

Uncertainty Resolution for Public and Private Firms: Empirical Evidence from the UK Syndicated Loan Market

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Abstract

We examine the impact of uncertainty on loan contract terms for public and private firms in the UK, using the 2016 Brexit referendum as an exogenous shock of uncertainty. We find that uncertainty leads to a higher cost of borrowing for private firms, relative to public firms. However, firm-level foreign exposure, i.e., foreign sales and foreign subsidiaries, mitigates the positive impact of uncertainty on loan prices for private firms. This finding suggests that foreign exposure allows private firms to enhance their access to loan markets under uncertainty. Moreover, uncertainty increases the number of financial covenants in loans for public firms with high information transparency, while there is no significant impact of uncertainty on financial covenants in loans for private firms. Overall, we provide novel evidence highlighting the differences between public and private firms in terms of their access to loan markets under uncertainty.

JEL Classification:

Keywords: Brexit, syndicated loan contracts, foreign exposure, private firms

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1. Introduction

On June 23rd, 2016, voters in the United Kingdom unexpectedly voted to leave the European Union in a referendum. The Brexit vote created considerable uncertainty surrounding the terms of the country's impending exit from the EU (e.g., Campello et al., 2020; Hassan et al. 2020). Financial analysts predicted that the UK's vote to leave the EU would hit economic growth, cause bad loans to rise, and push up funding costs.¹ UK banks were hit hard, with Royal Bank of Scotland, Barclays, and Lloyds Banking Group experiencing double-digit declines in their share prices. Under these circumstances one important question would be the following: How did the uncertainty, which was driven by the Brexit vote, influence the publicly held and privately held firms' access to bank loans?

Prior studies (e.g., Berg et al., 2021; Bloom et al., 2019; Julio and Yook, 2012; Bloom, 2009) show that uncertainty shock can lead to a reduction in the volume of loans as well as a decline in investment and hiring as the real option value of waiting increases due to the lower predictability in the future course of the economy. Further, uncertainty can cause a decline in overall productivity and lead to a higher dispersion in the firms' productivity before uncertainty is resolved (Bloom, 2009). Such a change in the distribution of productivity could push more firms into the left tail of the distribution leading to an increase in default risk (Bloom, 2014; Brand et al., 2019). Consistent with these arguments, prior studies find that uncertainty is related to higher credit spreads for syndicated loans and corporate bonds in public firms

¹ For instance, see 'Three Years of Uncertainty: Charting How Brexit Has Shaped U.K. Financial Markets' <https://www.wsj.com/articles/three-years-of-uncertainty-charting-how-brexit-has-shaped-u-k-financial-markets-11571917532>. Also, see 'UK banks suffer big share drops after EU referendum result' at <https://www.ft.com/content/8750bc92-3a02-11e6-9a05-82a9b15a8ee7>.

(Francis et al., 2014; Ashraf and Shen, 2019; Kaviani et al., 2020). In this study, different from prior research, we examine the effect of uncertainty on loan contracts for both public and private firms.

Extant literature has overlooked how the effect of uncertainty on loan contracts might differ for public and private firms. To our knowledge, ours is the first study that analyses how uncertainty affects the design of syndicated loan contract terms for public and private firms. More specifically, we investigate whether a firm's public status mitigates or exacerbates the impact of the uncertainty shock on loan contracts using the Brexit vote as an exogenous uncertainty shock for UK firms. Similar to other countries, private companies in the UK represent a significant portion of the UK's production base, which motivates us to improve our knowledge about their access to the syndicated loan market under uncertainty and explore potential differences compared to public firms.²

Public firms and private firms differ in various ways including ownership structure (e.g., the presence of institutional investors), disclosure requirements, their access to capital markets, and corporate financial policies (Saunders and Steffen, 2011; Michaely and Roberts, 2012; Farre-Mensa, 2017; Schauer et al., 2019; Mortal et al., 2020; Mason and Stegemoller, 2022).

² In our sample of analysis, we observe that 42% of the loan facilities are issued to private firms. The substantial share of private firms in the UK syndicated loan market might not be surprising considering the recent trend of decline in the number of public firms in the UK and the US (Stulz, 2018). Thus, it is important to ask how private and public firms differ in terms of their access to the syndicate loan market under uncertainty.

Compared with private firms, public firms are subject to higher disclosure requirements.³ In addition, public firms have less information asymmetry than private firms as they have higher coverage by financial analysts (e.g., Mortal and Reisel, 2013) and they are less likely to be financially constrained. Their access to alternative sources of financing other than bank loans helps public firms with higher bargaining power over bank lenders, which can lead to favourable contract terms (e.g., Pagano, 1998; Saunders and Steffen, 2011). Consistent with these arguments, Saunders and Steffen (2011) find that private firms on average pay higher prices on their loans in the syndicated loan markets.

Building on the prior literature highlighting differences between public and private firms, we investigate how uncertainty influences public and private firms' access to syndicated loan markets, which are viewed as a major source of financing. As uncertainty reduces the predictability of a firm's future outcomes, investors become more reluctant to provide financing. Given that private firms have more information asymmetry and less bargaining power than public firms (e.g., Nagar et al., 2019; Im et al., 2020), they can experience a higher cost of borrowing than public firms under uncertainty. We, therefore, predict that the discrepancy in the costs of loans between public and private firms can be even more pronounced during the period of uncertainty.

³ See, for instance, *Continuing obligations for companies listed in the UK*, PWC : <https://www.pwc.co.uk/audit-assurance/assets/pdf/continuing-obligations-for-uk-listed-companies-2017.pdf>

However, relationship lending might play an important role in firms' access to financing under uncertainty, which could be particularly valuable for private firms compared to public firms as they are more informationally opaque (López-Espinosa et al., 2017; Berger et al., 2005). Through repeated lending, lenders can acquire valuable information from borrowers and offer loans at lower prices (Berger and Udell, 1995). Therefore, relationship lending can potentially mitigate the informational disadvantages of private firms more than those of public firms under uncertainty. Overall, how firms' public status influences their access to syndicated loan markets remains an empirical question.

For our empirical analysis, we collect information on loan contracts from the Loan Pricing Corporation (LPC) Dealscan database, while firm-level information comes from the FAME database. We manually merge the two datasets based on borrowers' names, industries, and addresses. Our final sample contains 402 loan facilities issued to 176 UK borrowers during the period of 2014 to 2018 with non-missing information required in the analysis. We conduct a difference-in-difference type of analysis with the private firms serving as the treated group while the public firms constitute the control group.

Our baseline results show that the cost of borrowing increases following the 2016 Brexit referendum mainly for private firms. This finding is consistent with our prediction that uncertainty influences loan prices for private firms more than those for public firms as private firms are likely to have higher information asymmetry, lower bargaining power, and more limited access to external capital markets. Our baseline results remain robust when we use the entropy balancing method having a covariate balance between public and private firms. Further,

our parallel trend test results show that the increase in the cost of borrowing for private firms indeed emerges after the Brexit referendum and there are no statistically different trends in the loan prices between the two groups (i.e., public and private firms) before the shock.

Next, we explore whether cross-sectional heterogeneities among the public and private firms might drive the different effects of uncertainty on their loan prices. We consider firms' foreign exposure, which could be viewed as a measure of firms' access to external capital markets, information asymmetry, and bargaining power. Firms with foreign exposure can diversify and reduce their dependence on income from a single market (UK). Therefore, they can stabilize their operating performance and enhance their resilience against uncertainty (e.g., Hill et al., 2019). More importantly, foreign exposure can improve firms' access to foreign capital markets, which can increase borrowers' bargaining power in loan contract design. For instance, foreign subsidiaries can enhance information links between firms and foreign investors (Moshirian et al., 2021).

Notably, Jang (2017) shows that firms with foreign subsidiaries had wider access to foreign funding sources which helped them to mitigate the impact of the 2008 financial crisis. In addition, Houston et al. (2017) find that borrowers' foreign assets lower the cost of information acquisition for foreign lenders and increase the likelihood of including a foreign lead lender in a syndicate leading to better loan prices. Therefore, foreign exposure can mitigate the impact of uncertainty on the loan terms through diversification and reduced information asymmetry faced by foreign lenders.⁴ We predict that this impact might be particularly more

⁴ In our sample, we observe that 80% of loan facilities offered to UK borrowers include non-UK lead arrangers.

pronounced for private firms which have relatively more information symmetry, less bargaining power, and more limited access to external capital markets than public firms under uncertainty.

Consistent with our prediction, we find that firm-level foreign exposure, i.e., foreign sales and foreign subsidiaries, mitigates the positive impact of uncertainty on loan prices for private firms. This result is consistent with the view that foreign exposure grants borrowers diversification, reduced information asymmetry, and possibly higher bargaining power. The potential benefits of international diversification seem to dominate the effect of the potential challenges that might be related to future international trade disagreements and regulations on foreign operations when firms face uncertainty following the Brexit Referendum in the UK.⁵

We conduct additional tests to explore whether other cross-sectional differences between public and private firms can explain our baseline findings. We consider firms' access to the bond market, ownership structure in terms of the number of reported shareholders, relationship lending, listing on FTSE100/250 indexes, and the presence of institutional investors as shareholders, which could influence firms' access to syndicated loan markets. As Saunders and Steffen (2011) argue, these factors might be related to both the information asymmetry and the agency conflicts within a firm. Therefore, they could influence the relationship between uncertainty and loan prices. However, when we incorporate these characteristics into our analysis, we find that our baseline results stay robust.

⁵ Bloom et al. (2019), using the survey data, find that firms with more connections to the EU (sales, inputs, workforce) are more likely to rank Brexit as a top source of uncertainty.

