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THE LOAN COST ADVANTAGE OF PUBLIC FIRMS AND FINANCIAL MARKET CONDITIONS: EVIDENCE FROM THE EUROPEAN SYNDICATED LOAN MARKET

by Raffaele Gallo[*]

Abstract

This paper analyses the relationship between financial market conditions and the loan cost advantage of being a public firm, verifying whether the borrowing costs for public companies are more sensitive to the financial market climate than those of private firms. The analysis examines the spread of syndicated loans granted to European non-financial firms between 2004 and 2016. The results indicate that a rise in financial instability, proxied by the VSTOXX index, leads to an increase in loan spreads greater for public borrowers than for private ones. The decline in the loan cost benefit of public firms during high volatility periods is due to a weakening in their bargaining power (bargaining power channel) and in the information benefits of being listed on a market (transparency channel). Moreover, a well-developed stock market in the borrower's home country significantly mitigates the increase in public firms' borrowing costs observed following a worsening of financial market conditions.

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Contents

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1. Introduction[1]

The financial literature has documented that being public is associated with significant benefits for companies (Brav, 2009) and that the borrowing costs in loan markets are significantly lower for public firms than for private ones (Pagano et al., 1998; Saunders and Steffen, 2011). Relying on the credit market literature (Rajan, 1992; Sharpe, 1990), two main reasons may explain why the cost of bank loans is lower for public companies. First, they benefit from a stronger bargaining power with banks due to the availability of a source of funds alternative to bank debt (bargaining power channel). Second, being listed on a stock exchange is associated with a greater transparency that reduces information costs for banks (transparency channel).

However, a deterioration in financial market conditions may negatively affect both channels of the loan cost advantage of public firms. First, the access to markets for public companies may become more difficult, leading to a reduction in the bargaining power that public borrowers can have with banks and, consequently, to a weakening of their funding cost advantage relative to private firms.

Second, the signals on the public firms' creditworthiness conveyed by market prices may become less clear, eroding the information cost savings for banks. In normal times, market prices convey reliable and timely information about public companies; while, in high financial instability periods, negative market swings not only reflect the changes in firms' fundamentals but may also be affected by panic selling, financial contagion, fire sales, and similar market frictions. Consequently, also the advantage deriving from being more transparent may decrease when the financial market climate deteriorates.

Therefore, the borrowing costs for public firms may be more sensitive to the financial market climate than those of private companies, implying that the loan cost advantage of being listed may significantly decline after a rise in financial instability.

This analysis explores the relationship between the loan cost benefit of being a public company and the financial market climate by examining a sample of syndicated loans granted to European public and private firms between 2004 and 2016. The European syndicated loan market represents an ideal setting for this analysis. First, market evaluations are particularly important for syndicate participants because they generally have less private information on the borrower's creditworthiness than bilateral loan lenders. Second, the development of capital markets (i.e. size and liquidity) differs across European countries. Since a greater efficiency of stock markets may be associated

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with an easier access to market funds and lower information costs for investors, it may significantly mitigate the negative impact of a deterioration in financial market conditions on public firms' borrowing costs.

Consistent with the main hypothesis of this work, the empirical analysis shows that the loan cost difference between public and private firms significantly depends on financial market conditions, proxied by the VSTOXX index. When the financial instability level is low (i.e. when the VSTOXX value is below the median), banks apply significantly lower loan spreads to public firms than to private companies, consistent with the significant loan cost benefit of being listed documented in the literature (Pagano et al., 1998; Saunders and Steffen, 2011). However, the loan cost advantage of public firms significantly declines when financial market conditions deteriorate. In the examined high volatility periods (i.e. when the VSTOXX value is above the median), the average loan spreads rose by 7 per cent for private firms and by about 25 per cent for public companies, suggesting that the sensitivity of borrowing costs to the financial market climate is greater for public borrowers than for private ones.

Additional estimates document that a rise in financial instability leads to a reduction in the loan cost advantage of public firms by affecting both the bargaining power channel and the transparency channel.

Moreover, the analysis indicates that, after a deterioration in financial market conditions, public firms established in countries with more developed stock markets experience an increase in loan spreads lower than the one faced by those located in countries with less developed capital markets.

In contrast to the results obtained by examining the cost of loans, a rise in financial instability does not differently affect the amount of syndicated loans granted to public and private borrowers.

The results hold also when adopting a matched sample, controlling for relationship banking effects and the share of secured loans.

This work is related to the literature on the differences among public and private companies (Brav, 2009; Pagano et al., 1998; Saunders and Steffen, 2011; Schenone, 2010) and on the effect of exogenous shocks on the loan cost benefit of public firms (Santos and Winton, 2008). The analysis contributes to these strands of literature by exploring the relationship between the loan cost advantage of being listed and the financial market climate, suggesting that uncertain financial market conditions may represent a potential disincentive for firms to go public.

The main findings contrast with the results of Santos and Winton (2008). Their work documents that an exogenous shock (i.e. a recession) leads to an increase in loan spreads greater for more opaque borrowers (public firms without access to the public bond market) than for more transparent companies (public firms with access to the public bond market) in the US syndicated loan market.

The difference with their results may be due to the fact that Santos and Winton (2008) examine the impact of economic downturns between 1987 and 2002, not associated with significant financial market stress, while this analysis focuses on the effects of changes in financial market conditions.

An additional contribution to this literature is the focus on the European syndicated loan market, which is still partly unexplored because previous works mainly examined the US market. The adoption of a sample of borrowers established in different European states allows taking into account the heterogeneity among financial systems.

The remainder of this paper is organized as follows. Sections 2 and 3 review the related literature and present the research hypotheses. Section 4 describes the sample and the methodology. The main results are summarized in Section 5. Section 6 addresses potential issues employing robustness checks. Section 7 concludes.

2. Review of related research

The literature has extensively explored the benefits associated with being public, documenting that public firms generally have a significant loan cost advantage compared to private companies. Pagano et al. (1998) argue that going public leads to a stronger firms' bargaining position with banks and to a reduction in information asymmetry about the firms' value. Saunders and Steffen (2011) show that borrowing costs are higher for private firms than for public companies in the UK syndicated loan market.

Subrahmanyam and Titman (1999) suggest that the benefits from public financing are relatively greater for firms located in countries with more efficient and developed stock markets (i.e. larger and more liquid) because investors receive valuable information at a lower cost.

Notwithstanding these significant benefits, a strand of literature focuses on the potential determinants of going or remaining private (Bharath and Dittmar, 2010). Consistent with the model of Doidge et al. (2017), the propensity of going public is a function of the benefits and the costs of a listing. If the net benefit falls, listed firms may exit through going-private transactions and fewer companies may go public. Several works have documented that companies may be interested in being more opaque (Marosi and Massoud, 2007) and in avoiding outside scrutiny (Leuz et al., 2008). These studies do not examine the loan cost difference between public and private companies, but they indicate that firms are aware of potential risks connected with being listed.

The literature has also focused on the impact of exogenous shocks, such as recessions, on the loan cost advantage of public firms. Rajan (1992) hypothesize that banks hold an informational monopoly that allows them to increase interest rates to borrowers, mostly to those more opaque, in contexts characterized by high information asymmetry (informational hold-up problem). Consistent

with this hypothesis, Santos and Winton (2008) find that the increase in loan spreads during economic downturns between 1987 and 2002 is lower for US public firms with public bond market access (more transparent) than for US public companies without such access (more opaque). Allen and Paligorova (2015) document that the informational hold-up problem also affects loan amounts. During the 2007 crisis, Canadian banks decided to decrease lending mainly to public firms because they can extract higher returns from more informational opaque borrowers (i.e. private firms).

3. Research Hypotheses

The main hypothesis of this study is that financial market conditions may significantly affect the loan cost advantage of public firms.

When the financial instability level is negligible, public borrowers are able to rely on a funding source alternative to bank debt. Since this alternative source is generally cheaper, they may benefit from a better bargaining position with banks (bargaining power channel).

