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Entering the Public Bond Market during the Financial Crisis: Underinvestment and Asymmetric Information Costs

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Abstract

This paper investigates the impact of underinvestment and asymmetric information cost on the determinants and timing of a firm's decision to issue its first-time public bond. Using a sample of non-convertible public bonds made by UK public and private companies between 2007 and 2011, the results show that the choice of capital source is strongly affected by the agency conflict. In particular, the agency cost in the form of underinvestment problems delays a firm's entry to the public bond market. However, the results show that, unlike previous studies, private companies are more likely to enter the public bond market before undertaking their equity IPOs, supporting the pecking order theory under asymmetric information argument. The results also suggest that firms with less information asymmetry and those that establish a track record are more likely to undertake bond IPOs during the crisis, but private companies enter the public bond market earlier than the equity market. These results hold even after controlling for bank relationships and demands for external funds.

Keywords: Bond IPOs; Public and private companies; Logit and survival analyses
JEL classification: G30, G32

1. Introduction

An article by the Bank of England in 2011 shows that there has been a large increase in first-time bond issuance by UK companies during the recent crisis.[2] While first-time non-convertible issuers decreased in number with the financial crisis in 2007, the number of first-

[2] 2011, Going public: UK companies' use of capital markets.

time non-convertible bond issuers rose in 2008 and 2009.[3] The reasons and consequences of such a financing decision remain an open question. This paper assesses how private and public companies trade off the costs and benefits of entering the public bond market when they decide to issue public bonds for the first time. Unlike previous studies (e.g., Denis and Mihov, 2003; Hale and Santos, 2008), I test the impact of f asymmetric information and underinvestment costs on firms' decision to enter the public bond market. To test my hypotheses, the hand-collected data from prospectuses is also used to assess whether such a decision can be predicted at the IPO date, and to identify the firms that came to the market specifically to raise debt and equity capital, which is considered to be one of the major motivations for public capital market listings (e.g., Pagano et al., 1998).

This paper contributes to the existing literature in several ways. Firstly, the empirical literature on firms' choices of external funding predominantly investigates the decision to go public through equity IPOs. Studies on going public have devoted little attention to the alternative source of going public, which is the decision to tap the public bond market. In particular, unlike previous studies, this paper includes private companies in order to investigate the different decision of entering the public market, the choice between bond- and equity-IPOs, and uses public companies to analyse the decision between bond-IPOs and issuance of further equity financing during their quotation life, which have not been investigated in the literature. However, my results are related to previous studies that analyse the choice of bank, non-bank, or public debt (Blackwell and Kidwell, 1988; Easterwood and Krishnaswami, 1999; Denis and Mihov, 2003; Hale and Santos, 2008). The recent study by Hale and Santos (2008) investigates new public bond financing in the US. They find that firms with developed bank relationships and established track records enter the public bond market earlier than their counterparts. Denis and Mihov (2003) find the significant impact of

[3] See Figure 1.

credit quality on external borrowing, suggesting that firms with the highest credit quality borrow from public sources while those with the lowest credit quality borrow privately. These studies do not distinguish in depth between the choice of new debt and equity. Unlike previous studies, this paper tests the impact of asymmetric information and agency conflicts between shareholders and debt-holders on firms' decisions to enter the public bond market.

Secondly, in contrast to existing studies which are US-based, this paper analyses the UK market. It is of particular interest to examine corporate external financing in a country with a market-oriented environment similar to that of the US, but with different institutional settings with stronger creditor rights (see La Porta et al., 1997; Djankov et al., 2007).[4] Finally, this paper attempts to control for market conditions, and is thus one of the first studies to investigate the decision to go to the public bond market during the financial crisis, which is highly important for firms' decisions to enter the public market.

This paper documents several new findings. Unlike previous studies (e.g. Hale and Santos, 2008), I find that the agency cost in the form of underinvestment problems delays a firm's entry to the public bond market, suggesting that high-growth firms wait longer to issue their first public bonds. The results for private companies show that, although high-growth companies are less likely to issue their first public bonds, they tend to follow the pecking order theory, and hence have higher incentives to issue their first public bonds before going to the equity market, supporting the asymmetric information hypothesis. However, high-growth public companies prefer to raise equity capital, delaying their decision to enter the public bond market to resolve the underinvestment problem.

Moreover, the results show that larger firms with higher tangible assets undertake their bond IPOs earlier than smaller firms with lower tangible assets, supporting the

[4] La Porta et al. (1997) argue that, in the UK, the level of creditors' rights is higher than in the US. Their findings are consistent with those of Franks and Torous (1993), who compare the UK bankruptcy code with that of the US, showing that the UK appears to have the highest creditor incentive while the US keeps firms as its main concern. The results are in line with Djankov et al. (2007), who show that, in contrast to the US, the UK has strong creditor rights protection.

asymmetric information hypothesis, as larger companies with lower intangible assets have better market reputations, and hence suffer less adversity from bond IPOs. Controlling for the firm's debt-equity decision, I find that larger firms with higher tangible assets delay entering the public bond market, while, in contrast to private firms, public firms are those that I find issue further new equity prior to public bond. Consistent with previous studies (e.g., Berlin and Loyes, 1988; Datta et al., 2000; Denis and Mihov, 2003), I find that both public and private firms with higher credit risk, measured by interest coverage and/or solvency ratio, are more likely to time their entry into the public bond market. But, unlike previous studies, the results show that creditworthy firms rely more on public debt than on equity.

Firms delay their entry to the public bond market when they have higher internal funds, as measured by return on assets. The results are consistent with the pecking order theory, suggesting that firms prefer internal funds to external financing (Myers, 1977), and are in line with those empirical studies (e.g. Frank and Goyal, 2009 and Rajan and Zingales, 1995) which find that firms with higher profitability (return on assets) are less likely to use external financing in order to mitigate the asymmetric information. Finally, the impact of leverage and bank relationships on the timing of bond IPOs is mixed for public and private companies. For public companies, leverage delays firms' entry to the public bond market while prior bank relationships accelerate firms' decisions to undertake their bond IPOs. These results are consistent with those of Hale and Santos (2008), who investigate the timing of a firm's decision to issue for the first time in the US public bond market. By contrast, for private companies, the firm's timing of their bond IPOs is positively affected by leverage.

The remainder of the paper is organised as follows. Section 2 discusses the literature review and research hypotheses. Section 3 presents the data and methodology. Section 4 discusses the results, and the conclusions are presented in Section 5.

2. Theories and Research Hypothesis

Myers (1977) argues that the conflict between shareholders and debt-holders in the form of underinvestment problems arises in high-growth firms in which shareholders are disincentivised to invest in positive-NPV projects due to the partial payoff that debt-holders receive from these positive projects. The more valuable growth options the firms has, the greater the degree of the underinvestment problem. This problem can be mitigated by lowering leverage or shortening the debt maturity, which will allow valuable growth opportunities to be taken (Myers, 1977). Barclay and Smith (1995) suggest that a firms' future investment is considered as options that its value depends on the likelihood of exercising the options optimally. Since firms with greater investment opportunities have higher conflicts between shareholders and debt-holders over the exercise of the options, riskier projects are more easily substituted for less risky ones. In addition, positive NPV projects are more susceptible to be forgone.