Besides the loan price, lenders may as well manage their exposure to uncertainty through non-pricing terms. Prior studies document that static contract terms like loan price may not be efficient because they might not incorporate new information that arrives after a loan contract is designed. This problem is particularly severe when the future outcomes are less predictable. Demerjian (2017) provides a theoretical model illustrating how financial covenants address uncertainty. He considers a set-up where uncertainty exogenously increases without a clear corresponding rise in agency conflicts. Thus, lenders include contingent contract terms, i.e., financial covenants, that can provide opportunities to renegotiate the contract terms as new information signal is revealed after loan initiation but prior to maturity.

Specifically, financial covenants are agreements that require borrowers to maintain their financial figures above or below certain thresholds. Trespassing the thresholds triggers a violation, which results in technical default. Lenders, therefore, reclaim the control rights and can initiate renegotiations to strengthen the contract or waive the violation at discretion. Such contingent contract terms can strengthen contractual efficiency, especially under uncertainty, and facilitate ex-post allocation of control and renegotiations (Demerjian, 2017; Roberts, 2015). We, therefore, predict that lenders demand more financial covenants in loan contracts as they face uncertainty following the Brexit referendum. However, the effective use of financial covenants depends on information transparency (Ball et al., 2015; Nikolaev, 2010; Dou, 2020). Given that there are differences between public and private firms in terms of information transparency, e.g., reliability and quality of their financial statements, lenders can differentiate between public and private firms in terms of how they use financial covenants in their loan contracts.

Our results show that private firms have fewer financial covenants in their loan contracts after the referendum, relative to public firms. This result is consistent with the view that private firms are likely to have more information asymmetry compared to public firms, which can render the use of financial covenants inefficient as the use of covenants relies on the accounting information being informative, especially during a period of uncertainty. We next further explore the heterogeneities in the information transparency among the firms and the use of financial covenants following the Brexit referendum. We find that public firms that are listed in FTSE100/250 indexes, arguably the most informationally transparent firms, have more financial covenants in their contracts following the uncertainty shock. This result provides support for the view that information transparency can facilitate the use of financial covenants. Further, our results show that public firms with higher information transparency are not totally immune to uncertainty, but rather they face a trade-off, i.e., they obtain better loan prices but in exchange, they accept more financial covenants as additional protection for lenders. Similarly, we find evidence that the decline in the use of financial covenants is more pronounced for private firms without institutional ownership, which might experience a higher degree of information asymmetry.

Our study makes four major contributions to the literature. First, our study extends the literature on Brexit (e.g., Bloom et al., 2018; Bloom et al., 2019; Campello et al., 2020), and more broadly the literature on political and economic uncertainty. Prior studies document the adverse real effects of uncertainty on the economic outcomes, i.e., investment, hiring, and productivity, as the option value to waiting and cost of borrowing increase under uncertainty (Bernanke 1983; Bloom 2009; Julio and Yook, 2012; Christiano et al., 2014; Baker et al., 2016;

Brand et al., 2019).⁶ Different from these studies, we examine how uncertainty affects the design of syndicated loan contracts for public and private firms. We provide evidence that uncertainty can increase the costs of borrowing, but the impact of uncertainty on borrowing costs is stronger for private firms than public firms.⁷ Notably, we find that firms' foreign exposure can mitigate the impact of uncertainty on loan prices for private firms. These results complement the findings of Berg et al. (2021), who show that following the Brexit referendum, the syndicated loan issuance for public firms dropped due to a decline in both supply and demand.

Second, our study extends the literature on international diversification. Foreign trade, i.e., foreign exposure, can expose firms to potential fluctuations as cross-border regulations and policies might change for various reasons (Boutchkova et al., 2012). However, foreign exposure can also provide diversification of income sources (Hill et al., 2019), facilitate international information flow, and improve firms' access to foreign capital markets (Jang, 2017; Houston et al., 2017). We provide novel evidence that having foreign exposure, e.g., a subsidiary in a foreign market, grants private firms financial flexibility in their access to funding sources when they face uncertainty.

⁶ On the financial side, there is evidence that equity price commands a risk premium for political uncertainty (Pástor and Veronesi, 2013). Further, uncertainty depresses asset prices by raising the discount rates (Liu et al., 2017; Brogaard et al., 2020).

⁷ Prior studies also find that uncertainty can raise the cost of debt (Francis et al., 2014; Ashraf and Shen, 2019). However, these studies either use only the information on public firms or the aggregated data on the bank level, while we exploit the individual level firm information for both public and private firms.

Third, we contribute to the literature on the role of financial covenants in syndicated loan contracts (Rajan and Winton, 1995; Christensen and Nikolaev, 2012; Damerjian, 2017). For instance, Damerjian (2017) finds that covenant intensity increases with the level of uncertainty for public firms. To our knowledge, we are the first to show that there are differences between public and private firms in terms of how financial covenants are used in loan contracts under uncertainty. In contrast to private firms, public firms with higher information transparency can obtain better loan prices, but in exchange, they accept more financial covenants, which provide additional protection for lenders, with the presumption that their accounting information can accurately signal their creditworthiness.

Fourth, our study extends the literature on the differences between public and private firms. Prior literature documents that public and private firms differ along several dimensions, including their access to external capital markets, dividend pay-out (Michaely and Roberts, 2012), investment (Mortal and Reisel, 2013), innovation (Acharya and Xu, 2017), cash holding (Mortal et al., 2020), environmental policy (Shive and Forster, 2020), and cost of syndicated loans (Saunders and Steffen, 2011). Saunders and Steffen (2011) report that UK private firms experience a higher cost of borrowing than public firms in the UK syndicated loan markets. However, there is no evidence on how loan contract terms evolve for firms depending on their public status under uncertainty.

The remainder of the paper is organised as follows. Section 2 describes the construction of the sample and variables. The empirical model and results are presented in Section 3. Section 4 presents our conclusion.

2. Data and Sample

2.1 Sample Construction

To conduct our analysis, we build our sample based on several sources of data. Our data on loan contracts comes from the LPC DealScan database, which covers a comprehensive set of loan characteristics, including loan price, loan amount, maturity, financial covenants, loan type, and syndicate structure. We extract data for borrowing firm characteristics from the FAME database, which provides the accounting and financial information for both public and private firms that are registered in the UK market. For part of our analysis, we rely on the Refinitiv Deals database for information on bond issuances. DealScan and FAME do not share a common identifier; therefore, we manually merge the two sources of data. Specifically, we begin with all loan facilities whose country of syndication is the United Kingdom during the period from 2014 to 2018.⁸ Our sample initially includes 3,659 loan facilities to 1,471 borrowers, among which 1,273 firms are UK firms. We manually search each UK firm's name in the FAME database and record a link whenever we are confident about its identity based on its name, industry classification, and address. We drop the firms whose information is too ambiguous to prove their identity.

After matching, we have 1,139 UK firms which can be identified in both DealScan and FAME databases. Some firms underwent changes in their names through the sample period, but FAME automatically traces those changes for consistency of firm-specific information. We then extract the financial information for the 1,139 UK firms from FAME, and we further

⁸ Our sample period is similar to that of Berg et al. (2021), which also ends in 2018.

exclude facilities issued to the financial service firms with SIC codes from 6000 to 6999. We also require the loan facilities to be either term loans or credit lines, and the loan spreads are not missing and are based on LIBOR. Our final sample includes 176 firms in the sample that have the non-missing financial information and loan contract information required in the analysis, corresponding to 402 loan facilities.

We further classify our sample into the sub-samples of public firms and private firms. We define a firm to be a public firm if its DealScan variable “PublicPrivate” has a value of “Public”, and similarly for the private firms. However, this variable is static at the time when the data is collected; therefore, it does not account for the changes in the legal form through time. To address this issue, we check the changes in names and the listing status from 2014 to 2018. We note that only three firms out of 176 firms changed their listing status during the sample period.⁹

2.2 Variable Construction

2.2.1 Dependent Variables

⁹ For instance, Alent Plc was delisted and re-registered as a private firm in December 2015, with the new name Alent Limited. Therefore, it is labelled as a public firm before the date, and a private firm after the date. We denote a change from public firm to private firm if the name underwent a change from “PLC” and “Public Limited Company” to “Limited”, “Ltd”, and “LLP”, with the firm underwent delisting during the same time. The firm is therefore re-classified as a public firm if the period is before the date of change. We further re-classify firms to be public firms if the firms were delisted and the period is before the delisting date. We denote a change from private firm to public firm if the name underwent a change from “Limited”, “Ltd”, and “LLP” to “PLC” and “Public Limited Company”, and the firm is currently listed. We re-classify firms to be private firms if the period is before the date of change.

Our dependent variables are the all-in-drawn spread, which measures the cost of loans and the total number of financial covenants in a loan contract. The all-in-drawn spread is measured as the basis points over a certain base rate. We consider the loans whose base rate is LIBOR.

2.2.2 Variables for Foreign Exposure

We construct four proxies for firms' foreign exposure. The first proxy is based on a firm's foreign sales following the prior studies (Boutchkova et al., 2012; Bloom et al., 2019). For each year, we calculate the fraction of a firm's foreign sales over the total sales. We define a firm-year to have positive foreign sales if the fraction is greater than 1%. However, a firm's foreign sales can be affected by the Brexit referendum; to address this issue, we rely on the information before the referendum to construct the variable. We define a dummy variable, *Foreign Sales*, that equals one if a firm had foreign sales in any year of 2013, 2014, and 2015. If a firm has missing information about its foreign sales in the FAME database, we manually check its annual report. Through manual checking, we identify additional 63 firms with their information on whether they had foreign sales from 2013 to 2015 and include them in the sample. In addition, to check the robustness of our results, we construct a second proxy which is the average fraction of foreign sales over the total sales, through the years of 2013 to 2015.¹⁰

Our third proxy is based on a firm's foreign subsidiaries. Prior studies show that the presence of assets in a foreign market can affect a firm's exposure to the Brexit referendum

¹⁰ For some firms, the financial reports mention that they have foreign sales, but do not provide detailed breakdown among countries. For instance, a firm would report sales for "Europe", while does not report how much is in the UK market.