At the same time, since market prices provide signals about public firms' riskiness on a timely basis, banks are able to monitor and collect information about the creditworthiness of public firms with less effort. As a result, being public may reduce information costs for lenders (transparency channel). This channel does not imply that banks have less information on firms than market investors. More information is publicly available about public firms because being listed on a stock exchange is associated with binding information disclosure requirements (Pagano et al., 1998; Saunders and Steffen, 2011).

These two benefits may increase the loan cost difference between private and public borrowers, leading to a significant loan cost advantage for public firms. However, a worsening of financial market conditions may significantly affect both channels.

First, since a rise in financial instability leads to a lower funding supply and a rise in market spreads,[2] the access to market funding sources for public companies may become more difficult. Consequently, the bargaining power of public borrowers with banks may significantly decline during high financial instability periods, leading to a reduction in the relative advantage of public companies.

Second, a negative financial shock is generally associated with several market frictions (e.g. panic selling, financial contagion, and fire sales) that reduce the information value of stock prices for banks. At least in the short-run, market prices may deviate from fundamentals in extreme market

[2] For example, Goel and Zemel (2018) document that firms issuing traditionally bonds saw a spread increase of 70 per cent, on average, when issuing bonds during US crises between 1988 and 2011 relative to non-crisis times.

situations (see Claessens and Kose (2013) for a review). Since market signals become less clear, information costs for lenders may rise, decreasing the relative advantage of being listed.

Consequently, banks may raise loan spreads relatively more for public firms than for private ones after a rise in financial instability. As a result, the loan cost benefit of public companies may significantly decline in high volatility periods.

The characteristics of the syndicated loan market may strengthen the sensitivity of the loan cost advantage of public firms to the financial market climate. With the exception of arrangers, syndicate participants do not establish a close relationship with the borrower (Howcroft et al., 2014). For private companies, they mainly rely on lead arrangers to evaluate and monitor the borrower's creditworthiness. For public firms, in addition to the information provided by the arranger banks, they can also rely on market evaluations. If the spread at the loan origination significantly diverges from market prices related to the same company, potential lender banks might not accept to participate in the syndicate. Therefore, syndicated loan spreads applied to public firms may be more market-oriented than those charged to private borrowers.

Overall, the first testable hypothesis is:

H1. *After a deterioration in financial market conditions, public firms experience an increase in syndicated loan spreads greater than the one faced by private companies.*

Allen and Gale (2000) document that financial systems significantly vary across countries. The financial system characteristics of the firm's home country have an impact on the choice of external funding sources (Aktas et al., 2019). Financial markets play a significant role in allocating financial resources among firms mainly in market-based financial systems (Demirgüç-Kunt and Levine, 1999), where capital markets are larger and more liquid. As suggested by Subrahmanyam and Titman (1999), well-developed capital markets (i.e. size and liquidity) lowers information costs for investors, raising the advantage of public financing.

Given these premises, the sensitivity of public firms' borrowing costs to financial market conditions may significantly depend on the stock market development of their home country and, therefore, it may greatly differ across Europe. The stock market efficiency may affect both channels of the loan cost benefit of being public. First, public companies established in countries with more developed stock markets may have a relatively easier access to market funds (and at better conditions) than other public firms. Second, more efficient markets may provide clearer signals on public firms' creditworthiness to investors, reducing their information costs (Subrahmanyam and Titman, 1999).

The additional benefits of more efficient capital markets may mitigate the negative effects on public firms' borrowing costs observed in high volatility periods. As a result, the increase in

syndicated loan costs due to a worsening of financial market conditions may be lower for public firms established in countries with more developed stock markets. Thus, the second testable hypothesis is:

H2. *After a deterioration in financial market conditions, public firms established in countries with more developed stock markets experience an increase in syndicated loan spreads lower than the one faced by those located in countries with less developed capital markets*.

4. Data and Methodology

4.1. Data

The examined sample consists of syndicated loans to non-financial firms from EU member states registered in Thomson Reuters LPC's Dealscan from January 2004 to February 2016. The tranches in each deal are treated as different loans. I extract for each loan the all-in-drawn spread, which is the amount the borrower pays in basis points over LIBOR for each loan dollar drawn down (including any annual or facility fees paid by the firm), the granted amount, and the other characteristics (e.g. maturity, type, and purpose).

Accounting information for each borrower is obtained from Bureau Van Dijk's Orbis, using the company name, the country of residence, and other firm information. After the matching procedure between Dealscan and Orbis, the sample consists of 7,184 loans granted to 1,723 firms (572 public companies). Since the focus of the analysis is the spread applied at the loan origination date, the number of observations for each firm depends on the number of loans granted to each borrower.[3] The other financial variables are obtained from Datastream.

Table 1 shows the distribution of loans included in the sample, the number of loans granted to public firms, the mean all-in spread, and the mean amount by country of the borrower. The examined syndicated loans are mostly granted to private companies (about 68 per cent). The borrowers are located in 25 EU Members.[4] UK, France, and Spain are the most represented countries (60 per cent of loans).

The VSTOXX index is the adopted indicator of financial market conditions. This index reflects the market expectations of equity volatility across all EURO STOXX 50 options over the next thirty days. The implied volatility allows adopting a forward-looking perspective, which is in line with the view of lenders. Since syndicate participants and borrowers are frequently not established in the

[3] The potential effects of a different sample composition over the examined period are taken into account by employing the propensity score matching described in Section 4.2.1.

[4] The loans to borrowers located in the other EU countries are excluded for lack of information in Dealscan and Orbis.

same country, an index that takes into account the European equity market volatility is a more appropriate measure of common shocks for the entire area.[5]

Figure 1 shows the daily time series of the VSTOXX index between January 2004 and February 2016. This period represents an appropriate setting for this analysis because the index exhibits large upward and downward swings. The median value over the period is equal to 21.26 (the mean value is 23.31). In the following analyses, the periods in which the VSTOXX value is greater than the median are considered as "high volatility periods".[6]

The Appendix presents the complete list of variables with their relative sources (Table A.1) and the summary statistics comparing the sample of public and private firms (Table A.2).

4.2. Methodology

The model described in Eq. (1) is estimated to test *H1*:

$$Spread_{it} = \beta_0 + \beta_1 Public_{it} + \beta_2 VSTOXX_t + \beta_3 Public \cdot VSTOXX_{it} + \gamma X_{it} + \eta Y_{it} + \theta Z_i + \varepsilon_{it} \quad (1)$$

The dependent variable is the logarithm of the all-in-drawn spread of the loan granted to the *i-th* firm on day *t*.[7] *Public* is a dummy variable equal to 1 if the *i-th* firm is public in *t* and to 0 otherwise. This variable should have a negative sign, consistent with the literature on the loan cost advantage of public firms (Section 2). *VSTOXX* is the value of the VSTOXX index observed two weeks before the loan signing date.[8] Consistent with the literature on the effects of equity market volatility on firms' borrowing costs (Campbell and Taksler, 2003), this variable should have a positive impact on loan spreads. The interaction *Public·VSTOXX* is the main variable of interest. Consistent with *H1*, I expect to find a positive and significant coefficient of this variable.

Furthermore, the model includes three vectors of control variables. First, the vector *X* consists of *Loan Variables* (*RefRate*, *Maturity*, *Secured*, *Covenant*, *Seniority*, *Loan Type*, and *Loan Purpose*).

Second, the vector *Y* (*Borrower Variables*) includes firms' accounting data (*Size*, *Cash Flow*, *Leverage*, *Fixed Assets*), observed in the year preceding *t*; borrowers' industry (*Industry*); stock index returns of the country where the *i-th* firm is established over the thirty days preceding *t*

[5] As a robustness check, qualitatively similar results are obtained by replacing *VSTOXX* with a measure of the historical volatility of each country, estimated as the standard deviation of stock index returns of the country where the *i-th* firm is established over the year preceding *t*.

[6] The results are robust to considering also other thresholds to define high and low volatility periods, such as the mean and the 75th percentile of the distribution of the index.

[7] The model uses the log transformed spread because of the positive skewness of this variable. Firms are unlikely to receive loans having spreads lower than LIBOR (Goss and Roberts, 2011).

[8] The model considers the value of *VSTOXX* observed two weeks before *t* because the loan spread can be modified up to a few days before the loan signing date. Unreported robustness checks indicate that the results are robust to shifting the observation date of *VSTOXX* to one month and one week before the loan signing date.