Within the agency costs theory, Myers (1977) argues that high-growth firms are expected to rely on lower levels of debt to mitigate their underinvestment problems. Consistently, Krishnaswami et al. (1999) find that private debt typically monitors firms' operating and investment decisions to mitigate the underinvestment problem. Therefore, it is expected that firms with higher growth opportunities have less incentive to undertake their bond IPOs, as their shareholders can more easily substitute riskier projects for less risky ones, and are also more vulnerable to forgoing positive NPV projects (Krishnaswami et al., 1999). In particular, it is more likely that firms can mitigate the underinvestment problem by using more equity financing to delay their entry into the public bond market. Therefore the first hypothesis is:

H1: Firms with underinvestment problems are less likely to issue their first public bonds and wait for a longer period of time to issue their first public bond.

Diamond (1991) uses information asymmetry and firms' reputation in considering the decision as to debt source. He suggests that the decision to grant debt depends on firms' public information. In particular, if a firm's reputation is high enough, the adverse selection problem can be mitigated by the fact that collecting information is not costly for high-rated firms; while financial intermediaries, including banks, can monitor firms' information for low-rated firms, subject to a cost. Based on these notions, Diamond (1991) shows that middle-rated borrowers, whose reputation is not high enough to mitigate the adverse selection problem, are not able to issue debt directly and thus rely on bank debt. In contrast, high-rated borrowers do not need the monitoring role of banks and therefore can place debt directly. Lastly, low-quality firms have less to lose if they reveal bad news about themselves, not only by defaulting, but also by being caught when monitored. In this case, monitoring is not worth its cost and hence does not provide incentives for them to use bank debt. These implications show a non-monotonic relationship between a firm's reputation and debt source.

In addition, Myers (1984) looks at asymmetric information between issuers and investors, arguing on the basis of the pecking-order theory. He suggests that the cost of asymmetric information can be avoided if companies finance their investments with the least information-sensitive securities; thus firms prefer internal financing which is the safest security. If external funds are required, they will first issue debt, with common stock considered the last resort, as it is highly sensitive to information asymmetries. In particular, firms will issue the safest security firms. Consistently, Leland and Pyle (1977) and Diamond (1984) argue that firms with a higher degree of asymmetric information borrow privately, while firms with a lower asymmetric information cost are expected to issue public bonds. Since private debt lenders are better informed thorough the monitoring and screening (Welch, 1977), this type of debt is usually senior (Welch, 1977), and collateralized (Rajan and

Winton, 1995), it is expected that firms with higher asymmetric information costs less likely to issue public bonds. The second hypothesis is:

H2: Firms with a lower degree of asymmetric information are more likely to issue public bonds and enter the public bond market earlier.

Consistent with Diamond (1984), Datta et al. (2007) argue that firms with longer public existence and with less information asymmetry are less adversely affected by the introduction of public debt into their capital structure. As the degree of asymmetric information decreases the choice of debt will be determined by other factors such as the flexibility of covenants (Gilson and Warner, 1998) and credit quality (Diamond, 1991). In contrast, under the pecking order theory, as the degree of asymmetric information increases, the scale of safety becomes more important. Since private companies are subject to higher asymmetric information costs, it is expected that private firms wait for a longer period of time to issue their first public bond. However, when private companies decide to enter the capital market, they are more likely to issue their first public bonds before undertaking equity IPOs to avoid the cost of asymmetric information. In particular, as private firms have higher levels of asymmetric information and higher probability of default, it is expected that asymmetric information costs exceed underinvestment problems, and hence they are more likely to follow the pecking order theory. Therefore, the third hypothesis is:

H3: Private firms are more likely to issue their first public bonds before undertaking equity IPOs, and, therefore, enter the public bond market earlier than the equity market.

3. Data and Methodology

3.1 Data and Sample

The data is collected from different sources. First *SDC Platinum* is used to select UK non-financial firms that issue bonds in the UK since the data available, and to identify their first non-convertible public bond. This database is also used to collect data on firms' history of syndicated banks loans. This database includes both public and private companies which are distinguished in this study. In total, 143 firms issued a public bond for the first time during the sample period (2007-2011). The final sample includes 90 firms after excluding financial firms, merging the firms with *Fame*, *Thomson One Banker*, and those companies for which the data is not available. Table 1 presents the distribution for initial public offerings of non-convertible bonds by issuing year and the firm's age. The results indicate that while a small number of companies issue their first public bonds in 2007 and 2008 at which time the financial crisis started, the number of first-time issuers rose in 2009 for public companies and about 47 percent of public companies and 45 percent of private companies issue their first public bonds between 2008 and 2010. Using *Fame* and *Thomson One banker*, the data shows that 728 public and 1048 private companies that do not issue bonds during the sample period.

I then match public and private companies that issue bonds for the first time with those public and private companies that have not issued their first public bonds, based on the industry classification. In addition, in order to investigate the decision between issuing public bond and equity, I match the public companies that undertake their bond IPOs with those public companies that prefer to issue further new equity, based on their issuing time and industry. Moreover, for private companies, the bond IPO sample is matched with the equity IPO sample, based on the issuing time and industry.

[Insert Table 1 here]

3.2 Definition of the Proxy Variables

Table 2 defines a number of proxy variables to test the main hypotheses, based on asymmetric information and agency costs, and control variables for firms' demand for external financing and bank relationships.

The agency cost in the form of underinvestment problems leads to avoidance of issuing public bonds. Myers (1977) argues that the conflict between shareholders and debt-holders in the form of underinvestment problems arises in high-growth firms in which shareholders have a disincentive to invest in positive-NPV projects due to the partial payoff that debt-holders receive from these positive projects. Therefore, it is expected that firms with high growth opportunities are less likely to undertake public bond IPOs because of underinvestment problems. I use three variables to measure growth opportunities, growth in assets (*GR*), investment ratio (*Inv.*), and capital expenditure ratio (*Capex*).

The control variables for asymmetric information, firm size, age, and intangibility ratio (*Intg.*), are included, predicting that larger and older firms with lower intangible assets have lower asymmetric information (e.g., Frank and Goyal, 2009), and hence are more likely to issue their first public bonds. In addition, two measures are considered for firms' reputation and credit quality which are related to the information asymmetry notion, the interest coverage and solvency ratios. It is expected that these two ratios to increase the probability of issuing bonds as creditworthy firms have lower asymmetric information. The interest coverage is computed as the ratio of earnings before interest and tax over interest expenses. The solvency ratio is measured by the ratio between profits after tax and total liabilities. Companies with higher interest coverage and solvency ratio are less risky and subject to lower asymmetric information costs, and therefore are more likely to issue their first public bond.

Gaining access to public markets, together with enhanced transparency, would give firms greater bargaining power with which to relax the borrowing constraint and diversify their sources of finance (Pagano et al., 1998; Bharath and Dittmar, 2010). It is expected that firms with a greater demand for external funds are more likely to enter the public market. Hence a positive relationship is predicted between firms' external demands and the probability of issuing bond (e.g. Hale and Santos, 2008; Helwege and Packer, 2001). Following the pecking order theory, companies with higher internal funds, as measured by return on assets (Frank and Goyal, 2009), are less likely to use external financing, and therefore a negative relationship between the probability of issuing first public bonds and profitability (measured by return on assets) is expected.

