap for SMEs and unlisted private firms. The informative role of the rating is still significant, especially in disclosing the riskiness of issuers' growth orientation.

ENDNOTES

[1] ExtraMOT PRO is an acronym for *Extra Mercato Obbligazionario Telematico segmento Professionale* of the Borsa Italiana (Italian stock exchange).

[2] The ExtraMOT PRO market rules, published on February 11, 2013, define the main requirements. For details see the Borsa Italiana website: https://www.borsaitaliana.it/borsaitaliana/regolamenti/extramot/extramot.en.htm

[3] The annual average trading volume has been around only 128€/millions across 2014–2017 years (source: annual reports titled "Report italiano sui Mini-Bond" published by Politecnico di Milano). In the same period the main Italian bond market (MOT) have reported an annual trading volume of around 233€/billions.

[4] In our sample, issuers declare the following uses of proceeds in their bond prospectuses: growth opportunities (domestic, international, and M&A projects), 68%; working capital funding, 18%; debt restructuring, 8%; others or not declared, 6%.

[5] In particular, Jin and Myers (2006) define firm opacity as a "reduced firm information set" available to outside investors, particularly in terms of firm-specific information; they also claim that opacity shapes information asymmetry between firm insiders and outsiders. Veldkamp (2006) claims that information has a high fixed cost of production and a low marginal cost of replication; consequently, it is only economically feasible to produce information that allows assessment of multiple assets, as such information can be used by many different investors. Consequently, firm-specific information that is only valuable for evaluating the risks and returns of one firm is less likely to be produced because of the high fixed costs and smaller base of potential users.

[6] http://www.ecb.europa.eu/stats/financial_markets_and_interest_rates/euro_area_yield_curves

[7] The trading in this market segment is very low and infrequent. Moreover, mini-bonds are typically held until maturity by institutional investors.

[8] As a small number of bond prospectuses were not available, the number of observations for this variable is reduced from 220 to 198.

[9] We run models considering the other control variables presented in Table 8, but the results do not change.

[10] This result is robust even controlling for possible outliers by excluding the top 1% and lowest 1% of the sample for the variable under analysis.

[11] In a separate analysis not documented here, we controlled the ex-post sales growth measured as the average growth rate across three-year after the bond issue for mini-bond issuers pursuing a (risky) growth strategy and for firms following the low risky (no-growth) strategy. The results confirm that the former issuers' subsample reported a substantially higher average growth rate (10.07% vs. 6.37%).

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APPENDIX A1

see Table A1.

TABLE A1   Italian mini-bond market main features

Panel A: Market design differences: mini-bond versus main bond market of *Borsa Italiana Stock Exchange*		
Main features	**Extra MOT Pro (Italian mini-bonds market)**	**MOT (Italian corporate bond market)**
Issuers	Unlisted firms and SMEs	Listed firms and large firms
Investors	Only institutional investors (mainly private debt funds)	All investors (both retail and institutional)
Credit rating	Optional, not mandatory	Mandatory
Market liquidity	Highly illiquid, infrequent trading	Highly liquid
Market makers	No	Yes
Issuers' declared use of proceeds	Financing risky long-term growth projects (also international)	All type of uses
Role of the arranger	Organizing private debt placement transactions	Organizing a public debt placement
Panel B: Italian mini-bond market versus other European second-tier markets		
Main features	**Extra MOT PRO (Italian mini-bond market)**	**French, German, and UK mini-bond markets**
Issuers	Unlisted firms and SMEs	Mainly unlisted firms and SMEs
Investors	Only institutional investors (mainly private debt funds)	All investors (both retail and institutional)
Credit rating	Optional, not mandatory	Mostly mandatory
Market liquidity	Highly illiquid, infrequent trading	Quite liquid
Market makers	No	Yes
Role of the arranger	Organizing a private debt placement	Organizing a public debt placement

APPENDIX B1

see Table B1.

TABLE B1 List of variables

Variable	Description	Source	Note
Main variables			
Yield spread	The difference between the bond offering yield and the yield to maturity of a risk-free government bond (Euro area AAA curve) on the primary market	Self-constructed	Since the secondary market is illiquid we consider yield spread on the date of bond issuance
Size of the issuer	Size of the issuer measured by the natural logarithm of sales	Aida—Bureau van Dijk database	
Age	The issuer's age	Aida—Bureau van Dijk database	
Asset tangibility	The ratio between the issuer's Tangible fixed asset and total assets	Aida—Bureau van Dijk database	
Rated	Dichotomous variable equal to 1 if the issue has been rated by a CRA, zero otherwise (unrated issue)	Borsa Italiana website	
Investment-grade	Dichotomous variable equal to 1 if the rating of the issue is "investment grade," zero otherwise (thus if the rating is "speculative grade" or is an unrated issue).	Self-constructed	The investment-grade variable is equal to 1 for a Cerved rating agency score not lower than B1.2; a CRIF score not lower than BBB−; a Fitch score not lower than BBB−; a Moody's score not lower than Baa3; or a S&P score not lower than BBB-, zero otherwise.
Speculative grade	Dichotomous variable equal to 1 if the rating of the issue is "speculative grade," zero otherwise (thus if the rating is "investment grade" or is an unrated issue)	Self-constructed	The speculative-grade variable is equal to 1 for a Cerved rating agency score lower than B1.2; a CRIF score lower than BBB-; a Fitch score lower than BBB−; a Moody's score lower than Baa3; or a S&P score lower than BBB-, zero otherwise.

TABLE B1 (Continued)

Variable	Description	Source	Note
Guarantee	Dichotomous variable equal to one if the bond is secured (with any sort of partial and total guarantee provided by the borrower) and zero otherwise	Borsa Italiana website	
Growth (use of proceeds)	Dichotomous variable equal to one if the issuer declared use of proceeds is funding growth investment projects and zero otherwise	Self-constructed using mini-bond prospectuses	The use of proceeds is classified as a growth project when mini-bonds prospectuses indicate: organic internal growth, growth through mergers and acquisitions, or via international projects.
Other variables			
Time to maturity	Time between the issue date and the maturity date, in days	Borsa Italiana website	
Interest coverage ratio	The ratio between issuer's EBITDA and its interest expenses	Aida—Bureau van Dijk database	
Current ratio	The ratio between current assets and current liabilities	Aida—Bureau van Dijk database	
EBIT/Sales	The ratio between the issuer's EBIT and its sales	Aida—Bureau van Dijk database	
Debt/Equity ratio	The ratio between the issuer's total debt and equity	Aida—Bureau van Dijk database	
Callable	Dichotomous variable equal to 1 if the issue is callable, zero otherwise	Borsa Italiana website	
Spread Bond/Bund	The spread between 10Y Italian government bonds and 10Y German government bonds	Factset database	

Note: All accounting-based variables are computed using the last available issuer financial report data before the date of the bond issuance.