(*SovStockIndex*), which proxies the current business climate; and the sovereign rating of the *i-th* firm's home country in *t* (*SovRating*). To take into account a measure of the borrower's credit risk, this vector also considers the variable *RiskWeight*, which indicates the risk weight assigned to the *i-th* firm using the Basel 2 standardized approach. Consistent with Alexandre et al. (2014), the borrower's credit rating is converted into a risk weight (from 0 to 1.5) adopting the weighting scale used in the credit risk regulation (a risk weight equal to 1 is assigned to unrated firms). A higher value of this variable indicates a higher companies' credit risk.[9]

Third, the vector *Z* controls for country fixed effects (*Country dummies*).[10] Finally, ε indicates the error term.[11]

4.2.1. Propensity score matching

The methodology presented in Section 4.2 takes into account the differences in the borrowers' characteristics by controlling for the *Borrower Variables*. However, the composition and the characteristics of the examined sample may significantly differ over time because several riskier borrowers (mainly private ones) may not receive loans in high volatility periods. To mitigate potential selection bias and endogeneity issues, I employ a technique based on a propensity score matching combined with a difference-in-differences analysis between the matched samples (Ball et al., 2015; Heckman et al., 1997; Rosenbaum and Rubin, 1983). This method allows examining a sample of firms that have a similar propensity to being public.

First, the borrowers that have not received at least one loan in both high and low financial instability periods (i.e. when the VSTOXX index is above or below the median) are excluded from the sample. Public borrowers are considered as treated, while private companies are included in the control group. The propensity score of each firm is estimated by using *Public* as the dependent variable and the *Borrower Variables* as independent variables. Second, according to the nearest-neighbor matching with replacement, each loan to a public firm in a low financial instability period is matched with the nearest-neighbor loan – in terms of its propensity score – granted to a private company in the same period. After this process, the loans granted to firms without a match are excluded.

[9] Unreported analyses show that the results remain unchanged also including the *i-th* firm's *Z*-score. This variable is not included in the main model because it is not available for a significant subsample of examined firms.

[10] I excluded from the final sample loans granted to companies located in Bulgaria, Estonia, Hungary, Malta, and Slovenia (24 loans) because loans in these countries are granted only to public borrowers or only to private firms.

[11] Qualitatively similar results are obtained by including year fixed effects to take into account the effects of extraordinary times and, following Santos and Winton (2008), also introducing firm fixed effects to consider potential demand-side effects.

Finally, a difference-in-differences analysis is employed by using the matched sample of firms that received loans in both periods.

4.3. Sample Characterization

Table 2 reports a set of descriptive statistics of the borrowers included in the sample, distinguishing between public and private borrowers and between low and high volatility periods. Consistent with the literature mentioned in Section 2, banks apply on average spreads to public firms lower than those applied to private companies. The difference between the mean spreads is significant in both periods, but it is smaller when the financial instability level is above the median. This is a first evidence consistent with *H1*.

Table 2 also shows that the average loan spread applied to private borrowers in high volatility periods is lower than that charged in low volatility times. This reduction may depend on a different composition in the sample of private firms between the two analysed periods, as anticipated in Section 4.2.1. Indeed, the average spread level may be affected by a reduction in the number of riskier private borrowers (i.e. firms that pay high loan spreads) in high volatility periods.

To verify the effect of the different sample composition, I estimate the average loan spreads applied to a sample of public and private borrowers that have received at least one loan in both high and low volatility periods (i.e. the sample adopted in the first step of the matching process described in Section 4.2.1). The estimates, reported in Table A.3 in the Appendix, show that the average loan spread for the private firms included in this sample is higher when the VSTOXX index is above the median, confirming the significant impact of the different sample composition between the two periods. This result supports the inclusion of variables controlling for the borrowers' riskiness in the main model and the adoption of a propensity score matching combined with a diff-in-diff analysis. Table A.3 also indicates that the average loan cost difference between public and private borrowers is smaller in high volatility periods.

As regards the other measures, Table 2 indicates that the average size of syndicated loans is significantly greater for public borrowers than for private ones. The difference in the loan amount remains substantially similar in both periods.

Public firms are more frequently rated and larger than private companies. They also show greater fixed assets, lower leverage and risk weights. These differences in the firms' characteristics are significant in both analysed periods and reflect those already observed in the literature cited in Section 2. Overall, as expected, public companies are characterized on average by lower riskiness compared with private borrowers.

5. Results

This section presents the main results. First, I examine the relationship between the loan cost advantage of public firms and financial market conditions (*H1*). Second, I explore the bargaining power channel and the transparency channel. Third, I analyse the impact of the stock market development on the sensitivity of public firms' borrowing costs to financial market conditions (*H2*). Finally, I verify whether a change in the financial market climate differently affects the loan amount granted to public and private borrowers.

5.1. The loan cost advantage of public firms and the financial market climate

Table 3 reports the results from the estimation of Eq. (1). Column (1) indicates that public companies benefit on average from a significant loan cost advantage compared to private firms, consistent with the related literature (Pagano et al., 1998; Saunders and Steffen, 2011). However, financial market conditions significantly affect this benefit. Consistent with *H1*, an increase in *VSTOXX* of one standard deviation (8.64 units) reduces by 10 per cent the loan cost advantage of being public.[12] This result implies that a rise in financial instability leads to an increase in loan spreads greater for public firms than for private companies.

To better clarify the economic sense of the results, I replace the variable *VSTOXX* with *HighMktVol*, which is a dummy variable equal to 1 if the VSTOXX value observed two weeks before *t* is greater than the median over the examined period. The results of this test are reported in column (2). In low volatility periods (i.e. the VSTOXX value is below the median) the average spread of loans to public firms is about 14 per cent lower than that applied to private companies. In high volatility periods the average loan spreads rise by 7 per cent for private firms and by about 25 per cent for public companies.[13] Therefore, in high financial instability periods, public firms experience an increase in loan spreads that is 18 per cent greater on average than the one faced by private companies.

Column (3) of Table 3 shows the results of Eq. (1) estimated by replacing *VSTOXX* with *BotMktVol* (dummy variable equal to 1 if the VSTOXX index value observed two weeks before *t* is in the lowest tercile of the empirical distribution of the index) and *TopMktVol* (dummy variable equal to 1 if the VSTOXX index value observed two weeks before *t* is in the highest tercile of the empirical distribution of the index). The second tercile is the omitted group.

This test shows that the loan cost advantage of public borrowers is significantly greater when financial instability is in the lowest tercile, as suggested by the negative coefficient of

[12] Using the estimates in column (1): 8.64·0.012·100= 10.37.
[13] Using the estimates in column (2): (0.07+0.18)·100= 25.

Public·BotMktVol. In contrast, the positive coefficient of *Public·TopMktVol* confirms the negative relationship between financial instability and the loan cost benefit of being public.

Finally, column (4) presents the results of Eq. (1) estimated as a difference-in-differences regression using the matched sample. The results hold also employing this methodology. The coefficient of *Public·VSTOXX*, in fact, remains significant and positive.[14] Unreported analyses confirm that the results obtained by adopting the matched sample are robust to replacing *VSTOXX* with the other key explanatory variables.

With respect to control variables, the signs of the coefficients are consistent with the literature. Banks apply lower spreads to larger borrowers and those with lower risk weights. Lower spreads are also charged to firms located in countries with better sovereign ratings. The positive sign of the coefficient of *Secured* might seem a puzzling result. However, consistent with the related literature (Booth and Booth, 2006), the positive sign of the coefficient suggests that collateral in the syndicated loan market is mainly required for loans granted to riskier borrowers.[15]

5.2. The two channels of the loan cost advantage of public firms

This section explores the channels through which a rise in financial instability may reduce the loan cost advantage of public firms: the bargaining power channel and the transparency channel. Consistent with the literature (Saunders and Steffen, 2011), the baseline model is augmented with a control variable for each channel and with an interaction between these variables and *VSTOXX*.