Hale and Santos (2008) argue that the use of syndicated loans is substitutes for public bonds, and that therefore those firms that use syndicated loans are more likely to delay their decision to enter the public bond market. On the other hand, those firms might be expected to issue public bonds as they could establish their reputation through the use of syndicated loans. Moreover, firms with previous syndicated loans are more likely to develop their relationships with their investment banks in order to have future public bonds underwritten. In this case, for underwriters, the cost of gathering information is lower, and they have a stronger incentive to motivate firms to undertake their bond IPOs. Thus, the impact of syndicated loans on the probability of entering the public bond market and/or issuing public bond relative to equity is mixed and controversial. The bank relationship is controlled as if a company used syndicated bank loans before issuing its first public bond. Leverage is also included as a proxy for bank relationships. Houston and James (1996) and James (1987) find a positive relationship between bank debt financing and leverage, which suggests that highly levered firms have a positive reputation in credit markets, and thus use public debt financing.

[Insert Table 2 here]

3.3 Data Sources of the Proxy Variables

For private companies, *Fame* is used to get information on firms' balance sheets including total assets, total debt, investments, capital expenditures, earnings, and the structure of assets. A firm's age is also computed from this database by subtracting the incorporation date and the date of a firm enters the public bond market. For public companies, two main databases, *Thomson One* and *Fame*, are used to collect the data on firms' balance sheets. The prospectuses from *Perfect Filings* database are also downloaded to obtain hand-collect data at the time of equity IPO, including total debt, total assets, intangible assets, and interest expenses.

3.4 Methodology

The logit model is used to predict the determinants of entering public bond markets. The dependent variable is binary, 1 if a company undertakes a bond IPO and 0 otherwise. Then a hazard model is used to examine how changes in firm characteristics impact on the firm age at the time it issues its first public bond. Following Hale and Santos (2008), the Cox proportional hazard model (1972) is used to predict the length of time it takes to issue bond-IPOs, after controlling for related factors, as follows:

$$h(t) = h_0(t)e^{x'\beta} \quad (1)$$

where *h(t)* is the hazard rate and, in this case, the event is the firm's decision to issue non-convertible bonds for the first time. The survival analysis controls for a set of *x* control variables. β indicates the change in the hazard for a unit increase in the independent variable. However, for continuous explanatory variables, the hazard ratio measures the marginal effect of a unit increase in the independent variable. For discrete explanatory variables, the hazard ratio indicates the marginal effect when the event occurs. The hazard ratio greater than one means that the reference category (those enter into the public bond) has a shorter time to

event and otherwise. If the hazard ratio is equal to one, it indicates that there is no difference between the two groups.

4. Results

4.1 Univariate Analysis

The results for private companies in Table 3, Panel A, compare first-time bond issuers with non-issuers which are matched using the industry classification. Panel A also compares first-time bond issuers with further equity issuers matched based on their issuing time and industry. Panel B reports the results for private companies that compare first-time bond issuers with industry-matched non-issuers in the second and third column. This panel also reports the results for first-time bond issuers and their matched first-time equity issuers based on the issuance time and industry.

In Panels A and B, consistent with the agency theory in the form of underinvestment problem, the results for public and private companies show that high-growth firms, measured by growth in assets (*GR*), the capital expenditure ratio (*Capex*), and investment ratio (*Inv.*), are less likely to issue their first public bonds. However, high-growth public companies have higher incentives to use further equity financing prior to public bonds. While high-growth private companies are more likely to follow the pecking order theory and hence finance with public debt before undertaking their equity IPOs. The results are not consistent with Hale and Santos (2008) who do not find a significant relationship between the investment ratio and the probability of issuing public bonds. However, the results are in line with Krishnaswami et al. (1999) who find a positive relationship between growth opportunities and the use of private debt, arguing that private debt monitors firms' operating and investment decisions to mitigate the underinvestment problem.

In both panels, the results that compare the first-time bond issuers and non-issuers show that larger firms with lower intangible assets are more likely to enter the public bond market. This finding is consistent with the asymmetric information concept, according to which large firms with higher tangible assets have a better reputation and lower level of asymmetric information problem (Marosi and Massoud, 2007). These results are also consistent with Datta et al. (2000), who argue that public debt involves underwriting, filing, registration, and legal fees, which are too costly for smaller companies. However, older and bigger public firms prefer to use further equity than public bonds financing, suggesting that the lower the degree of asymmetric information, the more the likely firms are use equity financing. While the results for private companies show that larger and older firms are more likely to follow the pecking order theory, and hence issue their first public bonds before undertaking their equity IPOs. Moreover, the results for firms' credit quality and their reputation, as measured by insolvency and interest coverage ratios, are mixed. In contrast to the solvency ratio, which is not statistically significant, the interest coverage ratio is greater for both public and private new bond issuers. These findings suggest that new bond issuers have higher credit quality than their counterparts in line with those of reported by Hale and Santos (2008). Unlike previous studies, the results show that creditworthy public and private companies prefer bond to equity financing.

The results in Panels A and B show that both private and public companies have lower return on assets, suggesting that they have a higher demand for external financing, and hence are more likely to enter the public bond market. The results are in line with those of Hale and Santos (2008) and Datta et al. (2000), who find that firms with a lower demand for external funds wait longer to enter the public bond market. Finally, the results in Panel A show that, for public companies, new issuers have higher leverage and are more likely to tap bank loans to establish their relationships with their banks. In Panel B, the results show that

private companies with greater leverage and bank relationships are more likely to undertake bond IPOs but their decision of entering into the public bond or equity market is independent from their bank relationships and leverage.

[Insert Table 3 here]

4.2 Logit Results

The results in Table 4 show the determinants of undertaking bond IPOs for both public and private companies using the logit model. I try to check the multicollinearity problem across the proxies for growth opportunities as they are scaled by total assets. However, the results are consistent across all models. Panel A reports the results for public companies. The first three Models (1-3) show the results for first-time bond issuers against non-issuers. The dependent variable in Models (1-3) is categorised as 1 if a company issues bond for the first time and 0 otherwise. While the last three Models (4-6) show the results for first-time bond issuers against further new equity issuers. The dependent variable in Models (4-6) is categorised as 1 if a company issues bond for the first time and 0 if the company issues further new equity. Panel B reports the results for private companies. The first three models show the results for first-time bond issuers against non-issuers while the last three models show the results for first-time bond issuers against first-time equity issuers. The dependent variable in the first three columns is categorised as 1 if a company issues bond for the first time and 0 otherwise. In the last three columns, it is categorised as 1 if a company issues bond for the first time and 0 if the company issues equity for the first time.

In both panels (Models 1-3), in keeping with the underinvestment problem that indicates a tendency on the part of high-growth firms forgo investments in positive NPV projects (Myers, 1977), thereby reducing firm value, I find that firms with high growth opportunities are less likely to enter the public bond market, which suggests that they prefer other, private, sources of debt to mitigate the underinvestment problem. Denis and Mihov

(2003) argue that private debt-holders are more concentrated than public debt-holders and, hence, that firms are more likely to establish a continuous relationship with banks to help them solve their underinvestment problems. Both public and private firms prefer to delay their time to enter the public bond market to mitigate their underinvestment problems. These results are not consistent with those of Johnson (1997), who does not find any relationship between growth opportunities and the use of public debt. However, in Panel A (Models 4-6), the results show that public companies prefer to issue further equity before issuing their first public bond as the proxy variables for underinvestment problem; *GR*, *Inv.*, and *Capex*, are negatively related to the decision of issuing bonds versus equity. While, in Panel B (Models 4-6), private companies prefer to issue their first public bonds before undertaking their equity IPO. The results are relatively consistent for all variables which are used as proxies for growth opportunities, *GR*, *Inv*., and *Capex*, showing that the proxy variables are positively related to the decision of entering the public bond market before undertaking IPOs.