(Hill et al., 2019) and the interaction with foreign lenders (Houston et al., 2017). We extract the information on the firms' subsidiaries from the FAME database and construct a dummy variable *Foreign Subsidiary* that equals one if a UK firm has any subsidiary that is registered outside the UK around the world. Following the same idea, our fourth proxy is the logarithm of one plus the number of foreign countries where a firm has subsidiaries operating. This proxy not only captures the presence of foreign subsidiaries, but also the degree of international expansions.

2.2.3 Control Variables

Following the prior literature, we include a series of control variables in our analysis. The control variables for borrower characteristics include firm size (the logarithm of the total assets), leverage ratio (the sum of long-term debt and short-term liability over the total assets), the ratio of EBITDA to sales (a measurement of profitability), the ratio of bank deposit to total assets (a proxy for the corporate cash holding), tangibility (the ratio of net tangible assets over total assets), capital investment (the ratio of the change in the fixed assets between the current year and previous year over the total assets), sales growth (the ratio of current year's sales over the previous year's sales), riskiness (the logarithm of interest coverage ratio), firm age (the logarithm of firm age in years), and the capital investments (yearly change in fixed assets).

For our analysis of loan facilities, the control variables of facility features include the loan maturity in months, the logarithm of the facility amount in million dollars, the total number of financial covenants, the total number of general covenants, a dummy variable that equals one if a facility contains collateral, a dummy variable if a facility is a refinance loan, a

dummy variable if a facility is a term loan, a dummy variable if a facility is investment grade, and a dummy variable if a facility is not rated. For the analysis of the loan deal features, the control variables include the average loan maturity in the deal, the logarithm of the deal amount in million dollars, a dummy variable that equals one if any facility in the deal contains collateral, a dummy variable that equals one if any facility in the deal is a refinance loan, the total number of general covenants, a dummy variable that equals one if any facility in the deal is investment grade, and a dummy variable that equals one if every facility in the deal is not rated.

2.2.4 Summary Statistics

We present the summary statistics in both the sub-samples of the loans issued by public firms and private firms in Table 1. In Panel A, we present the summary statistics on the loan contract terms at the facility level. We find that facilities issued by private firms, on average, are more expensive in spreads, more likely to be term loans, smaller in size, and more likely to demand collaterals compared to those issued by public firms.

[Table 1 about here]

Next, we compare the firm characteristics of public and private borrowers in Panel B. We observe that private firms in our sample, on average, are smaller in size, riskier in terms of the leverage ratio, and have greater sales growth and tangibility ratio. The differences in profitability, cash holding, logarithm of interest coverage ratio, and capital investments are not statistically significant. In addition, we find that public firms overall have a higher number of reported shareholders and are more likely to have institutional shareholders and are more likely to issue bonds than private firms.

Notably, we find that public firms and private firms differ in terms of their foreign exposure. For instance, 70.7% of public firms in the sample have positive foreign sales before the Brexit referendum, while it is 31.3% of private firms. The average fraction of foreign sales over total sales is also higher for public firms. Similarly, we find that public firms are more likely to have foreign subsidiaries (83.6%) relative to private firms (49.3%). In addition, public firms on average have larger number of foreign countries where they have subsidiaries. Therefore, our summary statistics show that the level of foreign engagement is another dimension among which public and private firms are different. In Section 3.2.2, we investigate whether such heterogeneity can influence public and private firms' access to loan markets under uncertainty.

3. Empirical Results

3.1 Regression Model

In our analysis, we use the Brexit referendum as an exogenous shock of uncertainty to the UK syndicated loan market, to conduct a difference-in-difference analysis. In the first step, we investigate whether the uncertainty shock has a differential impact on the loan spreads for public and private firms. Specifically, we estimate the following regression model:

$$Y = \beta_1 Post\ Brexit_t + \beta_2 Private_i * Post\ Brexit_t + \beta_3 Private_i + \gamma X_{it} + \pi Z + Industry + Purpose + \epsilon \quad (1)$$

In the regression model (1), Y is the dependent variable, which can be the loan spread or the number of financial covenants. $Post\ Brexit$ is a dummy variable that equals one if the loan is

originated after June 23rd, 2016, and zero otherwise. *Private* is the indicator for a firm to be a private firm at the time when the loan was originated, and it equals zero for the public firms. X_{it} is the vector of control variables for the firm-level characteristics, and we use the firms' accounting information that is nearest before the date of loan origination. Z is the vector of control variables on the facility level if the dependent variable is loan spread or the deal level if the dependent variable is number of financial covenants. *Industry* represents the Fama-French 12 industries fixed effects; *Purpose* represents either loan purpose or deal purpose fixed effects depending on the dependent variable. We estimate equation (1) by the OLS estimation, and the standard errors are clustered on the firm level.

3.2 Regression Results

3.2.1 Loan Spreads for Private and Public Firms under Uncertainty

In this section, we investigate the effect of the uncertainty shock on the loan spreads and whether this effect differs between private and public firms. In the Table 2, the dependent variable is the all-in-drawn spread measured in basis points divided by 100. In the column (1), we estimate the regression model (1) with *Post Brexit* only and include firm-level control variables. We find that *Post Brexit* has a positive coefficient, and it is statistically significant at the 5% level. In the column (2), we further include contract term controls, and the coefficient of *Post Brexit* becomes smaller in size but is still statistically significant. This result indicates that loan spreads, on average, are higher after the uncertainty shock, which is consistent with the notion that uncertainty triggers an increase in the default risk of borrowers and makes the assessment of borrowers' creditworthiness more difficult, which causes the lenders to demand higher compensation.

In column (3), we include *Private* and its interaction with *Post Brexit*. By the construction, the dummy variable *Post Brexit* captures the average change in loan spread for the public firms after the referendum, and we find that it has a negative coefficient without any statistical significance. The interaction variable *Private*Post Brexit* has a positive coefficient which is statistically significant at 1%. Therefore, the increase in the cost of loans in column (1) is largely attributed to private firms. Given that the summary statistics show that the average loan spread for private firms is 339.8 bps, the 69.6-bps increase in the loan spread accounts for an increase of 20.5% for private firms, translating to a US\$3.21 million increase in the cost of loans, based on the average facility size. In the column (4), we repeat the regression with quarter fixed effects included while excluding the separately controlled Post Brexit indicator, and our result is qualitatively same. Our results overall provide evidence that being private firms makes the effect of uncertainty more pronounced on the cost of loans, while public firms are overall not affected on the cost of loans.

[Table 2 about here]

3.2.2 Parallel Trend Assumption

The identification in the difference-in-difference analysis relies on the assumption that the treated group (private firms) and the control group (public firms) have similar trends in the pre-shock period. To test whether this assumption holds for our analysis, we divide our sample period into six sub-periods in Table 3, which are the years *2014*, *2015*, *2016 Pre Brexit*, *2016 Post Brexit*, *2017*, and *2018*. *2016 Pre Brexit* denotes the first half of 2016 which is before the Brexit referendum, while *2016 Post Brexit* denotes the second half of 2016 which is after the

Brexit referendum. We use these period indicators to replace the *Post Brexit* indicator in the regressions and include the interactions of each indicator with the *Private* indicator. The *2014* indicator and its interaction with the *Private* indicator are omitted from regressions due to multicollinearity. If the parallel trend assumption holds, we should only observe statistically significant coefficients for the interaction terms after the Brexit referendum.

[Table 3 about here]

We present our results in Table 3. In column (1), we only include the period indicators. We find that the only indicator which has a statistically significant coefficient is *2016 Post Brexit*, while the coefficients of *2015* and *2016 Pre Brexit* are minimal and statistically insignificant. This result suggests that the loan spreads have been stable on average before the referendum, while instantaneously increasing following the referendum. In column (2), we further include the *Private* indicator together with its interactions with the period indicators. Again, we find that the only interaction term which has a statistically significant coefficient is *Private*2016 Post Brexit*. The coefficients of *2015* and *2016 Pre Brexit* remain statistically insignificant, as well as their interactions with the *Private* indicator. This result provides evidence that private and public firms do not have differential trends in the pre-shock loan spreads.

In addition, we also plot the average loan spread for private and public firms in each quarter. We find that loans with different purposes and industries are distributed unevenly through the sample period, and these factors can confound our parallel trend graph. To overcome this, we conduct a regression of loan spreads on the industry and loan purpose fixed

effects only. We then calculate the residuals, which should be net of the industry and loan purpose effects. We call the residuals the residual loan spreads and plot the average residual loan spread for private and public firms in each quarter in Figure 1. Since they are the residuals from a regression, they can take negative values.

[Figure 1 about here]

In Figure 1, we find that the average residual loan spread for private firms remains stable before the date of the Brexit referendum, which is the second quarter of 2016 (2016q2), while a huge spike appears instantaneously following the Brexit referendum. On the contrary, the average residual loan spread for public firms remains stable through the whole sample period. Overall, both our regression results and figure provide evidence that the parallel trend assumption holds in our analysis.

Table 3 and Figure 1 shows that the effect of uncertainty concentrates within a short period of time after the Brexit referendum. To further collaborate our results, we plot the time trend of the Economic Policy Uncertainty (EPU) Index proposed by Baker et al. (2016) in Figure 2. We find that the EPU index has a dramatic spike in the June of 2016, which confirms that economic uncertainty increases following the referendum. The EPU index then drops through the second half of 2016, which can explain why our results concentrate within a short period. We also use the quarterly-averaged EPU index as the measurement of uncertainty and find that most of our empirical results remain qualitatively similar. For brevity, we do not tabulate these results.