This section focuses on the subsample of loans granted to public firms for exploiting the heterogeneity in the sensitivity of borrowing costs to financial market conditions among public borrowers. By analysing this subsample, I am able to take into account the swings of public firms' stock prices by adding as control variables *StockReturn* (the quarterly returns of the *i-th* firm's stock in the quarter preceding *t*) and *StockVolatility* (the *i-th* firm's stock volatility estimated as the standard deviation of stock returns over the year prior to *t*). Therefore, this allows excluding that the following results are due to differences in the creditworthiness across public companies.[16]

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[14] The significance of the *Public·VSTOXX* coefficient is lower in this model. This result is likely due to the reduction in the number of observations and to the lower variability of *VSTOXX* in the matched sample.

[15] Booth and Booth (2006) show that a low-quality borrower may decide to pledge collateral to obtain a lower rate on a particular loan. In this case, the applied spreads may differ across the loans granted to the same firm. As a result, borrower-level variables (e.g. accounting variables and *RiskWeight*) cannot capture this source of heterogeneity. Therefore, *Secured* allows considering the differences between secured and unsecured loan pricing. Section 6.2 presents a discussion on the potential impact of secured loans on the main results.

[16] In unreported robustness checks, the same models are estimated by including in the sample only the public borrowers that have received at least one loan in high or low financial instability periods. These tests confirm that the results of both channels are robust to controlling for a different composition in the examined sample of public firms between low and high volatility periods.

5.2.1. The bargaining power channel

The bargaining power may differ across public firms. The literature has underlined that the concentration of credit may represent an indicator of the bargaining position of the borrower. A higher concentration may imply greater costs for borrowers of switching to different lenders (Ioannidou and Ongena, 2010; Rajan, 1992), leading to a greater hold-up power for banks. Therefore, a higher concentration of credit implies a lower bargaining power (Pagano et al., 1998).

Public firms with a lower concentration of credit may have a greater loan cost advantage with respect to other public companies, consistent with the bargaining power channel. However, as predicted by *H1*, this relative advantage may depend on financial market conditions. Therefore, if the observed reduction in the loan cost advantage of being public is related to an impairment of the bargaining power channel, public firms with a greater bargaining power will experience an increase in loan spreads greater than the one faced by other public companies after a rise in financial instability.

Consistent with the literature on the syndicated loan market (Dennis and Mullineaux, 2000; Goss and Roberts, 2011), I estimate the loan concentration as the log of the ratio of the deal amount to the deal amount plus total debt of the *i-th* firm in the year preceding *t*.[17] This variable is estimated at the syndicated loan level, therefore it measures the bargaining position of the *i-th* borrower with the loan syndicate.

I identify the public firms with a greater bargaining power by including the variable *HighBargPower*, which is a dummy variable equal to 1 if the log of the ratio of the deal amount to the deal amount plus total debt of the *i-th* firm in the year preceding *t* is below the median and 0 otherwise.

Column (1) of Table 4 shows the results of Eq. (1) estimated by considering only loans to public firms and substituting *Public* with *HighBargPower*. Public companies with a greater bargaining power benefit on average from lower borrowing costs, as indicated by the negative coefficient of *HighBargPower*. However, the loan spreads applied to these firms are more sensitive to financial market conditions. The significant positive coefficient of *HighBargPower·VSTOXX* suggests that, after a rise in financial instability, public companies with a greater bargaining power experience an increase in loan spreads greater than the one faced by other public companies. This result suggests that a worsening of financial market conditions reduces the loan cost advantage of public firms through the bargaining power channel.

[17] Therefore the loan concentration is estimated as: Deal Amount/(Deal Amount + Total Debt). A caveat is that information on the overall credit granted to the borrower by each syndicate participant (e.g. bilateral loans) is not available.

In addition, consistent with the financial literature, lower returns and higher volatility of public firms' stocks lead to greater loan spreads, as indicated by the coefficients of *StockReturn* and *StockVolatility*.

5.2.2. The transparency channel

The second channel is related to the lower information costs for lenders that assess the creditworthiness of public borrowers. The degree of transparency may differ across public companies. Lenders have more timely information about larger public borrowers because these firms disclose more information compared with smaller ones (Saunders and Steffen, 2011). Large companies are scrutinized by more analysts and are included in stock market segments with more binding disclosure requirements. Therefore, the information costs about large firms' creditworthiness are significantly lower. Also in this case, *H1* predicts that this channel is affected by a change in the financial market climate. If the observed reduction in the loan cost advantage of being public is related to the transparency channel, a deterioration in financial market conditions will lead to an increase in loan spreads greater for larger public firms than for smaller ones.

To employ this test, I replace in Eq. (1) *Public* with *Large*, which is a dummy variable equal to 1 if the *i-th* firm size is above the median in *t* and 0 otherwise.[18]

Column (2) of Table 4 shows the results of this model estimated by considering only loans to public firms. As expected, banks apply lower spreads to large firms. The significant positive coefficients of *Large·VSTOXX* suggests that large public firms experience an increase in loan spreads greater than the one faced by other public companies after a rise in financial instability. This confirms that the reduction in the loan cost advantage of public firms is also related to the transparency channel.

The inclusion of *StockReturn* and *StockVolatility* allows excluding that the main findings are driven by differences in the creditworthiness between larger and smaller public firms. Indeed, I have verified that large firms' stock returns were not significantly lower than those of other public companies. Similarly, their stocks were not significantly more volatile.

In unreported analyses, I have verified that the results remain unchanged by considering firms with a credit rating as the most transparent borrowers.

5.3. Stock market development

This section explores the impact of the stock market development on the sensitivity of public firms' borrowing costs to financial market conditions, discussed formulating *H2*.

[18] In this model I exclude *Size* from the vector of borrower control variables.

To identify countries with more developed capital markets, in line with the related literature (Aktas et al., 2019; Levine and Zervos, 1998), I adopt an index estimated as the ratio of the aggregate stock market capitalization to the corresponding country GDP. I retrieve this index from the Global Financial Development Database (GFDD) of the World Bank for each country included in the sample. A greater ratio of the index indicates a greater stock market development. Second, following Aktas et al. (2019), I estimate *MktDev*, which is a dummy variable equal to 1 if the *i-th* firm is located in a country in the highest tercile of the empirical distribution of the stock market development index. The terciles are computed each year to obtain a time-varying dummy variable for each country.[19]

To test *H2*, I estimate the model described in Eq. (2) by considering only loans to public firms:

$$Spread_{it} = \beta_0 + \beta_1 MktDev_{it} + \beta_2 VSTOXX_t + \beta_3 MktDev \cdot VSTOXX_{it} + \gamma X_{it} + \eta Y_{it} + \theta Z_i + \varepsilon_{it} \quad (2)$$

The variable of interest is *MktDev·VSTOXX*. This model includes as additional borrower control variables *StockReturn* and *StockVolatility*, defined in Section 5.2.

Column (1) of Table 5 shows the results of Eq. (2). The positive coefficient of *MktDev* suggests that, holding else equal, public firms located in countries with more developed stock markets pay on average higher spreads than the other examined public companies. This result might be due to the significant differences between bank-based and market-based systems (Demirgüç-Kunt and Levine, 1999). The activities of banks are not limited to lending, but they also include the offering of multiple services to customers (i.e. cross-selling). This policy is associated with significant informational economies of scope that lead to discounted loan costs (Drucker and Puri, 2005). Indeed, the pricing of each service is affected by the contemporaneous selling of multiple products. These benefits may be mostly significant for borrowers in bank-based systems, given their greater reliance on financial institutions.[20]

The interaction *MktDev·VSTOXX* has a significant negative sign. After an increase in *VSTOXX* of one standard deviation (8.64 units), the average loan spreads rise by 17 per cent for public firms

[19] As a robustness check, I replicated the analysis by distinguishing countries with bank-based and market-based systems. To identify the financial structure of each country, I adopted the classification of Demirgüç-Kunt and Levine (1999). Therefore, I estimated a dummy variable equal to 1 if the *i-th* firm is located in a country identified as market-based by Demirgüç-Kunt and Levine (1999). The results hold also adopting this variable.