For public companies in Panel A (Models 1-3), the results for firm size and intangibility of assets show that larger firms with greater tangible assets are more likely to enter the public bond market. These results are consistent with Marosi and Massoud (2007), who argue that such firms are subject to less asymmetric information problems, and Denis and Mihov (2003), who find that firm size and the fixed asset ratio are positively related to the probability of choosing public debt. In contrast, the results in Models (4-6) suggest that larger and older firms are more likely to issue further new equity before entering the public bond market, suggesting that asymmetric information is less sever for public companies, and hence they are more likely to raise equity capital. Moreover, Marsh (1982), Titman and Wessels (1988), Michaelas (1999), and Frank and Goyal (2009) also argue that firms with more tangible assets lose less firm value when they go into bankruptcy; therefore it is expected that firms with higher collateral will obtain more external financing.

For private companies in Panel B (Models 1-3), the results for firm age and size for private companies show that older and bigger firms are more likely to enter the public bond market. Firms' intangibility has a positive and significant impact on the likelihood of bond IPOs relative to equity IPOs (Model 3), but is statistically negative for the probability of issuing first public bonds against non-issuers (Model 6). These results suggest that asymmetric information delays the probability of issuing public bonds but companies tend to enter the public bond market earlier than the equity market to mitigate the cost of asymmetric information.

In Panel A, the empirical proxies for firms' credit quality, the interest coverage ratio in Model 3, is statistically significant and positive for public companies, suggesting that public companies are more likely to issue their first public bonds when they have greater credit quality in the market. In particular, they are more likely to issue their first public bonds before issuing further new equity as suggested in Models (4-6). In contrast, in Panel B (Models 4-6), the proxy variables for firms' credit quality, *Int. C* and *Solv*, increase only the probability of issuing first public bonds before issuing first equity.

The results in Panel A (Models 1-3) demonstrate that public firms with a higher demand for external financing, measured by return on assets (*ROA*), are more likely to enter the public bond market, suggesting that the demand for external financing is a significant determinant in predicting a firm's decision to issue a bond IPO. While returns on assets do not have significant impact on the probability of issuing first public bonds compared to new equity issuers in Models (4-6). For private companies in Panel B, the results show that private companies with greater return on assets are less likely to undertake their bond IPOs (Models 1-3) but they are more likely to issue their first public bonds before issuing new equity (Models 4-6). The results are in line with the pecking order theory (Myers, 1977) which predicts that firms with greater internal financing, measured by return on assets (Frank and

Goyal, 2009), are less likely to use external financing. By contrast, the results are not in line with Denis and Mihov (2003) who find little evidence of a significant and positive relationship between profitability and the use of public debt.

In Panel A, in contrast to Hale and Santos (2008), who find that firms with higher leverage do not wait longer to enter the public bond market, the results for public companies show that firms with higher leverage are less likely to tap the public bond market (Models 1-3). However, in Panel B, the impact of leverage is not significant for private companies in Models (1-3). Finally, firms' access to syndicated loans facilitates their relationships with banks, thereby developing the relationship with their underwriters. These relationships are highly important in mitigating asymmetric information between firms and their potential bond underwriters (Hale and Santos, 2008). Consistently, in Models (1-3), I find that both public and private firms that had bank loans before issuing their first public bonds are more likely to enter the public bond market, suggesting that firms' relationships with their banks help them to undertake their bond IPOs. Especially, the results of Panel A for Models (4-6) suggest that pubic companies prefer to enter the public bond market before issuing further equity if they had bank loans.

[Insert Table 4 here]

In Figure 2, the changes in two of fundamental factors 3 years before the bond-IPO date are traced. In line with the results reported above for public companies, Panel A shows that, relative to the control firms, growth opportunity as measured by growth in assets, at the time of the IPO, and the last three years before the IPO date, is lower for first-time bond issuers, while it remained relatively stable and high for the control firms (non-issuers). This panel also shows that size as measured by logarithm of total assets increased for first-time issuers over the last three years before taking bond-IPOs. In contrast, it was smaller at the time of IPO and relatively constant over the last three years prior to the IPO date for the

control firms. In Panel B, the results for private companies are similar and even more pronounced. Overall, these results are in line with the findings from the univariate analysis, and suggest that first-time issuers are larger and have lower growth opportunities, supporting the agency and asymmetric information hypotheses that those firms that suffer less adversely from asymmetric information and underinvestment problems are more likely to tap the public bond market.

[Insert Figure 2 here]

4.3 Cox Proportional Hazard Results

The results in Table 5 show the survival analysis of a firm's decision to undertake a bond IPO. I use the Cox Proportional Hazard Model to investigate the determinants the time that a firm it enters the public bond market during the recent financial crisis. A positive coefficient indicates that the related variable promotes the hazard event, which is to undertake a bond IPO. Panel A presents the results for public companies while Panel B presents the results for private companies. In Models (1-5) of both Panels, the dependent viable is the time at which a firm issues public bond for the first time, assuming that there is a probability of issuing bond every year to satisfy the assumption of proportional hazard in which all explanatory variables are time-invariant. In Models (6-10) in Panel A, the dependent viable is the time at which a public firm issues public bond before issuing equity. In Models (6-10) in Panel B, the dependent viable is the time at which a private firm issues public bond before undertaking an IPO.

In Panels A and B, the results in Models (1) and (2) show that both public and private companies enter the public bond market earlier when they have lower investment and capital expenditure to asset ratios, suggesting that the underinvestment problem decreases the hazard of undertaking bond IPOs during the financial crisis. However, the results in Panel A (Models 6 and 7) show that public companies issue bond before equity. In contrast, considering

Models 6 and 7 in Panel B, private companies are more likely to enter the public bond earlier than the equity market when they have higher growth opportunities. I test for the robustness of the results by using different measures of growth opportunities across all models, which support similar findings. Lower return on assets accelerates both public and private companies' decision to issue their first public bonds. These results provide strong support for the impact of external financing, suggesting that firms with higher return on assets are less likely to use external financing (Myers, 1977). The results for Models (6-10) in both panels show that both public and private firms prefer debt to equity financing when they have higher return on assets and hence enter the public bond market earlier.

In Model (3) of Table 5, I further investigate the impact of asymmetric information on the hazard of issuing the first public bonds. The results for both companies in Panels A and B show that creditworthy firms, measured by the solvency ratio, enter the public bond market earlier. However, the results for credit quality, measured by the interest coverage ratio, are mixed for both public and private companies in Model (4 and 8). For public companies (Model 4 in Panel A), it accelerates the time of entering the public bond market, while, for private companies (Model 8 in Panel B), it accelerates the time of issuing first public bonds before entering the equity market. Moreover, the results in Model (4) suggest that larger firms with lower intangible assets undertake their bond IPOs earlier than smaller firms with higher intangible assets. These findings are consistent with Denis and Mihov (2003) and Johnson (1997), who find that larger firms are more creditworthy, and hence use more public debt. However, large public companies are more likely to issue further equity than to undertake their bond IPOs (Models 8-10).