3.2.3 Covariate Balance and Entropy Balancing

One potential concern is that differences in firm characteristics between private and public firms may lead to biases in our baseline results because of model dependence (Ho et al., 2007; Hainmueller, 2012). To address this concern, we use the entropy balancing method proposed by Hainmueller (2012). Ho et al. (2007) demonstrate that pre-processing the data to achieve covariate balance can make the estimated treatment effect more robust to potential model misspecifications.

[Table 4 about here]

As the first step, we perform entropy balancing between private and public firms for the firm-level control variables, and we target the balance in the mean.¹¹ We present our results in Table 4. We observe that private and public firms are different among several factors with statistical significance before entropy balancing. We then obtain the weights from entropy balancing and apply the weights to the observations. After re-weighting, the factors are statistically identical between the two groups.

[Table 5 about here]

Next, we estimate the regression model (1) again but with the re-weighted observations. The results are presented in Table 5. We find that our results with re-weighted observations are

¹¹ We also try propensity score matching method such that we use the same set of variables to estimate the propensity score, and we find that we are not able to achieve balance for some variables. In addition, propensity score matching method results in substantial loss of observations in the sample, therefore, entropy balancing method is preferred as it does not reduce the sample size and it balances the mean value of the variables.

qualitatively the same. Therefore, our results are robust to potential misspecification in the function form.

3.2.4 Cross-sectional Heterogeneity: Foreign Exposure and Loan Spreads under Uncertainty

We next investigate the potential channels that could explain the heterogeneous effects of uncertainty on loan spreads between private and public firms. In particular, we examine whether different effects of uncertainty on loan spreads for private and public firms could be due to differences in firms' foreign exposure. Following the previous studies, we use four proxies to measure foreign exposure, as described in Section 2.2.2. We estimate the following regression model:

$$\begin{aligned}
 Y = & \beta_1 \text{Foreign Exposure}_i * \text{Post Brexit}_t * \text{Private}_i + \beta_2 \text{Foreign Exposure}_i \\
 & * \text{Post Brexit}_t + \beta_3 \text{Foreign Exposure}_i * \text{Private}_i + \beta_4 \text{Private}_i \\
 & * \text{Post Brexit}_t + \beta_5 \text{Private}_i + \beta_6 \text{Foreign Exposure}_i + \beta_7 \text{Post Brexit}_t \\
 & + \gamma X_{it} + \pi Z + \text{Industry} + \text{Purpose} + \epsilon \quad (2)
 \end{aligned}$$

In the regression model (2), *Foreign Exposure* can take one out of four proxies of foreign exposure as we defined. We include its triple interaction with the *Private* indicator and the *Post Brexit* indicator, as well as the mutual interactions among the three indicators *Foreign Exposure*, *Private*, and *Post Brexit*, and the stand-alone three indicators.

[Table 6 about here]

We present our estimation results in Table 6. In column (1), the proxy of foreign exposure is *Foreign Sales* indicator. We find that the interaction term *Private*Post Brexit* is positive and statistically significant, which confirms our previous finding. The potential heterogeneity in the effects of uncertainty on loan spreads between private and public firms is captured by the triple interaction of *Foreign Sales*Private*Post Brexit*. We find that the coefficient on the interaction term is negative and statistically significant at the 1% level. This result indicates that, though on average private firms are more affected by uncertainty on loan spreads, having foreign sales can mitigate the effect of uncertainty. In column (2), we repeat our analysis with the *Fraction of Foreign Sales* as the proxy, and we find a qualitatively similar result, though the coefficient on the triple interaction is less statistically significant at the 10% level.

In column (3), we use the *Foreign Subsidiaries* indicator as the proxy for foreign exposure. The triple interaction is negative, but not statistically significant. In column (4), we instead use the *Log (1+Number of Foreign Countries)* where a firm has subsidiaries as the proxy. We find that the triple interaction has a negative coefficient and is statistically significant at the 5% level. This result again provides evidence that foreign exposure can mitigate the effect of uncertainty on loan spreads for private firms.

These results are consistent with the views that international diversification can help firms reduce their default risk, and therefore they can access debt markets at a lower cost relative to those firms without international diversification under uncertainty (e.g., Hill et al., 2019). In addition, foreign operations can facilitate information flow between domestic

borrowers and foreign lenders (Houston et al., 2017; Moshirian et al., 2021).¹² Hence, these firms can access foreign capital markets, which grants them higher bargaining power in loan negotiations. In addition, we observe that foreign exposure is another dimension among which private and public firms are different and this has not been documented by previous studies. Our results highlight that foreign exposure is an important factor that can explain the heterogeneous effects of uncertainty on loan spreads for private and public firms.

3.2.5 Other Differences between Public and Private Firms

In this section, we investigate other aspects where private and public firms could be different in terms of the effect of uncertainty on loan contracts. Previous literature documents that public firms and private firms have notable differences in information transparency, ownership characteristics, and access to external capital markets (e.g., Brav, 2009; Michaely and Roberts, 2012; Mortal et al., 2020). These characteristics may as well influence how uncertainty influences firms' loan prices. In the following analysis, we try to address this issue by controlling for whether a firm has access to the bond market, the ownership structure in terms of the number of shareholders, presence of relationship lending, whether a public firm is listed in FTSE100/250 indexes, and whether a private firm has institutional investors as shareholders. We present our regression results in Table 7 and discuss the results in the following sections.

[Table 7 about here]

¹² As in our sample, 80% of loan facilities contain non-UK lead arrangers.

3.2.5.1 Bond Market Access

Our summary statistics show that public firms are more likely to have access to the bond market compared with private firms.¹³ Access to the bond market can facilitate information flow and grant borrowers higher bargaining power against bank lenders, which can lead to lower cost of loans (Hale and Santos, 2009).

In column (1) of Table 7, our regression model includes *Bond*, which is a dummy variable indicating whether a firm has access to the bond market after 2009. We find that *Private*Post Brexit* has a positive and statistically significant coefficient, which confirms our previous results. In addition, we find that the coefficient for *Bond*Private* is negative and statistically significant at the 5% level. This result indicates that having access to bond market can lower the cost of loans for private firms, which is consistent with the view that access to bond market can reduce information asymmetry and increase bargaining power over lenders. However, the coefficient estimate for *Bond*Private*Post Brexit* is not statistically significant, which indicates that access to bond market does not explain the heterogeneous effect of uncertainty on the loan spreads for private and public firms.

3.2.5.2 Ownership Structure

The ownership structure is another characteristic that public firms and private firms differ, as public firms generally have more diffused shareholder bases. We construct a variable *Log (1+number of shareholders)*, which is the logarithm of one plus the number of reported

¹³ We manually check each firm in our sample in the Refinitiv Deals database for information on bond issuances.

shareholders in December 2015, including both direct and indirect shareholders.¹⁴ Our summary statistics show that public firms, on average, have a significantly higher number of shareholders than private firms. According to prior literature, ownership concentration is related to higher agency conflicts between shareholders and creditors (Aslan and Kumar, 2012); therefore, ownership structure may influence the relation between uncertainty and the loan contract terms.

In column (2) of Table 7, our regression model includes *Log (1+number of shareholders)*. We do not find any evidence that the number of reported shareholders can explain the differences in loan spreads for private and public firms.

3.2.5.3 Relationship Lending

Relationship lending is an important aspect of private loans. On the one hand, lenders may acquire valuable information about borrowers' quality through repeated lending, which can reduce information asymmetry (Berger and Udell, 1995; Bharath et al., 2011; Bolton et al., 2016). On the other hand, the information acquired from the lending relationship may as well grants lenders with higher bargaining power over the borrowers, resulting in a hold-up problem (Rajan, 1992). Either way, relationship loans might react differently to the uncertainty shock.

We construct a dummy variable if a loan facility is a relationship loan, defined as whether the borrower ever borrowed from the same lead arranger in the current loan during the past five years (Bharath et al., 2011). In column (3) of Table 7, we include *Relationship Loan*

¹⁴ This variable does not take unnamed minority shareholders into account. These shareholders are combined and labelled as "More than 100 shareholders". Most of this kind of shareholders are within public firms. Also, we consider the information by the end of 2015 to minimize the potential confounding effect of the Brexit.

in our regression model. Our results show that presence of relationship loans cannot explain the differences in loan spreads for private and public firms under uncertainty.

3.2.5.4 FTSE 100/250 Listing

Saunders and Steffen (2011) document that public firms who are listed in the indexes FTSE100 and FTSE250 are arguably the most informationally transparent and have lower costs of borrowing. The level of information transparency may also affect how uncertainty affects loan spreads. In column (4) of Table 7, we include *FTSE100/250 Public*, which is a dummy variable indicating whether a firm is a public firm and is listed in FTSE100/250, in our regression model. The base group in the regression is therefore the public firms that are not listed in FTSE100/250. We find that the *FTSE100/250 Public* has a negative coefficient, but it is not statistically significant. The coefficient for the interaction with the *Post Brexit* is not statistically significant either, indicating that FTSE100/250 listing does not explain the heterogeneous effect of uncertainty on loan spreads.

3.2.5.5 Institutional Ownership

Institutional ownership is another aspect that public firms and private firms can differ. We construct a dummy variable that is equal to one if a firm has institutional investors as shareholders.¹⁵ Our summary statistics show that 98.8% of public firms have institutional investors as shareholders, while it is 19.2% of private firms.