[20] This result does not exclude that the overall borrowing costs for public firms located in countries with more developed stock markets might be lower compared to those of the other public companies. Indeed, since this analysis focuses only on the spreads applied in the syndicated loan market, it does not consider the potential benefits in terms of lower public financing costs related to being established in countries with more developed financial markets (Subrahmanyam and Titman, 1999). However, given that the goal of this test is to assess the different sensitivity of public firms' borrowing costs to financial market conditions, a deeper analysis of the differences between bank-based and market-based systems is beyond the scope of this work.

located in countries with less developed stock markets and by 9 per cent for those established in countries with more developed capital markets.[21] Therefore, consistent with *H2*, the development of capital markets mitigates the increase in public firms' borrowing costs observed following a deterioration in financial market conditions. Other findings remain unchanged.

In addition, I explore the relationship between the stock market development in the firm's home country and the two channels of the loan cost advantage of being public. To employ this test, I estimate two versions of Eq. (2) by interacting *MktDev·VSTOXX* with *HighBargPower* and *Large*, alternatively.

Columns (2) and (3) of Table 5 present the results of this test. The negative coefficient of the triple interaction *MktDev·VSTOXX·Large* indicates that, after a rise in financial instability, large public firms located in countries with more developed stock markets experience an increase in loan spreads lower than the one faced by other public companies. In contrast, the coefficient of *MktDev·VSTOXX·HighBargPower* is not significant at the considered levels. These results suggest that a greater market efficiency mitigates the increase in public firms' borrowing costs associated with a worsening of financial market conditions mainly through the transparency channel.

5.4. The amount of syndicated loans

Previous tests focused on the cost of syndicated loans. This section verifies whether a change in financial market conditions also differently affects the loan amount granted to public and private borrowers. To employ this test, Eq. (1) is estimated by using *Amount*, which is the logarithm of the loan amount granted to the *i-th* firm on day *t*, as the dependent variable.[22]

Column (1) of Table 6 shows the results of this test. Controlling for borrower and loan characteristics, the amount of syndicated loans granted to public firms is not significantly greater on average than that extended to private companies. The negative coefficient of *VSTOXX* indicates that a rise in financial instability lowers the amount of syndicated loans. However, the estimates do not show a different sensitivity of the loan amount to financial market conditions between public and private borrowers. The results remain substantially unchanged by using the matched sample in column (2).

Therefore, these results document that a change in financial market conditions does not differently affect the loan amount granted to public and private firms. However, this analysis does not take into account the full loan portfolio of each bank; consequently, it does not allow verifying

[21] Using the estimates in column (1): 8.64·0.02·100= 17.28; 8.64·(0.02-0.01)·100= 8.64.
[22] Qualitatively similar results are obtained by using the ratio of the loan amount to total assets of the *i-th* firm as the dependent variable.

whether lenders have decided to decrease lending to a specific category of firms. As a result, these findings only regard the effect on the size of loans granted to the borrowers included in the sample.

6. Robustness checks

The following sections present a set of robustness checks to confirm the validity of the analysis. First, I take into account relationship banking effects. The second test addresses the potential impact of a greater share of secured loans extended to private firms. Finally, unreported analyses indicate that the results are robust to adding an interaction between each *Borrower Variable* and *VSTOXX*. This test allows excluding that the observed effect is due to a change in the average value of the borrowers' characteristics in high volatility periods.[23]

6.1. Relationship banking effects

This section verifies whether the main findings are driven by relationship banking effects. Lenders with a stronger relationship with their borrowers (relationship lenders) can insulate them against exogenous shocks as part of a multi-period relationship (Berlin and Mester, 1999; Bolton et al., 2016). The benefits of close bank-firm relationships may be particularly sizeable for private companies (Bosch and Steffen, 2011; Saunders and Steffen, 2011). Since they have reduced access to non-bank finance, private firms may be more likely to be relationship borrowers (Bosch and Steffen, 2011; Saunders and Steffen, 2011).

The differential treatment between relationship and transactional loans may affect the results. After an exogenous shock (e.g. a rise in financial instability), relationship banks may raise loan spreads to private borrowers at a slower pace to preserve their relationships. As a result, the lower rise in loan spreads observed following a worsening of financial market conditions for private firms might be due to a stronger relationship with their lenders compared to that established by public borrowers.

To employ this test, I identify lenders with previous relationships with the same borrower.[24] I focus on arranger banks because they evaluate the borrower quality, negotiate loan contract terms, and, only after this process, invite other syndicate participants to acquire a loan share (Giannetti and Laeven, 2012). The arrangers that were at least in one syndicate of a loan granted to the same borrower before the current loan are considered as the relationship lenders. A caveat of this analysis

[23] Unreported analyses indicate that the results hold by taking into account the presence of foreign lenders in the loan syndicate.
[24] Previous bank-firm relationships also include the syndicated loans that were no longer outstanding in *t*.

is that, in line with the related research on syndicated loans, it cannot control for previous relationships unrelated to the syndicated loan market (e.g. bilateral loans).

To take into account the effects of relationship banking, I add in Eq. (1) *Relationship*, which is a dummy variable equal to 1 if the arranger was in a syndicated loan granted to the *i-th* firm prior to the current loan,[25] and an interaction between this variable and *VSTOXX*.

For loans with more than one arranger, each loan is considered multiple times to capture differences across the arrangers (Adelino and Ferreira, 2016; Santos, 2011). In addition to other control variables, I also include *Share* (the share of the loan to the *i-th* firm held by each arranger), *NumLenders* (the number of lenders in the loan syndicate), and bank-firm fixed effects.

Table 7 shows the results of this test.[26] Column (1) presents the estimates obtained by estimating the model without interactions between relationship banking variables and *VSTOXX*. The negative coefficient of *Relationship* indicates that relationship lenders apply on average lower loan spreads to their borrowers. This result is consistent with the literature that finds evidence of lower cost of credit for the borrowers that establish a stronger relationship with their lenders (Berger and Udell, 1995; Bharath et al., 2011).

More concentrated syndicates (i.e. high shares held by each arranger and a low number of participants) are positively related to loan spreads because, as documented in the literature (Bosch and Steffen 2011; Sufi 2007), the syndicates of loans to more opaque borrowers are significantly smaller and more concentrated.

Column (2) of Table 7 introduces the interaction *Relationship·VSTOXX* to verify whether the effects of relationship banking change after a rise in financial instability. The interaction variable does not have a significant impact on loan spreads, implying that banks with longer relationships with their borrowers do not charge different spreads than other lenders after a change in financial market conditions.

The coefficient of *Public·VSTOXX* remains significant in both columns, confirming that the main findings remain unchanged also taking into account the effects of relationship banking. The results hold also when including bank-firm fixed effects, implying that the findings are robust to considering the same firm that receives a loan from the same bank over the examined period.[27]

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[25] In unreported analyses, I obtained qualitatively similar results by considering: *i*) a dummy variable equal to 1 if the arranger was in a syndicated loan granted to the *i-th* firm within 5 years prior to the current loan; or *ii*) a variable estimated as the logarithm of 1 plus the number of loans granted by the arranger to the *i-th* firm within 5 years prior to the current loan.

[26] Reported standard errors are clustered at the bank-firm level. Qualitatively similar results are obtained by clustering at the country level and at the bank and firm levels.

[27] Qualitatively similar results are obtained by replacing bank-firm fixed effects with bank-time fixed effects. The inclusion of the latter controls allows taking into account potential changes in the funding conditions and in the characteristics of lenders.

Unreported analyses indicate that the benefits of stronger bank-firm relationships do not affect the results obtained by testing *H2*.

6.2. Secured loans

An additional concern not ruled out by previous tests is the potential effect of a greater share of secured loans extended to private firms in high financial instability periods. In these periods banks might ask more frequently collateral to riskier borrowers (i.e. private companies). This effect may drive the results because, holding all else equal, greater collateral leads to lower loan spreads.

To address this potential issue, the main model is estimated by introducing an interaction between *Secured* and *HighMktVol*.[28] This test allows taking into account a potential change in the secured loan share between low and high volatility periods.

Column (1) of Table 8 shows the results of this test. The increase in loan spreads during high volatility periods is lower for secured loans, as suggested by the negative sign of the coefficient of *Secured·HighMktVol*. However, the main results hold also when including this variable.