The results of Model (5) in Panel A show those, for public companies, firms with higher leverage are more likely to wait longer to issue their first public bonds, suggesting that firms with higher leverage are less creditworthy, and that that is why they delay undertaking

their bond IPOs. In contrast, private companies (Panel B) with higher leverage are more likely to issue their first public bonds earlier than those private companies with lower leverage. This result is consistent with Hale and Santos (2008), who find that leverage is positively related to the hazard of issuing the first public bonds and is consistent with the pecking order theory in the sense that companies tap the public bond market after using bank and non-bank private debt. Denis and Mihov (2003) also find that leverage increases the probability of issuing public debt; they note that existing leverage highlights a positive reputation in credit markets, thereby increasing that probability of issuing public bond.

The overall results show that both public and private companies with higher growth opportunities and stronger reputation in capital markets accelerate the time of entering the public bond market. However, I find mixed evidence for the impact leverage and syndicated loans on the timing of their bond IPOs. I find that bank relationships increase the probability of issuing first public bonds, while, unlike private companies, leverage inhibits the decision to enter public bond markets.

The results for hazard ratios (H-1) show that, among public companies in Panel A, firms with lower intangibility are the most likely firms to issue their first public bond, proving strong evidence of the impact of information asymmetry. Moreover, the results for H-2 show that, for public companies, those with the highest credit quality measured by solvency ratio have the highest probability of choosing public debt relative to further equity. For private companies in Panel B, bigger companies have the highest probability of undertaking their bond IPOs (H-1) while those companies with the best relationship with their banks have the highest probability of entering the public bond relative to equity market (H-2).

[Insert Table 5 here]

In Figure 2, the changes in some of fundamental factors 3 years before the bond-IPO date are traced. In line with the results reported above for public companies, Panel A shows that, relative to the control firms, growth opportunity as measured by growth in assets, at the time of the IPO, and in three years before the IPO date, is lower for first-time bond issuers, while it remained relatively stable and high for the control firms. This panel also shows that size as measured by logarithm of total assets increased for first-time issuers over the last three years before taking bond-IPOs. In contrast, it was smaller at the time of IPO and relatively constant over the last three years prior to the IPO date for the control firms. In Panel B, the results for private companies are similar and even more pronounced. Overall, these results are in line with the findings from the univariate analysis, and suggest that first-time issuers are larger and have lower growth opportunities, supporting the agency and asymmetric information hypotheses that those firms that suffer less adversely from asymmetric information and underinvestment problems are more likely to tap the public bond market.

5. Conclusions

This paper examines the set of determinants of the timing of bond IPOs. In particular, the aim of this paper is to investigate the factors that impact on firms' decisions to issue their first public bonds during the crisis. Using a sample of bond IPOs made between 2007 and 2011 in the UK, I document that agency costs in the form of underinvestment problems decrease the probability of issuing first public bonds. These results prove consistent when I use the Cox Proportional Hazard Model as an additional estimation. I find that both public and private firms delay the time of issuing their first public bonds when they have higher growth opportunities, measured by the ratio of capital expenditure, total investment, and asset growth, supporting the underinvestment problem. However, private companies tend to follow the pecking order theory, and hence issue public bonds prior to become public.

My findings show that larger firms with higher tangible assets are more likely to undertake bond IPOs, as they suffer less adversely from asymmetric information problems. In addition, I find that creditworthy firms are more likely to enter the public bond market during the crisis, as firms with greater interest coverage and/or solvency ratios have established their market reputations, and hence are more likely to undertake bond IPOs, providing strong evidence of the impact of asymmetric information on the decision to issue first public bonds. Moreover, the results show that firms issuing their first public bonds have used syndicated bank loans, suggesting that their relationships with banks might have helped them to enter the public bond market during the crisis.

References

Barclay, M., Smith, C., 1995. The maturity structure of corporate debt. *Journal of Finance* 50, 609–631.

Berlin, M., Loyes, J., 1988. Bond covenants and delegated monitoring. *Journal of Finance* 43, 397-412.

Bharath, S.T. and Dittmar. A. K., 2010. Why do firms use private equity to opt out of public markets?. *The Review of Financial Studies* 23, 1772-1818.

Blackwell, D., Kidwell, D., 1988. An investigation of the cost differences between public sales and private placements of debt. *Journal of Financial Economics* 22, 253–278.

Cox, D. R., 1972. Regression models and life-tables (with discussion). *Journal of the Royal Statistical Society* 34, 187-220.

Datta, S., Iskandar-Datta, M., Patel, A., 2000. Some evidence on the uniqueness of initial public debt offerings. *Journal of Finance* 55, 715–743.

Denis, D. J., Mihov, V. T., 2003. The choice among bank debt, non-bank private debt and public debt: Evidence from new corporate borrowings. *Journal of Financial Economics* 70, 3-28.

Diamond, D., 1984. Financial intermediation and delegated monitoring. *Review of Economic Studies* 51, 393-414.

Diamond, D. W., 1991. Debt maturity structure and liquidity risk. *The Quarterly Journal of Economics* 106, 709-737.

Djankov, S., McLiesh, C., and F., Shleifer, A., 2007, Private credit in 129 countries, *Journal of Financial Economics* 82, 299-329.

Easterwood, J., Kadapakkam, P. R., 1991. The role of private and public debt in corporate capital structures. *Financial Management* 20, 49-57.

Frank, M. Z. and Goyal, V. K., 2009, Capital structure decisions: Which factors are reliably important?. *Financial Management* 38, 1-37.

Franks, J. R. and Torous, W. N., 1993, A comparison of the U.K. and U.S. bankruptcy codes. *Continental Bank Journal of Applied Corporate Finance* 6, 95-103.

Gilson, S., Warner, J., 1998. Junk bonds, bank debt and financing corporate growth. Working paper, Harvard Business School.

Hale, J. and Santos, A. C., 2008. The decision to first enter the public bond market: The role of firm reputation, funding choices, and bank relationships. *Journal of Banking and Finance* 32, 1928-1940.

Helwege, J. and Packer, F., 2001. The decision to go public: Evidence from corporate bond issuers. Working paper. SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=280890.

Houston, J., James, C. M., 1996. Bank information monopolies and the mix of private and public debt claims. *Journal of Finance* 51, 1863- 1899.

James, C. M., 1987. Some evidence on the uniqueness of bank loans. *Journal of Financial Economics* 19, 217-235.

Johnson, S. A., 1997. An empirical analysis of the determinants of the corporate debt ownership structure. *Journal of Financial and Quantitative Analysis* 32, 47-69.

Krishnaswami, S., Spindt, P., Subramaniam, V., 1999. Information asymmetry, monitoring and the placement structure of corporate debt. *Journal of Financial Economics* 51, 407-434.

La Porta, R., Lopez-De-Silanes, F., Shileifer A., and Vishny, R. W., 1997. Legal determinants of external finance. *The Journal of Finance* 3, 1131-1150.

Leland, H., Pyle, D., 1977. Informational asymmetries, financial structure, and financial intermediation. *Journal of Finance* 32, 371-387.

Marosi, A. and N. Massoud, 2007, Why do firms go dark? *Journal of Financial and Quantitative Analysis* 42, 421-442.

Marsh, P., 1982. The choice between equity and debt: An empirical study. *Journal of Finance* 37, 121-144.

Michaelas, N., Chittenden, F., and Poutziouris, P., 1999. Financial policy and capital structure choice in U.K. SMEs: Empirical evidence from company panel data. *Small Business Economics* 12, 113-130.

Myers S. C., 1977. Determinants of corporate borrowing. *Journal of Financial Economics* 5, 147-175.

Myers, S. C. and Majluf, N. S., 1984. Corporate financing and investment decisions when firms have information that investors do not have'. *Journal of Financial Economics* 13, 187-221.