The presence of institutional investors can be related to agency problems within a firm. On the one hand, institutional investors can provide strong monitoring and governance, which

¹⁵ In our analysis, we consider both direct and indirect share ownership reported in FAME database.

can reduce managerial risk-taking and the likelihood of financial distress (e.g., McCahery et al., 2016; Ward et al., 2018). On the other hand, institutional investors with limited investment horizons may pressure the management to engage in myopic activities, which may exacerbate agency conflicts between shareholders and creditors (Kim et al., 2019). If agency conflicts are more pronounced during a time of uncertainty, institutional ownership may lead to an increase in loan spreads under uncertainty. In addition, Boone and White (2015) also document that institutional ownership is associated with lower information asymmetry, which can reduce loan spreads when firms face uncertainty.

In column (5) of Table 7, we test whether presence of institutional investors as shareholders influences private firms' loan prices. We find that coefficient for *Private with IO* is negative and statistically significant at 10% level. This result indicates that private firms with institutional ownership can obtain cheaper loans before the referendum, providing evidence that institutional ownership can provide potential monitoring and governance, leading to a lower cost of borrowing. However, we also observe that the interaction *Private with IO*Post Brexit* has a positive coefficient and is statistically significant at 1% level. This coefficient is larger than the one of *Private without IO*Post Brexit* and has higher significance level, though a test reveals that the two coefficients are not different at traditional significance level. Overall, we do not find evidence that institutional ownership can mitigate the effect of uncertainty on loan spreads.

3.2.6 Financial Covenants for Private and Public Firms under Uncertainty

In this section, we investigate the use of financial covenants as a type of contingent contract term under uncertainty. Financial covenants can specify the actions required by the lenders when additional information arrives after the contract has been determined; therefore, they can enhance contractual efficiency, especially during the period when borrowers' future outcomes are less predictable (Demerjian, 2017). Financial covenants can transfer the control right to the lenders and initiate renegotiations following a borrower's violation, and therefore lenders' claims are better protected during the period of uncertainty.

[Table 8 about here]

We begin by estimating the regression model (1) on the deal level with the number of financial covenants as the dependent variable. We present the results in Table 8. In column (1), we include only the *Post Brexit* indicator and the control variables. The coefficient for *Post Brexit* is not statistically significant, indicating that the use of financial covenants does not change after the Brexit referendum. In column (2), we include the *Private* indicator and its interaction with the *Post Brexit* indicator. *Post Brexit* indicator therefore captures the change in the use of financial covenants for public firms, and it is not statistically significant. This indicates that the use of financial covenants does not change for public firms. The interaction *Private*Post Brexit*, however, has a negative coefficient and it is statistically significant at 5% level. This result indicates that private firms have fewer financial covenants after the Brexit referendum. Taken together with our previous results on the loan price, private firms experience an increase in cost of borrowing, but they have lower number of financial covenants

following the Brexit referendum. One potential explanation is that private firms are likely to have limited contractibility on their accounting information compared to public firms, which can deter the use of financial covenants, especially during a period of uncertainty.

To investigate whether information transparency can explain the heterogeneous effect of uncertainty on the use of financial covenants, we explore two factors that can potentially proxy a firm's informational transparency, one is whether a public firm is listed in the indexes FTSE100 or FTSE250 (Saunders and Steffen, 2011); the other one is whether a private firm has institutional investors as shareholders (Boone and White, 2015). We present our regression results in Table 9. The base group in the regression is therefore the public firms that are not listed in FTSE100/250.

In column (1), the coefficient for *Post Brexit* is negative coefficient but it is not statistically significant. *Private*Post Brexit* has a negative coefficient, and it becomes statistically insignificant, which indicates that the use of financial covenants is not different from that for non-FTSE100/250 public firms. The absolute change for private firms, which is represented by *Private*Post Brexit + Post Brexit*, is still statistically significant at 5% level. Notably, we find that the interaction *FTSE100/250 Public*Post Brexit* has a positive coefficient, and it is statistically significant at 5% level. This result indicates that, compared with private firms and public firms who are not listed in FTSE100/250, the public firms listed in FTSE100/250 use more financial covenants after the Brexit referendum. FTSE100/250 public firms are arguably the most informationally transparent firms, and therefore, this result provides evidence that informational transparency can facilitate the use of financial covenants

under uncertainty. Our result points to a narrative that public firms are not totally immune to the uncertainty shock triggered by the Brexit referendum, but rather their contract design is affected differently. Hence, our finding suggests a trade-off in the contract design, such that public firms with more information transparency (i.e., constituents of FTSE 100/250) receive favourable loan prices, but in exchange, they accept more financial covenants in their contracts during the time when uncertainty increases.

In column (2), we find that the decline in the use of financial covenants concentrates in the private firms without institutional ownership, as *Private without IO*Post Brexit* has a negative coefficient and is statistically significant at 5% level. On the contrary, the coefficient for *Private with IO*Post Brexit* is also negative but not statistically significant. These results again provide evidence that information asymmetry can deter the use of financial covenants.

4. Conclusion

This study investigates how uncertainty influences private and public firms by examining the design of syndicated loan contracts around the Brexit referendum. As prior researchers argue, the Brexit referendum could be viewed as an exogenous uncertainty shock to financial markets. Our results show that uncertainty makes it harder for private firms to access syndicated loan markets as they experience large increases in their cost of borrowing while public firms are overall not affected. We also find that borrowers' foreign exposure, proxied by foreign sales or the presence of foreign subsidiaries, can mitigate the impact of the uncertainty shock for private firms. This finding offers another rationale for both public and

private firms' engagement in international operations, as it allows them to access debt markets at a lower cost under uncertainty.

Besides the loan price, lenders also manage their exposure to the increasing uncertainty through non-pricing terms, e.g., financial covenants, under uncertainty. We find that for public firms with higher information transparency, lenders demand more financial covenants in the loan contracts as additional protection after the referendum. Even though public firms' cost of borrowing does not increase when they face uncertainty, they are not totally immune to the uncertainty shock, as they need to accept more financial covenants in exchange for lower costs of loans. Our findings show that private firms do not face similar demands from lenders in terms of financial covenants in their loan contracts under uncertainty, suggesting that private firms' accounting information can be less informative than public firms to facilitate the use of covenants. Overall, our findings provide novel evidence on how borrowers' public status and foreign exposure shape loan contracts under uncertainty.

APPENDIX: VARIABLE DEFINITION

Contract Terms

All-In-Drawn: “The amount the borrower pays in basis points over LIBOR for each dollar drawn down. It adds the spread of the loan with any annual (or facility) fee paid to the bank group.” (According to DealScan). We scale the variable to the percentage term. *Source: DealScan*

Term Loan: A dummy variable that is equal to one if the facility is a term loan and zero otherwise. *Source: DealScan*

Credit Line: A dummy variable that is equal to one if the facility is a credit line and zero otherwise. *Source: DealScan*

Maturity: The loan maturity in months. *Source: DealScan*

Log (Loan Size): The logarithm of one plus loan amount in million dollars. *Source: DealScan*

Financial Covenants: The number of financial covenants. *Source: DealScan*

General Covenants: The number of general covenants, which include equity issuance sweep, excess cash flow sweep, asset sales sweep, debt issuance sweep, insurance proceeds sweep, dividend restrictions, and a clause which requires lenders to hold a certain amount of commitments to approve any modifications to the deal. *Source: DealScan*

Secured: A dummy variable that is equal to one if the facility contains collaterals and zero otherwise. *Source: DealScan*

Refinance: A dummy variable that is equal to one if the facility is a refinance loan and zero otherwise. *Source: DealScan*

Investment Grade: A dummy variable that is equal to one if the facility is investment grade and zero otherwise. *Source: DealScan*

Not Rated: A dummy variable that is equal to one if the facility is not rated and zero otherwise. *Source: DealScan*

Relationship Loan: A dummy variable that is equal to one if the borrower ever borrowed from a same lead arranger during the past five years as in the current facility and zero otherwise. *Source: DealScan*

Log (Deal Size): The logarithm of one plus the deal amount in million dollars. *Source: DealScan*

Firm Characteristics

EBITDA: The ratio of EBITDA over total sales. *Source: FAME*

Sales Growth: The ratio of the current year's sales over the previous year's sales. *Source: FAME*

Leverage: The ratio of long-term debt plus short-term debt over total assets. *Source: FAME*

Cash: The ratio of bank deposits to total assets. *Source: FAME*

Size: The logarithm of total assets. *Source: FAME*

Tangibility: The ratio of tangible assets to total assets. *Source: FAME*

Log (Age): The logarithm of firm age in years. *Source: FAME*

Log (1+Interest Coverage): The logarithm of one plus the interest coverage ratio. *Source: FAME*

Capital Investment: The difference between the current year's fixed assets and the previous year's fixed assets. *Source: FAME*

Foreign Sales: A dummy variable that is equal to one if a firm ever had positive foreign sales during the years of 2013, 2014, and 2015. *Source: FAME*

Fraction of Foreign Sales: The average fraction of foreign sales over the total sales for the years of 2013, 2014, and 2015. *Source: FAME*

Foreign Subsidiary: A dummy variable that is equal to one if a firm has any foreign subsidiary that is registered outside the UK. *Source: FAME*

Log (1+Number of Foreign Countries): The logarithm of one plus the number of foreign countries where a firm has subsidiaries. *Source: FAME*

FTSE100/250: A dummy variable that is equal to one if a firm is listed in FTSE 100/250 indexes. *Source: FAME*

Institutional Ownership: A dummy variable that is equal to one if a firm has institutional investors as shareholders in the year of 2015. *Source: FAME*

Log (1+number of shareholders): The logarithm of one plus the number of reported shareholders in the year of 2015. This does not account for unnamed individual shareholders.

Source: FAME

Bond: A dummy variable that is equal to one if a firm ever issued bonds since the year 2009.