7. Conclusions

This work analyses the relationship between the loan cost advantage of being public and financial market conditions. The results indicate that the loan spreads applied to public firms may be more sensitive to the financial market climate than those charged to private companies. In low volatility periods, banks apply significantly lower loan spreads to public companies than to private ones. However, the loan cost benefit of being a public firm significantly declines when financial market conditions deteriorate. The analysis suggests that a rise in financial instability decreases the loan cost advantage of public companies by weakening their bargaining power (bargaining power channel) and by reducing the benefits of being more transparent (transparency channel).

The sensitivity of loan spreads to the financial market climate differs across countries. Indeed, public firms established in countries with more developed stock markets experience a lower increase in loan spreads after a rise in financial instability.

The main findings are robust to adopting a matched sample, controlling for relationship banking effects and the share of secured loans. In contrast, a worsening of financial market conditions does not differently affect the amount of syndicated loans granted to public and private borrowers.

[28] I adopt the variable *HighMktVol* in this test because lenders may ask collateral mainly during prolonged periods of high volatility, such as those in which the dummy *HighMktVol* is equal to 1. However, the results are robust to replacing *HighMktVol* with *VSTOXX*.

Overall, a rise in financial instability may increase the cost of being public. Consistent with the model of Doidge et al. (2017), a reduction in the net benefit of being listed lowers the propensity to go public. As a result, this analysis may shed light on a potential disincentive for going or remaining public. However, a listing on a stock exchange leads to several benefits for companies, such as an improvement in their capital structure (Brav, 2009), that remain noticeable over time. Therefore, the findings of this paper do not imply that uncertain financial market conditions nullify the net benefit of being public for European firms, mainly for those located in countries with developed capital markets.

These findings point to avenues for future research. As pointed out in Section 3, the characteristics of the syndicated loan market may increase the sensitivity of the loan cost advantage of being public to the financial market climate. In addition, firms with access to the syndicated loan market have different characteristics (i.e. greater size) than other firms in the credit market. Therefore, future research may explore the relationship between the loan cost advantage of public firms and financial market conditions by adopting a sample of bilateral bank loan contracts.

Appendix

Table A.1

Variables description.

Variable	Description	Source
Dependent Variable		
Spread	Logarithm of the all-in-drawn spread of the loan granted to the *i-th* firm on day *t*.	Dealscan
Amount	Logarithm of the loan amount granted to the *i-th* firm on day *t*.	Dealscan
Key Explanatory Variables		
Public	Dummy variable equal to 1 if the *i-th* firm is public in *t* and 0 otherwise.	Orbis
VSTOXX	VSTOXX index value observed two weeks before the loan signing date. The index reflects the market expectations of equity volatility by measuring the square root of the implied variance across all EURO STOXX 50 options over the next thirty days.	Datastream
HighMktVol	Dummy variable equal to 1 if the VSTOXX value observed two weeks before *t* is greater than the median over the examined period, 0 otherwise.	Datastream
BotMktVol	Dummy variable equal to 1 if the VSTOXX value observed two weeks before *t* is in the lowest tercile of the empirical distribution of the index, 0 otherwise.	Datastream
TopMktVol	Dummy variable equal to 1 if the VSTOXX value observed two weeks before *t* is in the highest tercile of the empirical distribution of the index, 0 otherwise.	Datastream
HighBargPower	Dummy variable equal to 1 if the log of the ratio of the deal amount to the deal amount plus total debt of the *i-th* firm in the year preceding *t* is below the median, 0 otherwise.	Dealscan
Large	Dummy variable equal to 1 if the *i-th* firm size is above the median in *t* and 0 otherwise.	Orbis
MarketDev	Dummy variable equal to 1 if the *i-th* firm is located in a country in the highest tercile of the empirical distribution of the stock market development index, 0 otherwise.	Global Financial Development Database (GFDD)
X: Loan Variables		
RefRate	Loan reference rate (Euribor or Libor) value observed in *t*.	Datastream
Maturity	Months to maturity on the loan.	Dealscan
Secured	Dummy variable equal to 1 if the loan is secured, 0 otherwise.	Dealscan
Covenant	Dummy variable equal to 1 if there are covenants in the loan contract, 0 otherwise.	Dealscan
Seniority	Indicator variables for seniority: *Senior, Mezzanine, Subordinated*. *Senior* is the omitted variable.	Dealscan
Loan Type	Indicator variables for loan typology: *Revolver/Line, Term loan, Bridge loan* and *Other*. *Revolver/line* is the omitted variable.	Dealscan
Loan Purpose	Indicator variables for loan purpose: *Merger & Acquisition, Capital expenditure, Leveraged Buyout, Restructuring, Working capital, Other*. *Merger & Acquisition* is the omitted variable.	Dealscan
Y: Borrower Variables		
RiskWeight	The risk weight assigned to the *i-th* firm using the Basel 2 standardized approach.	Dealscan
SovRating	S&P long-term foreign currency of the *i-th* firm's home country in *t*, mapped into 22 numerical categories (22 is assigned to AAA level and 1 to SD).	S&P
SovStockIndex	Stock index returns of the *i-th* firm's home country over the thirty days preceding *t*.	Datastream
Size	Logarithm of the *i-th* firm's total assets in the year preceding *t*.	Orbis
Cash Flow	Ratio of cash flow to total assets of the *i-th* firm in the year preceding *t*.	Orbis
Leverage	Ratio of total assets minus total equity to total assets of the *i-th* firm in the year preceding *t*: (*Total Assets – Total Equity*)/*Total Assets*.	Orbis
Fixed Assets	Ratio of fixed assets to total assets of the *i-th* firm in the year preceding *t*.	Orbis
Industry	Indicator variables for the *i-th* firm's industry based on 2-digit SIC codes: *Agriculture* (01-09); *Mining* (10–14); *Construction* (15–19); *Manufacturing* (20–39) *Transportation, Commercial, Gas and Electricity* (40–49); *Wholesale* (50–51); *Retail* (52–59); *Financial* (60–69); *Services* (70–89); *Public Administrative* (90-99). *Mining* is the omitted variable.	Dealscan

Z: Country dummies		
Country dummies	Country fixed effects.	Dealscan
Other Variables		
StockReturn	Quarterly returns of the *i-th* firm's stock in the quarter preceding *t*.	Datastream
StockVolatility	The *i-th* firm' stock volatility estimated as the standard deviation of stock returns over the year prior to *t*.	Datastream
Relationship	Dummy variable equal to 1 if the arranger was in a syndicated loan granted to the *i-th* firm prior to the current loan.	Dealscan
Share	Share of the loan to the *i-th* firm held by each arranger.	Dealscan
NumLenders	Number of lenders in the syndicate.	Dealscan

Table A.2

Summary statistics comparing public and private firms.

Variable	Public Firms			Private Firms			Differences	
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Diff. in mean[1]	Diff. in median[2]
Spread *(bp)*	204.72	175.00	164.09	303.92	275.00	182.69	-99.20***	-100.00***
Amount (*mln of euro*)	977.10	300.00	2093.90	250.31	83.26	571.35	726.79***	216.74***
VSTOXX	23.44	21.59	8.52	22.22	20.51	8.67	1.22***	1.08***
HighMktVol	0.52	1.00	0.50	0.45	0.00	0.50	0.07***	1.00***
BotMktVol	0.29	0.00	0.45	0.38	0.00	0.48	-0.09***	0.00***
TopMktVol	0.33	0.00	0.47	0.28	0.00	0.45	0.05***	0.00***
HighBargPower	0.48	0.00	0.50	-	-	-	-	-
Large	0.81	1.00	0.39	-	-	-	-	-
MarketDev	0.32	0.00	0.47	0.40	0.00	0.49	-0.07***	0.00***
RefRate *(%)*	1.62	0.98	1.68	2.05	1.49	1.79	-0.43***	-0.51***
Maturity *(months)*	55.45	60.00	26.96	78.49	72.00	44.17	-23.04***	-12.00***
Secured	0.29	0.00	0.45	0.74	1.00	0.44	-0.45***	0.00***
Covenant	0.09	0.00	0.28	0.04	0.00	0.19	0.05***	0.00***
RiskWeight	0.96	1.00	0.20	1.01	1.00	0.09	-0.05***	0.00**
SovRating	20.62	22.00	2.71	20.72	22.00	2.61	-0.10	0.00
SovStockIndex *(%)*	0.46	0.74	6.17	-0.01	0.50	6.01	0.47**	0.23
Size *(ln)*	14.98	14.88	1.90	11.96	12.35	2.98	3.02***	2.53***
Cash Flow	0.09	0.08	0.08	0.06	0.06	0.46	0.03**	0.02***
Leverage	0.65	0.65	0.30	0.75	0.71	1.70	-0.10*	-0.06***
Fixed Assets	0.65	0.69	0.19	0.57	0.61	0.29	0.08***	0.08***
Rated	0.37	0.00	0.48	0.07	0.00	0.25	0.30***	0.00***
StockReturn *(%)*	2.64	2.22	24.77	-	-	-	-	-
StockVolatility	0.16	0.13	0.11	-	-	-	-	-
Relationship	0.65	1.00	0.48	0.40	0.00	0.49	0.25***	0.00***
Share	0.09	0.06	0.10	0.15	0.11	0.15	-0.06***	-0.05***
NumLenders	18.36	17.00	10.45	12.00	9.00	9.40	6.36***	8.00***