Pagano, M., Panetta, F., and Zingales, L., 1998. Why do companies go public? An empirical analysis. *The Journal of Finance* 53, 27-64.

Rajan, R. and Zingales, L., 1995. What do we know about capital structure: Some evidence from international data. *Journal of Finance* 50, 1421-1460.

Rajan, R., Winton, A., 1995. Covenants and collateral as incentives to monitor. *Journal of Finance* 50, 1113–1146.

Titman, S., and Wessels, R., 1988. The determinants of capital structure choice. *Journal of Finance* 43, 1-21.

Welch, I., 1997. Why is bank debt senior? A theory of asymmetry and claim priority based on influence costs. *Review of Financial Studies* 10, 1203–1236.

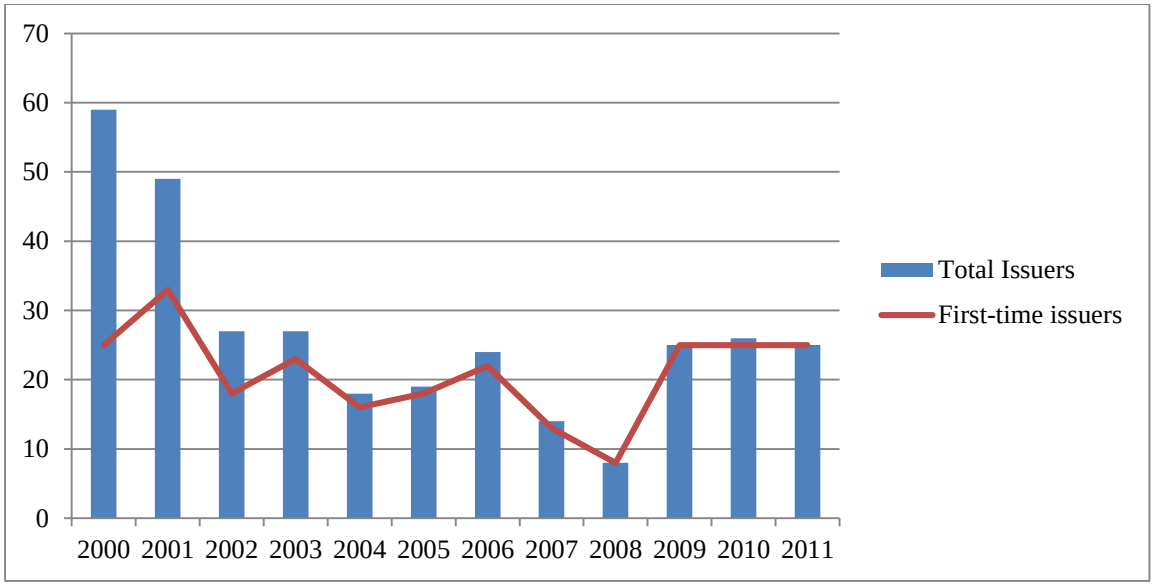
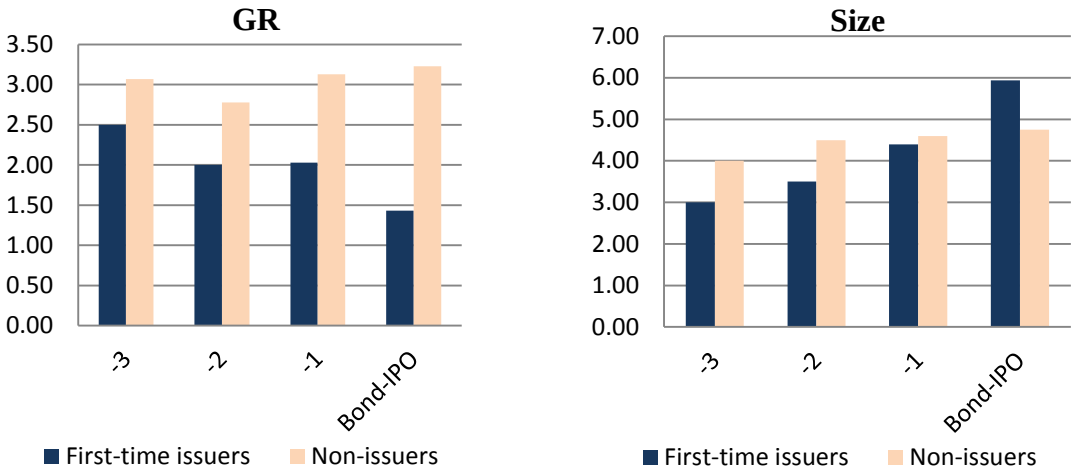


Figure 1: Non-convertible Bonds Issued by Non-Financial Companies

This graph shows issuance of non-convertible bonds by non-financial companies as well as first-time issuers during 2001-2011.
Source: author calculation based on the information of *SDC Platinum and Thomson One Banker*.

Panel A: Public Companies



Panel B: Private Companies

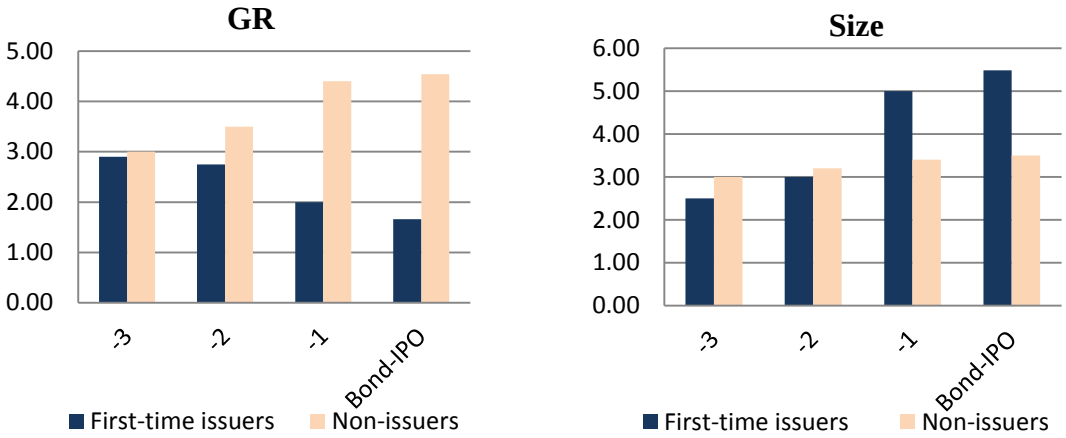


Figure 2: Trend in Firms' Characteristics over the Bond-IPO Period.

The sample includes 90 (59 public and 31 private) firms that issue their first-time bonds during the sample period between 2007 and 2011. Non-issuers are matched firms based on the industry classification. Panels A and B illustrate the results for public and private companies, respectively. *GR* is growth rate in assets and *Size* is measured by logarithm of total assets
Source: author calculation based on the information of *SDC Platinum, Thomson One Banker,* and *Fame.*

Table 1: Distribution of Bond IPOs by Issuing Year and Firms' Age

Panel A: Distribution of bond IPOs

Year	Public	Percentage	Private	Percentage
2007	2	3.39	3	9.68
2008	8	13.56	3	9.68
2009	11	18.64	4	12.90
2010	9	15.25	7	22.58
2011	29	49.15	14	45.16
Total	*59*		*31*	
Panel B: Firms' age at the time of bond IPO				
2007	16.00		23.33	
2008	21.86		10.67	
2009	20.36		24.25	
2010	17.33		20.00	
2011	21.61		22.21	
Average	*20.61*		*20.97*	

This table shows a sample of initial public offers of non-convertible bonds during 2007 and 2011. Panel A shows the distribution of bond IPOs by issuing year and Panel B shows the average age of firms at the time of their bond IPOs.