Source: Refinitiv

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Fig. 1: Parallel Trends

In this figure we plot the quarterly average loan spread net of industry and purpose effects for private and public firms around the Brexit referendum (in June 2016, represented by the vertical line). A borrower falls in the treatment sample (solid line) if it is a private firm. The control sample (dashed line) is made up of public firms during the same period.

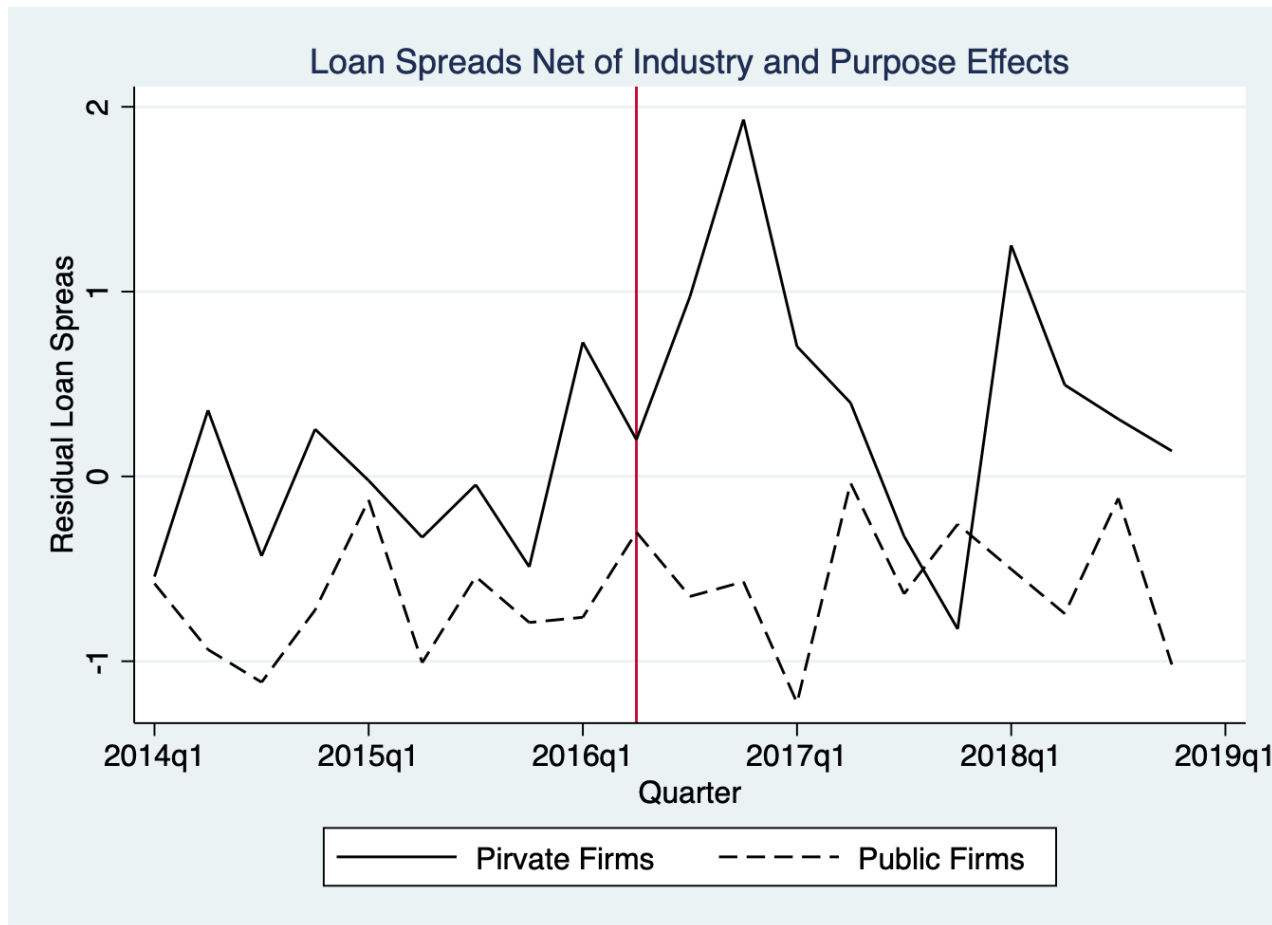


Fig. 2: Economic Policy Uncertainty Index

In this figure we plot the Economic Policy Uncertainty Index around the Brexit referendum (in June 2016, represented by the vertical line).

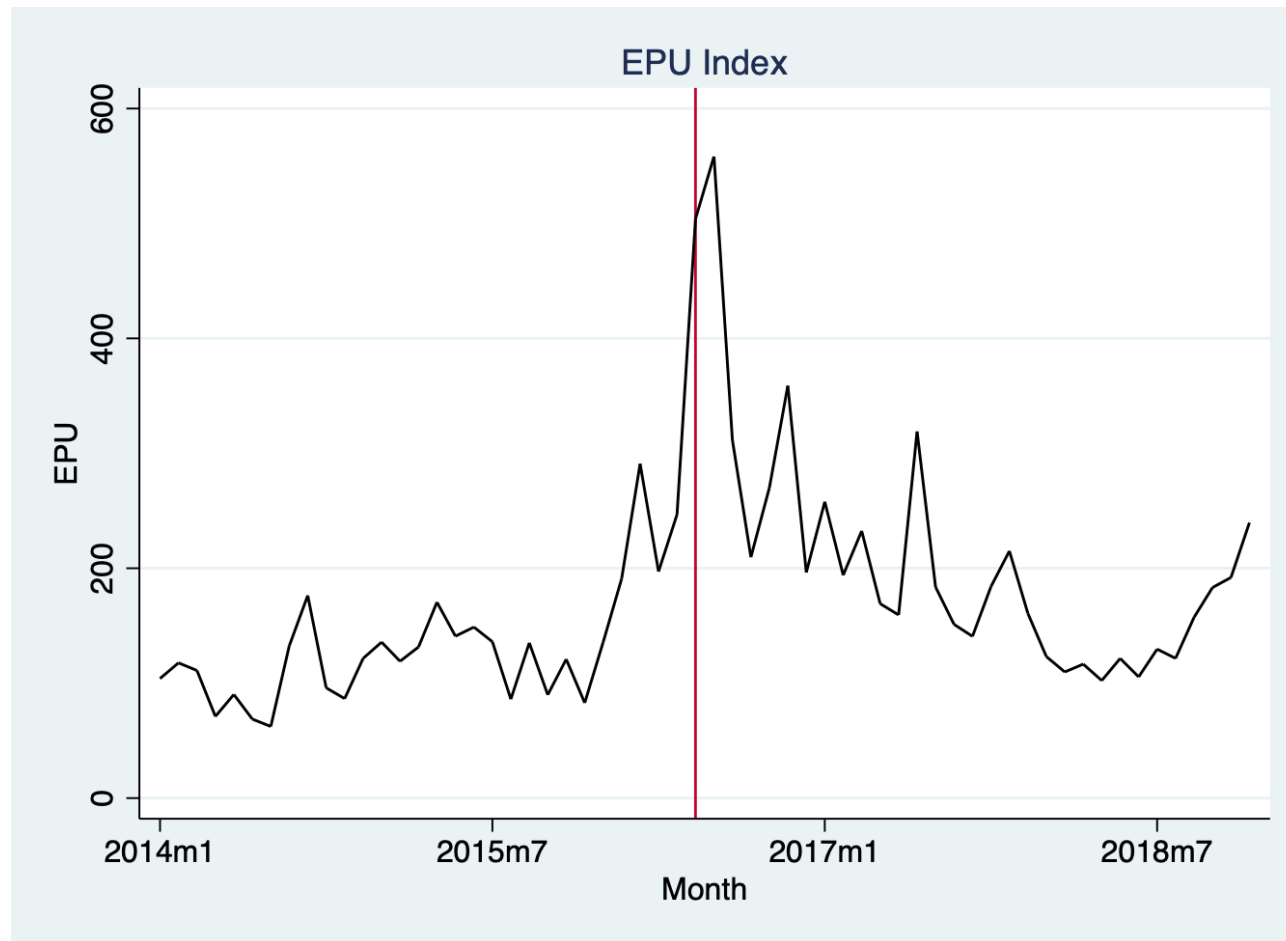


Table 1: Summary Statistics

This table reports the summary statistics of key variables in the sub-samples of public firms and private firms. We winsorize firm level data at the 1st and 99th percentiles. We perform two-sample t-test for the difference in means, and Wilcoxon rank-sum test for the difference in medians. *, ** and *** denote statistical significance at the level of 10%, 5% and 1%, respectively.