[1] **** Significant at 1%, ** significant at 5%, * significant at 10%* in a *t*-test for means.
[2] **** Significant at 1%, ** significant at 5%, * significant at 10%* in a Pearson χ^2 test for medians.

Table A.3

Loan spreads applied to public and private borrowers that have received at least one loan in both high and low volatility periods.

	Public Firms	Private Firms	Diff[1]
Mean spread (*bp*) in low financial instability periods	174.12	308.47	-134.35***
Mean spread (*bp*) in high financial instability periods	198.59	325.68	-127.09***

1 **** Significant at 1%, ** significant at 5%, * significant at 10%* in a *t*-test for means.

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Tables and figures

Table 1
Distribution of syndicated loans by borrower's country.

Country	N. of loans	N. of loans to public firms	Mean all-in spread *(bp)*	Mean amount *(mln of euro)*
Austria	77	31	189.98	506.11
Belgium	212	55	269.70	850.40
Bulgaria	1	0	450.00	195.00
Cyprus	17	16	236.47	338.69
Czech Republic	30	11	236.82	247.31
Denmark	56	17	275.94	745.11
Estonia	1	1	170.00	43.10
Finland	73	29	230.10	394.76
France	1,134	405	238.15	417.77
Germany	881	336	246.98	821.81
Greece	15	5	253.50	324.55
Hungary	17	0	228.41	329.65
Ireland	98	55	273.36	712.59
Italy	488	132	251.08	488.56
Luxembourg	93	31	282.89	581.98
Malta	3	0	300.00	66.48
Netherlands	494	150	272.10	470.75
Poland	66	25	233.22	347.50
Portugal	47	24	213.21	807.45
Romania	21	4	293.52	148.46
Slovakia	9	4	164.94	170.35
Slovenia	2	2	312.50	147.50
Spain	1,019	303	258.10	369.62
Sweden	188	31	342.44	386.20
United Kingdom	2,142	613	314.69	385.67
Total	7,184	2,280	261.52	411.89

Table 2
Descriptive statistics of the examined sample.

Variable	Low Financial Instability Periods			High Financial Instability Periods		
	Mean Pub. Firm	Mean Priv. Firm	Diff.[1]	Mean Pub. Firm	Mean Priv. Firm	Diff.[1]
Spread *(bp)*	198.18	307.80	-109.62***	210.78	299.24	-88.46***
Amount *(mln of euro)*	986.66	257.96	728.69***	968.33	241.14	727.19***
RiskWeight	0.97	1.01	-0.04***	0.95	1.01	-0.06***
Size *(ln)*	14.89	11.92	2.97***	15.06	11.99	3.07***
Cash Flow	0.09	0.06	0.03	0.08	0.06	0.02***
Leverage	0.66	0.73	-0.07	0.65	0.77	-0.12**
Fixed Assets	0.64	0.56	0.08***	0.66	0.59	0.07***
Rated	0.36	0.06	0.29***	0.38	0.07	0.31***

[1] **** Significant at 1%, ** significant at 5%, * significant at 10%* in a *t*-test for means.

Table 3

The syndicated loan spreads applied to public and private firms.

	(1) *VSTOXX*	*(2)* *HighMktVol*	*(3)* *Top-BotMktVol*	*(4)* *Matched sample*
Public	-0.333***	-0.144***	-0.070	-0.231**
	(0.000)	(0.000)	(0.134)	(0.023)
VSTOXX	0.006***	-	-	0.014***
	(0.001)			(0.003)
Public·VSTOXX	0.012***	-	-	0.009*
	(0.000)			(0.065)
HighMktVol	-	0.074***	-	-
		(0.001)		
Public·HighMktVol	-	0.177***	-	-
		(0.000)		
BotMktVol	-	-	-0.109***	-
			(0.002)	
Public·BotMktVol	-	-	-0.107***	-
			(0.003)	
TopMktVol	-	-	0.028	-
			(0.304)	
Public·TopMktVol	-	-	0.139***	-
			(0.004)	
Loan Variables				
RefRate	-0.147***	-0.145***	-0.144***	-0.170***
	(0.000)	(0.000)	(0.000)	(0.000)
Maturity	-0.001	-0.001	-0.001	0.002*
	(0.354)	(0.268)	(0.288)	(0.063)
Secured	0.447***	0.449***	0.454***	0.372***
	(0.000)	(0.000)	(0.000)	(0.000)
Covenant	-0.036	-0.025	-0.037	0.022
	(0.311)	(0.497)	(0.362)	(0.756)
Borrower Variables				
RiskWeight	1.212***	1.188***	1.193***	0.980***
	(0.000)	(0.000)	(0.000)	(0.000)
SovRating	-0.058***	-0.056***	-0.057***	-0.045***
	(0.000)	(0.000)	(0.000)	(0.000)
SovStockIndex	0.242	0.050	0.164	0.288
	(0.251)	(0.828)	(0.392)	(0.415)
Size	-0.052***	-0.052***	-0.051***	-0.134***
	(0.000)	(0.000)	(0.000)	(0.000)
CashFlow	-0.056	-0.058	-0.062	-0.303*
	(0.250)	(0.214)	(0.191)	(0.065)
Leverage	0.041	0.038	0.039	0.392***
	(0.186)	(0.212)	(0.199)	(0.000)
Fixedassets	-0.015	-0.019	-0.017	-0.014
	(0.843)	(0.798)	(0.817)	(0.942)
Constant	5.658***	5.774***	5.815***	6.158***
	(0.000)	(0.000)	(0.000)	(0.000)
Loan control dummies	*Yes*	*Yes*	*Yes*	*Yes*
Industry dummies	*Yes*	*Yes*	*Yes*	*Yes*
Country dummies	*Yes*	*Yes*	*Yes*	*Yes*
Observations	5676	5676	5676	1913
Adj R-squared	0.536	0.531	0.536	0.594

Column (1) shows the results obtained from the estimation of Eq. (1). In columns (2) and (3), the variable *VSTOXX* is replaced by *HighMktVol* and with *BotMktVol* and *TopMktVol*, respectively. Column (4) shows the results of the difference-in-differences test estimated by adopting the matched sample of firms. The dependent variable is *Spread*, logarithm of the all-in-drawn spread of the loan granted to the *i-th* firm on day *t*. Standard errors are clustered at the country level. Robust *p*-values in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 4

The two channels of the loan cost advantage of public firms.