Table 2: Definition of the Proxy Variables

Variables	Description	Hypotheses	Sign
GR	Growth rate is growth in assets	Agency conflict (underinvestment problem)	-
Inv.	Investment ratio is computed as total investment over total assets	Agency conflict (underinvestment problem)	-
Capex	Capital expenditure ratio is computed as capital expenditure over total assets	Agency conflict (underinvestment problem)	-
Intg.	Intangibility is computed as intangible assets over total assets	Asymmetric information	-
Age	Firm age at the bond IPO date	Asymmetric information	+
Size	Firm size is measured by logarithm of total assets	Asymmetric information	+
Int.C	Interest coverage is computed as earnings before interest and taxes over interest expenses	Asymmetric information	+
Solv.	Solvency ratio is measured by the ratio between profits after tax and total liabilities	Asymmetric information	+
ROA	Return on assets is measured by earnings before interest and tax over total assets	External needs	-
Leverage	Measured by total debt divided by total assets	Bank relationships	-/+
Bank loans	A dummy variable is set to 1 if the company used syndicated bank loans before taking it bond IPO	Bank relationships	-/+

This table summarises the proxy variables, their definitions, related hypotheses, and their expected signs based on the relevant theories.

Table 3: Firms' Characteristics for First-Time Issuers and Non-Issuers for Public and Private Samples

Panel A: Public Companies

	First-time bond issuers	Non-issuers	t-statistics (MW test)	First-time bond issuers	Further equity issuers	t-statistics (MW test)
GR	1.43	3.23	-3.68***	1.98	2.25	-1.99**
	(1.11)	(4.01)	(2.99)***	(1.20)	(2.00)	(2.58)***
Inv.	0.09	0.10	-0.25	0.05	0.12	-1.98**
	(0.00)	(0.04)	(1.02)	(0.00)	(0.10)	(2.00)**
Capex	0.03	0.15	-1.98**	0.00	0.04	-1.75*
	(0.00)	(0.05)	(1.46)	(0.00)	(0.03)	(1.00)
Intg.	0.06	0.10	-1.74*	0.00	0.05	-1.24
	(0.02)	(0.04)	(0.52)	(0.02)	(0.01)	(1.01)
Age	20.61	18.11	1.95**	16.50	19.05	-1.95**
	(15.00)	(12.00)	(1.61)	(15.00)	(18.50)	(2.15)**
Size	5.94	4.75	1.98**	3.25	4.00	-2.41**
	(5.90)	(2.64)	(2.02)**	(3.17)	(3.98)	(2.00)**
Int. C	5.63	3.97	3.02***	3.05	2.10	2.88***
	(1.94)	(0.32)	(1.95)*	(2.84)	(1.98)	(2.24)**
Solv.	31.27	34.29	-0.35	27.00	19.25	2.54**
	(33.20)	(33.55)	(1.01)	(20.25)	(15.00)	(1.99)**
ROA	0.24	0.58	-2.58***	0.11	0.09	0.58
	(0.33)	(0.13)	(1.99)**	(0.19)	(0.14)	(2.05)**
Bank loans	0.13	0.08	1.96**	0.15	0.04	2.88***
	(0.00)	(0.00)		(0.00)	(0.00)	
Leverage	0.37	0.23	3.54***	0.21	0.15	1.75*
	(0.33)	(0.13)	(1.99)**	(0.19)	(0.14)	(2.05)**
N	59	59		59	59	

Panel B: Private Companies

	First-time bond issuers	Non-issuers	t-statistics (MW test)	First-time bond issuers	First-time equity issuers	t-statistics (MW test)
GR	1.66	4.54	-2.88***	1.50	1.49	0.54
	(1.50)	(2.00)	(3.01)***	(1.18)	(1.12)	(0.83)
Inv.	0.06	0.21	-3.52***	0.15	0.17	-0.84
	(0.02)	(0.11)	(2.40)**	(0.12)	(0.12)	(0.00)
Capex	0.01	0.00	0.12	0.05	0.00	1.81*
	(0.00)	(0.00)	(1.08)	(0.00)	(0.00)	(1.08)
Intg.	0.15	0.14	1.02	0.12	0.11	0.54
	(0.07)	(0.11)	(1.69)*	(0.15)	(0.05)	(1.75)*
Age	20.97	20.05	1.00	22.00	15.20	2.33**
	(18.00)	(17.00)	(1.01)	(18.50)	(14.00)	(1.90)*
Size	5.49	3.53	2.31**	3.00	2.52	2.21**
	(3.57)	(1.69)	(2.25)**	(1.50)	(1.02)	(1.75)*
Int. C	3.54	2.22	4.05***	2.54	1.05	2.25**
	(0.64)	(0.00)	(2.05)**	(2.05)	(0.98)	(1.95)**
Solv.	17.19	15.17	1.66	15.02	10.25	1.98**
	(18.49)	(14.11)	(1.75)*	(10.99)	(10.00)	(1.12)

ROA	1.36	2.33	-1.92**	1.92	2.54	-2.12**
	(1.00)	(3.93)	(3.25)***	(1.25)	(1.90)	(2.10)**
Leverage	0.63	0.58	2.98***	0.45	0.52	-1.24
	(0.69)	(0.24)	(2.00)**	(0.44)	(0.49)	(1.00)
Bank loans	0.21	0.05	2.86***	0.10	0.08	1.36
	(0.00)	(0.00)		(0.00)	(0.00)	
N	31	31		31	31	

The table presents the means (medians) of the characteristics of the first time issuers and non-issuers for public companies in Panel A and for private companies in Panel B. I divide the sample issuers into 3 categories; first-time bond issuers are those that issue their first public bonds during 2007-2011, further equity issuers are those that issue further new equity in their post-IPO period during 2007-2011, and first-time equity issuers are those that undertake their equity IPOs during 2007-2011. In Panel A, the first-time bond issuers include 59 public companies which matched with 59 non-issuers based on the industry classification and with 59 further equity issuers based on the timing issue and industry. In Panel B, 31 private companies matched with 31 non-issuers based on the industry classification and with 31 first-time equity issuers based on the timing issue and industry. Following Hale and Snatos (2008), for first-time bond issuers, the variables are measured the year before they issue their first public bond. For non-issuers, the variables are computed at the end of the sample period (2007-2011). For first-time equity issuers, the variables are measured at the time of their IPOs. The t-statistics for the differences in means and the Wilcoxon-Mann-Whitney test (MW) of the differences in medians are reported in the last column. The remaining variables are defined in Table 2. ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively.