Panel A. Contract terms

<i>Variable:</i>	Public firm sub-sample			Private firm sub-sample			Private - Public	
	(1) N	(2) Mean	(3) Median	(4) N	(5) Mean	(6) Median	(5) - (2) t-statistics	(6) - (3) Wilcoxon Z-statistics
<i>All-In-Drawn</i>	256	1.977	2	146	3.398	4	8.84***	8.42***
<i>Term Loan</i>	256	0.27	0	146	0.562	1	5.88***	5.81***
<i>Credit Line</i>	256	0.73	1	146	0.438	0	-5.88***	-5.81***
<i>Maturity</i>	256	54.254	60	146	68.836	62	5.39***	7.78***
<i>Log (Loan Size)</i>	256	5.5	5	146	5.201	5	-2.35**	-1.69*
<i>Financial Covenants</i>	256	0.234	0	146	0.171	0	-1.12	-0.29
<i>General Covenants</i>	256	0.055	0	146	0.041	0	-0.39	-1.57
<i>Secured</i>	256	0.23	0	146	0.76	1	11.99***	10.33***
<i>Refinance</i>	256	0.664	1	146	0.623	1	-0.82	-0.82
<i>Investment Grade</i>	256	0.645	1	146	0.178	0	-10.68***	-9.00***
<i>Not Rated</i>	256	0.285	0	146	0.712	1	9.08***	8.29***
<i>Relationship Loan</i>	256	0.742	1	146	0.63	1	-2.32**	-2.36**

Panel B. Firm characteristics

<i>Variable:</i>	Public firms			Private firms			Private - Public	
	(1) N	(2) Mean	(3) Median	(4) N	(5) Mean	(6) Median	(5) - (2) t-statistics	(6) - (3) Wilcoxon Z-statistics
<i>Profitability</i>	256	0.220	0	146	0.209	0	-0.35	-1.13
<i>Sales Growth</i>	256	1.125	1	146	1.263	1	2.19**	0.61
<i>Leverage</i>	256	0.246	0	146	0.456	0	8.35***	7.60***
<i>Cash</i>	256	0.072	0	146	0.066	0	-0.88	-1.15
<i>Size</i>	256	6.990	7	146	6.472	7	-3.34***	-2.56**
<i>Tangibility</i>	256	0.217	0	146	0.302	0	2.76***	1.30
<i>Log (Age)</i>	256	3.101	3	146	2.866	3	-2.68***	-1.89*
<i>Log (1+Interest Coverage)</i>	256	2.072	2	146	1.929	2	-1.13	-2.61***
<i>Capital Investment</i>	256	0.044	0	146	0.047	0	0.19	-0.36
<i>Foreign Sales</i>	246	0.707	1	115	0.313	0	-7.54***	-7.07***
<i>Fraction of Foreign Sales</i>	236	0.428	0	112	0.115	0	-8.48***	-7.18***
<i>Foreign Subsidiary</i>	256	0.836	1	146	0.493	0	-7.21***	-7.29***
<i>Log (1+Number of Foreign Countries)</i>	256	1.987	2	146	0.529	0	-14.71***	-10.53***
<i>FTSE100/250</i>	256	0.445	0					
<i>Institutional Ownership</i>	256	0.988	1	146	0.192	0	-23.86***	-16.72***
<i>Log (1+number of shareholders)</i>	256	4.301	4	138	1.222	1	-35.69***	-15.38***
<i>Bond</i>	256	0.309	0	146	0.110	0	-5.12***	-4.51***

Table 2: Loan Prices for Public and Private Firms under Uncertainty

This table presents the results for loan contract terms around the Brexit referendum. The dependent variable is the all-in-drawn spread divided by 100. We measure uncertainty by the *Post Brexit* indicator, which is equal to one if a facility is issued after the referendum date on June 23rd, 2016, and zero otherwise. *Private* is a dummy variable, which is equal to one if the borrower is a private firm at the time of loan issuance, and zero otherwise. Loan purpose fixed effects, and Fama-French 12 industries fixed effects are included in the regressions (1) to (3); quarter fixed effects are included in regression (4). *t*-statistics are based on robust standard errors clustered at the firm level. *, ** and *** denote statistical significance at the level of 10%, 5% and 1%, respectively.

	(1)	(2)	(3)	(4)
<i>Post Brexit</i>	0.409**	0.225**	-0.015	
	(2.55)	(2.06)	(-0.15)	
<i>Private*Post Brexit</i>			0.696***	0.637***
			(2.81)	(2.69)
<i>Private</i>			0.086	0.127
			(0.43)	(0.67)
<i>Profitability</i>	-0.626**	-0.827***	-0.752***	-0.689***
	(-2.59)	(-3.76)	(-3.54)	(-3.63)
<i>Sales Growth</i>	0.194	-0.063	-0.129	-0.062
	(1.55)	(-0.78)	(-1.60)	(-0.75)
<i>Leverage</i>	0.972**	0.049	-0.052	-0.071
	(2.08)	(0.14)	(-0.15)	(-0.20)
<i>Cash</i>	0.204	0.648	0.854	1.066
	(0.16)	(0.89)	(1.20)	(1.37)
<i>Size</i>	-0.211***	-0.175***	-0.174***	-0.178***
	(-3.55)	(-3.35)	(-3.45)	(-3.62)
<i>Tangibility</i>	0.370	-0.014	-0.104	-0.095
	(1.11)	(-0.05)	(-0.39)	(-0.37)
<i>Log (Age)</i>	-0.138	0.011	0.019	0.003
	(-1.44)	(0.16)	(0.33)	(0.06)
<i>Log (1+Interest Coverage)</i>	-0.109	-0.100**	-0.116**	-0.128***
	(-1.46)	(-1.99)	(-2.46)	(-2.63)
<i>Capital Investments</i>	-0.334	-0.212	-0.206	-0.310
	(-0.56)	(-0.47)	(-0.51)	(-0.69)
<i>Maturity</i>		0.002	0.002	0.001
		(0.66)	(0.79)	(0.34)
<i>Log (Loan Size)</i>		0.024	0.036	0.024
		(0.47)	(0.73)	(0.50)
<i>Financial Covenants</i>		0.085	0.118	0.094
		(1.15)	(1.61)	(1.25)
<i>General Covenants</i>		-0.131	-0.169	-0.130
		(-0.88)	(-1.38)	(-0.96)
<i>Refinance</i>		0.396	0.362	0.261
		(1.42)	(1.30)	(1.14)
<i>Term Loan</i>		0.544***	0.494***	0.500***
		(5.05)	(4.85)	(4.68)
<i>Secured</i>		0.328*	0.234	0.207
		(1.93)	(1.34)	(1.13)
<i>Investment Grade</i>		-1.375***	-1.340***	-1.344***

<i>Not rated</i>		(-4.92)	(-5.48)	(-5.66)
		0.021	0.025	0.005
		(0.08)	(0.10)	(0.02)
<i>Constant</i>	3.699***	4.086***	4.134***	4.521***
	(5.25)	(7.35)	(7.98)	(7.67)
Loan purpose fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Quarter fixed effects	No	No	No	Yes
Observations	408	402	402	402
R-squared	0.59	0.78	0.80	0.81

Table 3: Parallel Trend Test

This table presents the results for loan prices around the Brexit referendum. The dependent variable is the all-in-drawn spread divided by 100. *2018* is a dummy variable, which is equal to one if a loan is issued in the year of 2018; *2017* is a dummy variable, which is equal to one if a loan is issued in the year of 2017; *2016 Post Brexit* is a dummy variable, which is equal to one if a loan is issued in the year of 2016 after the referendum of Brexit; *2016 Pre Brexit* is a dummy variable, which is equal to one if a loan is issued in the year of 2016 before the referendum of Brexit; *2015* is a dummy variable, which is equal to one if a loan is issued in the year of 2015. *Private* is a dummy variable, which is equal to one if the borrower is a private firm at the time of loan issuance, and zero otherwise. Loan purpose fixed effects and Fama-French 12 industries fixed effects are included according to the regressions. *t-statistics* are based on robust standard errors clustered at the firm level. *, ** and *** denote statistical significance at the level of 10%, 5% and 1%, respectively.

	(1) Spread	(2) Spread
2018	0.135 (0.90)	-0.003 (-0.02)
2017	0.171 (1.06)	0.109 (0.66)
2016 Post Brexit	0.597** (2.06)	-0.141 (-0.55)
2016 Pre Brexit	-0.060 (-0.30)	-0.249 (-1.32)
2015	0.049 (0.31)	0.151 (1.14)
Private*2018		0.557 (1.62)
Private*2017		0.275 (0.86)
Private*2016 Post Brexit		1.307*** (2.97)
Private*2016 Pre Brexit		0.603 (1.31)
Private*2015		-0.433 (-1.15)
Private		0.165 (0.61)
Constant	4.126*** (7.07)	4.105*** (7.81)
Controls	Yes	Yes
Loan purpose fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	402	402
R-squared	0.79	0.81

Table 4: Entropy Balancing - Test for Balance

This table presents the test of balance property between public and private firms, before and after the entropy balancing. The differences in means are calculated by the regressions of each variable on the dummy variable of *Private*. The weights calculated from the entropy balancing are applied to the regressions after the entropy balancing. *, ** and *** denote significance at the 10%, 5% and 1% levels.

<i>Variable:</i>	Mean			Differences in Mean	
	Private Firms	Public Firms Pre-match	Public Firms After-Match	Pre-match	After-match
<i>Profitability</i>	0.209	0.220	0.209	-0.012	0
<i>Sales Growth</i>	1.263	1.125	1.263	0.137***	0
<i>Leverage</i>	0.456	0.246	0.456	0.210***	0
<i>Cash</i>	0.066	0.072	0.066	-0.007	0
<i>Size</i>	6.472	6.990	6.472	-0.518***	0
<i>Tangibility</i>	0.302	0.217	0.302	0.085***	0
<i>Log (Age)</i>	2.866	3.101	2.866	-0.235**	0
<i>Log (Interest Coverage)</i>	1.929	2.072	1.929	-0.143	0
<i>Capital Investment</i>	0.047	0.044	0.047	0.003	0

TABLE 5: LOAN CONTRACT TERMS FOR PUBLIC AND PRIVATE FIRMS UNDER UNCERTAINTY – ENTROPY BALANCED

This table presents the results for loan prices around the Brexit referendum, with the covariates entropy balanced between public firms and private firms. The dependent variable is the all-in-drawn spread divided by 100. We measure uncertainty by the *Post Brexit* indicator, which is equal to one if a facility is issued after the referendum date on June 23rd, 2016, and zero otherwise. *Private* is a dummy variable, which is equal to one if the borrower is a private firm at the time of loan issuance, and zero otherwise. Loan purpose fixed effects and Fama-French 12 industries fixed effects are included according to the regressions. *t*-statistics are based on robust standard errors clustered at the firm level. *, ** and *** denote statistical significance at the level of 10%, 5% and 1%, respectively.