	(1) *HighBargPower*	*(2)* *Large*
HighBargPower	-0.430***	-
	(0.000)	
Large	-	-0.556***
		(0.001)
VSTOXX	0.011***	0.009**
	(0.005)	(0.014)
HighBargPower·VSTOXX	0.015***	-
	(0.001)	
Large·VSTOXX		0.011***
		(0.005)
StockReturn	-0.164***	-0.157***
	(0.001)	(0.002)
StockVolatility	0.882***	0.990***
	(0.000)	(0.000)
Loan Variables	*Yes*	*Yes*
Borrower Variables	*Yes*	*Yes*
Country dummies	*Yes*	*Yes*
Observations	1956	1956
Adj R-squared	0.602	0.563

Columns (1) and (2) show the results of Eq. (1) estimated by considering only loans to public firms and substituting *Public* with *HighBargPower* and *Large*, respectively. Both models include *StockReturn* and *StockVolatility* as additional control variables. The dependent variable is *Spread*, logarithm of the all-in-drawn spread of the loan granted to the *i-th* firm on day *t*. Standard errors are clustered at the country level. Robust *p*-values in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 5

The syndicated loan spreads applied to public firms by considering the stock market development.

	(1) *Public*	*(2)* *HighBargPower*	*(3)* *Large*
MktDev	0.257**	0.228*	-0.180
	(0.027)	(0.074)	(0.337)
VSTOXX	0.022***	0.015***	0.009***
	(0.000)	(0.000)	(0.004)
MktDev·VSTOXX	-0.013***	-0.011***	0.001
	(0.000)	(0.001)	(0.909)
HighBargPower	-	-0.332***	-
		(0.000)	
Large	-	-	-0.717***
			(0.001)
HighBargPower·VSTOXX	-	0.012**	-
		(0.019)	
Large·VSTOXX	-	-	0.015***
			(0.002)
MktDev·HighBargPower	-	-0.172	-
		(0.215)	
MktDev·Large	-	-	0.473**
			(0.031)
MktDev·VSTOXX·HighBargPower	-	0.005	-
		(0.348)	
MktDev·VSTOXX·Large	-	-	-0.015**
			(0.025)
StockReturn	-0.163***	-0.160***	-0.155***
	(0.001)	(0.001)	(0.002)
StockVolatility	0.861***	0.877***	0.967***
	(0.000)	(0.000)	(0.000)
Loan Variables	*Yes*	*Yes*	*Yes*
Borrower Variables	*Yes*	*Yes*	*Yes*
Country dummies	*Yes*	*Yes*	*Yes*
Observations	1956	1956	1956
Adj R-squared	0.599	0.604	0.566

The table shows the results obtained from the estimation of Eq. (2) by considering only the sample of public borrowers. Columns (2) and (3) show the results of Eq. (2) estimated by interacting *MktDev·VSTOXX* with *HighBargPower* and *Large*, respectively. The dependent variable is *Spread*, logarithm of the all-in-drawn spread of the loan granted to the *i-th* firm on day *t*. Standard errors are clustered at the country level. Robust *p*-values in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 6

The syndicated loan amount granted to public and private firms.

	(1) *VSTOXX*	*(2)* *Matched sample*
Public	0.056	-0.153
	(0.738)	(0.392)
VSTOXX	-0.008*	-0.008
	(0.073)	(0.190)
Public·VSTOXX	-0.001	0.004
	(0.843)	(0.531)
Loan Variables	*Yes*	*Yes*
Borrower Variables	*Yes*	*Yes*
Country dummies	*Yes*	*Yes*
Observations	5541	1867
Adj R-squared	0.478	0.605

The table shows the results obtained from the estimation of Eq. (1) using as the dependent variable *Amount*, logarithm of the loan amount granted to the *i-th* firm on day *t*. Column (2) shows the results of Eq. (1) estimated by adopting the matched sample of firms. Standard errors are clustered at the country level. Robust *p*-values in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 7

The syndicated loan spreads applied to public and private firms by considering relationship banking effects.

	(1) *Baseline model*	*(2)* *Rel. interaction*
Public	-0.274***	-0.270***
	(0.000)	(0.000)
VSTOXX	0.020***	0.020***
	(0.000)	(0.000)
Public·VSTOXX	0.007***	0.007***
	(0.000)	(0.000)
Relationship	-0.107***	-0.133***
	(0.000)	(0.003)
Relationship·VSTOXX	-	0.001
		(0.519)
Share	0.346***	0.346***
	(0.000)	(0.000)
NumLenders	-0.003***	-0.003***
	(0.008)	(0.009)
Bank-firm FE	*Yes*	*Yes*
Loan Variables	*Yes*	*Yes*
Borrower Variables	*Yes*	*Yes*
Country dummies	*Yes*	*Yes*
Observations	38160	38160
Adj R-squared	0.358	0.358

Column (1) presents the results obtained by including in Eq. (1) *Relationship*, *Share*, *NumLenders*, and bank-firm fixed effects. The model reported in column (2) includes the interaction *Relationship·VSTOXX*. The dependent variable is *Spread*, logarithm of the all-in-drawn spread of the loan granted to the *i-th* firm on day *t*. Standard errors are clustered at the bank-firm level. Robust p-values in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 8

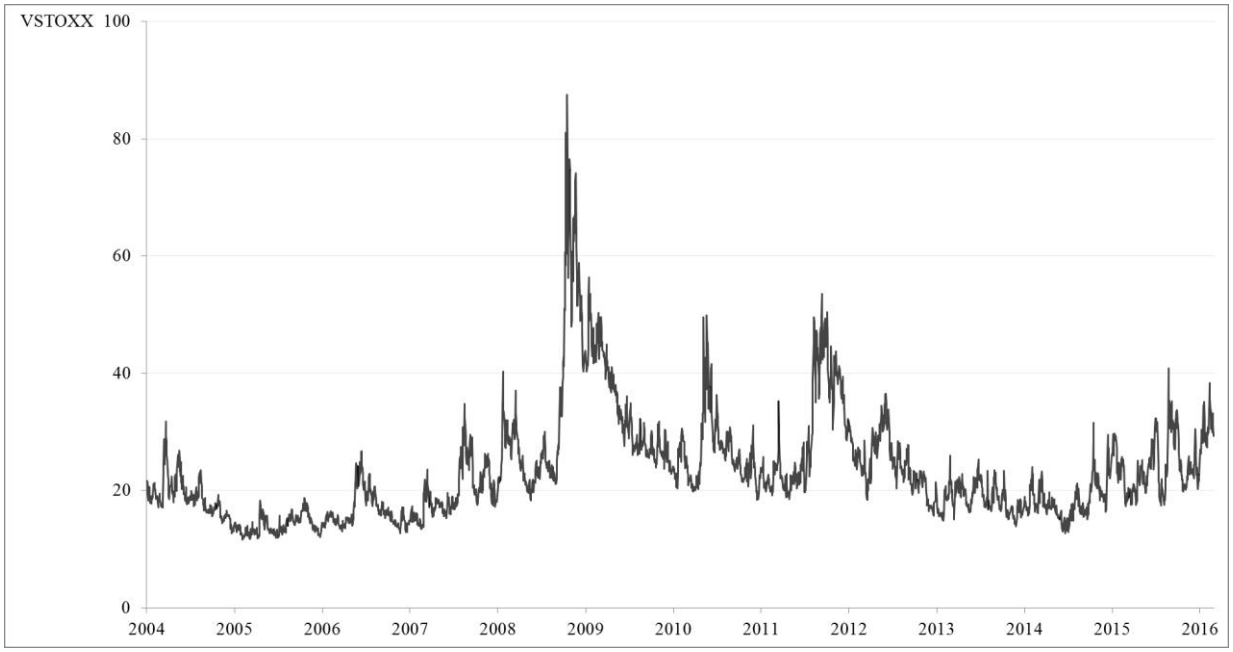
The syndicated loan spreads applied to public and private firms by considering the effect of secured loans.

	(1) *Secured*
Public	-0.099**
	(0.014)
HighMktVol	0.217***
	(0.000)
Public·HighMktVol	0.089**
	(0.011)
Secured	0.550***
	(0.000)
Secured·HighMktVol	-0.204***
	(0.002)
Loan Variables	*Yes*
Borrower Variables	*Yes*
Country dummies	*Yes*
Observations	5676
Adj R-squared	0.534

Column (1) shows the results obtained from the estimation of Eq. (1) by including *Secured·HighMktVol*. The dependent variable is *Spread*, logarithm of the all-in-drawn spread of the loan granted to the *i-th* firm on day *t*. Standard errors are clustered at the country level. Robust *p*-values in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Figure 1

The daily time series of the VSTOXX index between January 2004 and February 2016.



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