	(1)	(2)
Post Brexit	0.380*** (2.64)	-0.010 (-0.07)
Private*Post Brexit		0.667** (2.40)
Private		0.160 (0.66)
Constant	3.953*** (4.90)	4.019*** (5.00)
Controls	Yes	Yes
Loan purpose fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	402	402
R-squared	0.81	0.82

Table 6: Foreign Exposure

This table presents the results for loan prices around the Brexit referendum, considering the effects of foreign exposure. The dependent variable is the all-in-drawn spread divided by 100. We measure uncertainty by the *Post Brexit* indicator, which is equal to one if a facility is issued after the referendum date on June 23rd, 2016, and zero otherwise. *Private* is a dummy variable, which is equal to one if the borrower is a private firm at the time of loan issuance, and zero otherwise. *Foreign Sales* is a dummy variable, which is equal to one if a firm has foreign sales during any year of 2013 to 2015, and zero otherwise. *Fraction of Foreign Sales* is the ratio of foreign sales over total sales averaged over 2013 to 2015. *Foreign Subsidiaries* is a dummy variable, which is equal to one if a firm has subsidiaries outside the UK, and zero otherwise. *Log (1+Number of Foreign Countries)* is the logarithm of one plus number of countries outside the UK where a firm has subsidiaries. Loan purpose fixed effects and Fama-French 12 industries fixed effects are included according to the regressions. *t-statistics* are based on robust standard errors clustered at the firm level. *, ** and *** denote statistical significance at the level of 10%, 5% and 1%, respectively.

	(1) Foreign Sales	(2) Fraction of Foreign Sales	(3) Foreign Subsidiaries	(4) Log (1+Number of Foreign Countries)
Post Brexit	0.284* (1.67)	0.230 (1.56)	0.434 (1.59)	0.375** (2.35)
Private*Post Brexit	1.050*** (3.33)	0.742** (2.27)	0.649 (1.62)	0.668** (2.10)
Private	-0.374 (-1.60)	-0.018 (-0.07)	-0.107 (-0.34)	-0.129 (-0.52)
Foreign Sales*Private*Post Brexit	-1.438*** (-3.35)			
Foreign Sales*Post Brexit	-0.397* (-1.91)			
Foreign Sales*Private	1.239*** (4.21)			
Foreign Sales	-0.129 (-0.87)			
Fraction of Foreign Sales*Private*Post Brexit		-1.205* (-1.87)		
Fraction of Foreign Sales*Post Brexit		-0.545** (-2.15)		
Fraction of Foreign Sales*Private		1.164***		

		(2.77)			
Fraction of Foreign Sales		-0.233			
		(-1.15)			
Foreign Subsidiaries*Private*Post Brexit				-0.350	
				(-0.72)	
Foreign Subsidiaries*Post Brexit				-0.503*	
				(-1.67)	
Foreign Subsidiaries*Private				0.485	
				(1.37)	
Foreign Subsidiaries				-0.047	
				(-0.22)	
Log (1+Number of Foreign Countries)*Private*Post Brexit					-0.610**
					(-2.36)
Log (1+Number of Foreign Countries)*Post Brexit					-0.171***
					(-2.61)
Log (1+Number of Foreign Countries)*Private					0.398**
					(2.23)
Log (1+Number of Foreign Countries)					-0.087
					(-1.64)
Constant	3.958***	3.893***	4.284***	4.174***	
	(6.31)	(5.63)	(8.36)	(8.68)	
Controls	Yes	Yes	Yes	Yes	
Loan purpose fixed effects	Yes	Yes	Yes	Yes	
Industry fixed effects	Yes	Yes	Yes	Yes	
Observations	361	348	402	402	
R-squared	0.83	0.81	0.80	0.81	

Table 7: Other Differences between Private and Public Firms

This table presents the results for loan prices around the Brexit referendum, considering the effects of different heterogeneities between private and public firms. The dependent variable is the all-in-drawn spread divided by 100. We measure uncertainty by the *Post Brexit* indicator, which is equal to one if a facility is issued after the referendum date on June 23rd, 2016, and zero otherwise. *Private* is a dummy variable, which is equal to one if the borrower is a private firm at the time of loan issuance, and zero otherwise. *Bond* is a dummy variable, which is equal to one if a firm ever issued bonds since the year of 2009, and zero otherwise. *Log (1+Number of Shareholders)* is the logarithm of one plus the number of reported shareholders in the year of 2015. *Relationship Loan* is a dummy variable, which is equal to one if the borrower ever borrowed from the same lead arranger during the past five years as in the current facility, and zero otherwise. *FTSE100/250 Public* is a dummy variable if a firm is a public firm and is listed in FTSE100 or FTSE250, and zero otherwise. *Private with IO* is a dummy variable that is equal to one if a firm is a private firm and had institutional ownership in 2015, and zero otherwise. *Private without IO* is a dummy variable that is equal to one if a firm is a private firm and did not have institutional ownership in 2015, and zero otherwise. Loan purpose fixed effects and Fama-French 12 industries fixed effects are included according to the regressions. *t-statistics* are based on robust standard errors clustered at the firm level. *, ** and *** denote statistical significance at the level of 10%, 5% and 1%, respectively.

	(1)	(2)	(3)	(4)	(5)
Post Brexit	-0.043 (-0.36)	0.139 (0.17)	-0.289 (-1.09)	0.046 (0.30)	-0.013 (-0.13)
Private*Post Brexit	0.625** (2.38)	0.468 (0.51)	1.111** (2.29)	0.614** (2.21)	
Private	0.240 (1.14)	-0.762 (-1.30)	-0.084 (-0.26)	0.030 (0.15)	
Bond*Private*Post Brexit	0.608 (0.99)				
Bond*Post Brexit	0.028 (0.13)				
Bond*Private	-1.003** (-1.98)				
Bond	0.097 (0.70)				
Log (1+Number of Shareholders)*Private*Post Brexit		0.048 (0.18)			
Log (1+Number of Shareholders)*Post Brexit		-0.040 (-0.22)			

Log (1+Number of Shareholders)*Private		0.275				
		(1.53)				
Log (1+Number of Shareholders)		-0.183				
		(-1.44)				
Relationship Loan*Private*Post Brexit				-0.575		
				(-1.02)		
Relationship Loan*Post Brexit				0.347		
				(1.20)		
Relationship Loan*Private				0.262		
				(0.70)		
Relationship Loan				-0.123		
				(-0.73)		
FTSE100/250 Public*Post Brexit					-0.049	
					(-0.23)	
FTSE100/250 Public					-0.211	
					(-1.38)	
Private with IO*Post Brexit						1.188***
						(3.35)
Private without IO*Post Brexit						0.548*
						(1.91)
Private with IO						-0.615*
						(-1.81)
Private without IO						0.273
						(1.24)
Constant	4.003***	4.617***	4.197***	3.942***	4.083***	
	(8.44)	(8.15)	(8.18)	(7.09)	(7.59)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Loan purpose fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	402	394	402	402	402	402
R-squared	0.80	0.80	0.80	0.80	0.80	0.81

Table 8: Financial Covenants

This table presents the results for the use of financial covenants around the Brexit referendum. The dependent variable is the number of financial covenants. We measure uncertainty by the *Post Brexit* indicator, which is equal to one if a facility is issued after the referendum date on June 23rd, 2016, and zero otherwise. *Private* is a dummy variable, which is equal to one if the borrower is a private firm at the time of loan issuance, and zero otherwise. Deal purpose fixed effects, and Fama-French 12 industries fixed effects are included in the regressions. *t-statistics* are based on robust standard errors clustered at the firm level. *, ** and *** denote statistical significance at the level of 10%, 5% and 1%, respectively.

	(1)	(2)
Post Brexit	-0.036 (-0.58)	0.073 (0.87)
Private*Post Brexit		-0.338** (-1.98)
Private		0.034 (0.18)
Constant	0.768 (0.99)	0.571 (0.75)
Controls	Yes	Yes
Deal purpose fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	267	267
R-squared	0.17	0.18

Table 9: Financial Covenants and Information Transparency

This table presents the results for the use of financial covenants around the Brexit referendum. The dependent variable is the number of financial covenants. We measure uncertainty by the *Post Brexit* indicator, which is equal to one if a facility is issued after the referendum date on June 23rd, 2016, and zero otherwise. *Private* is a dummy variable, which is equal to one if the borrower is a private firm at the time of loan issuance, and zero otherwise. *FTSE100/250 Public* is a dummy variable if a firm is a public firm and is listed in FTSE100 or FTSE250, and zero otherwise. *Private with IO* is a dummy variable that is equal to one if a firm is a private firm and had institutional ownership in 2015, and zero otherwise. *Private without IO* is a dummy variable that is equal to one if a firm is a private firm and did not have institutional ownership in 2015, and zero otherwise. Deal purpose fixed effects, and Fama-French 12 industries fixed effects are included in the regressions. *t-statistics* are based on robust standard errors clustered at the firm level. *, ** and *** denote statistical significance at the level of 10%, 5% and 1%, respectively.

	(1)	(2)
Post Brexit	-0.149 (-0.97)	0.071 (0.85)
Private*Post Brexit	-0.111 (-0.49)	
FTSE100/250 Public*Post Brexit	0.432** (2.13)	
FTSE100/250 Public	-0.106 (-0.56)	
Private with IO*Post Brexit		-0.168 (-0.93)
Private without IO*Post Brexit		-0.382** (-2.03)
Private with IO		-0.005 (-0.03)
Private without IO		0.049 (0.22)
Constant	0.516 (0.65)	0.591 (0.76)
Controls	Yes	Yes
Deal purpose fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	267	267
R-squared	0.20	0.18