Table 4: Logit Results

Panel A: Public Companies						
	First-time bond issuers vs. non-issuers			First-time bond issuers vs. new equity issuers		
	(1)	(2)	(3)	(4)	(5)	(6)
GR	-0.005**		-0.002*	-0.085		-0.091*
	(-1.99)		(-1.84)	(-0.75)		(-1.88)
Inv.		-0.570**	-0.655**		-0.025**	-0.030***
		(-2.23)	(-2.51)		(-2.01)	(-2.59)
Capex	-1.684*	-1.643*	-1.673*	-0.011**	0.009*	-0.012*
	(-1.75)*	(-1.69)	(-1.74)	(-2.16)	(-1.75)	(-1.69)
Intg.			-0.125**			-0.654**
			(-2.54)			(-1.99)
Age	0.019*	0.020*	0.028*	-0.251**	-0.212**	-0.119**
	(1.72)	(1.89)	(1.87)	(-1.96)	(-2.22)	(-2.35)
Size	3.416***	3.510***	4.138***	-0.357*	-0.285**	-0.254*
	(12.91)	(12.63)	(10.02)	(-1.93)	(-2.12)	(-1.75)
Int. C			0.010**			0.151*
			(2.09)			(1.92)
Solv.	0.009	0.008	0.005	0.548*	0.652**	0.548**
	(1.09)	(0.85)	(0.56)	(1.75)	(2.18)	(2.02)
ROA	-0.005**	-0.008***	-0.003**	0.012	0.005	0.002
	(-2.34)	(-3.23)	(-2.79)	(1.13)	(1.25)	(1.09)
leverage	-1.442**	-1.548***	-1.349**	-0.110**	-0.958**	-0.920***
	(-1.99)	(-2.85)	(-2.45)	(-2.54)	(-2.41)	(-3.25)
Bank Loans	0.195*	0.202*	0.240**	0.212**	0.200*	0.230*
	(1.78)	(1.90)	(1.99)	(1.95)	(1.75)	(1.77)
Constant	4.129***	4.292***	4.598***	2.012	2.87	2.01
	(8.63)	(8.50)	(5.02)	(0.02)	(1.20)	(0.99)
Pesudo R^2	0.421	0.434	0.422	0.321	0.412	0.445
H.L test	0.154	0.161	0.144	0.111	0.141	0.145
Panel B: Private Companies						
	First-time bond issuers vs. non-issuers			First-time bond issuers vs. first-time equity issuers		
GR	-0.002		-0.001	0.920		0.990
	(-1.14)		(-0.89)	(1.01)		(1.19)
Inv.	-0.398**	-0.370***	-0.356***	0.254*	0.201*	0.214*
	(-2.50)	(-3.09)	(-3.67)	(1.70)	(1.89)	(1.67)
Capex	0.080	0.084	0.071	0.021**	0.025*	0.020*
	(0.16)	(0.15)	(0.13)	(2.16)	(1.75)	(1.93)
Intg.			-2.758***			1.253***
			(-5.05)			(2.98)
Age	0.015***	0.012**	0.010**	0.142*	0.144**	0.121**
	(2.70)	(2.16)	(2.17)	(1.70)	(1.98)	(2.05)
Size	1.617***	1.559***	1.524***	0.981**	0.871**	0.857*
	(16.33)	(14.48)	(13.73)	(2.53)	(2.28)	(1.73)
Int. C			0.001			0.145*

			(1.34)			(1.84)
Solv.	0.005	0.006	0.008	0.045**	0.058***	0.052**
	(0.74)	(0.58)	(1.42)	(1.98)	(2.98)	(2.02)
ROA	-0.004**	-0.004*	-0.005*	0.102**	0.100**	0.105**
	(-2.01)	(-1.85)	(-1.79)	(2.09)	(2.25)	(2.00)
leverage	-0.245	-0.268	-0.260	-0.010	-0.012	-0.018
	(-0.87)	(-0.88)	(-0.50)	(-1.45)	(-1.02)	(-1.40)
Bank Loans	0.010**	0.008**	0.012***	0.005	0.006	0.010
	(2.45)	(1.99)	(3.54)***	(0.44)	(0.23)	(0.35)
Constant	-1.829**	-1.887**	-1.968***	2.012	1.985	1.257
	(-2.00)	(-2.39)	(-3.34)	(0.10)	(1.39)	(1.74)
Pesudo R^2	0.166	0.189	0.210	0.125	0.168	0.195
H.L test: (p-value)	0.103	0.124	0.110	0.152	0.145	0.121

This table presents the results for the logit regression for the factors affecting the probability of issuing bonds for the first time, in which the dependent variable in the first three columns (models 1-3) of Panel A is categorised as 1 if a company issues bond for the first time and 0 otherwise and, in the last three columns (models 4-6), is categorised as 1 if a company issues bond for the first time and 0 if the company issues further new equity. In Panel B, the dependent variable in the first three columns is categorised as 1 if a company issues bond for the first time and 0 otherwise. In the last three columns, it is categorised as 1 if a company issues bond for the first time and 0 if the company issues equity for the first time. The variables are defined in Table 2. The Hosmer and Lemeshow (H.L) test shows the goodness-of-fit of the subsequent models. Its significance shows that the model does not fit the data. ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively. The t-statistics are reported in parentheses.

Table 5: Determinants of Timing Bond IPOs

Panel A: Public Companies

	First-time bond issuers vs. non-issuers						First-time bond issuers vs. new equity issuers					
	(1)	(2)	(3)	(4)	(5)	H-1	(6)	(7)	(8)	(9)	(10)	H-2
GR	-0.002	-0.002	-0.002	-0.004	-0.006	0.994	-0.020	-0.032	-0.029	-0.035	0.030	0.225
	(0.425)	(0.373)	(0.611)	(0.328)	(0.162)		(0.232)	(0.425)	(0.475)	(0.521)	(0.500)	
Inv.	-0.931**						-0.254					
	(0.013)						(0.850)					
Capex		-0.431**	-0.666*	-0.672**	-0.536**	0.790		-0.542*	-0.624**	-0.651**	-0.589**	1.022
		(0.034)	(0.071)	(0.020)	(0.025)			(0.051)	(0.010)	(0.011)	(0.023)	
Intg.			-2.994***	-3.417***	-3.938***	1.321			-0.984*	-0.854*	-0.787**	0.587
			(0.000)	(0.000)	(0.000)				(0.061)	(0.084)	(0.074)	
Size			1.359***	1.369***	1.527***	0.217			-0.475**	-0.471**	-0.511*	0.870
			(0.000)	(0.000)	(0.000)				(0.030)	(0.045)	(0.065)	
Int. C			0.009*						0.008			
			(0.073)						(0.257)			
Solv.				0.006**	0.015**	0.986				0.054**	0.084**	1.551
				(0.040)	(0.010)					(0.040)	(0.035)	
ROA	-0.001**	-0.001	-0.003	-0.008**	-0.008**	0.992	0.651	0.877**	0.810*	0.741*	0.784*	0.980
	(0.015)	(0.482)	(0.362)	(0.023)	(0.018)		(0.587)	(0.030)	(0.053)	(0.058)	(0.062)	
Leverage					-1.281**	0.278					-1.025	0.743
					(0.040)						(0.120)	
Bank Loans			0.198**	0.211**	0.214**	0.956			0.425**	0.385*	0.354*	1.254
			(0.035)	(0.045)	(0.025)				(0.047)	(0.068)	(0.085)	
Likelihood R. Test	1345.573**	1350.573	554.967***	544.787***	536.767***		451.011***	480.217***	525.132***	401.424***	422.241***	
p-value	(0.041)	(0.559)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

Panel B: Private Companies

	First-time vs. non-issuers						First-time bond issuers vs. first-time equity issuers					
GR	-0.002	-0.002	-0.001	-0.001	-0.000	1.004	0.012	0.017	0.014	0.010	0.009	1.000
	(0.331)	(0.224)	(0.507)	(0.750)	(0.831)		(0.258)	(0.242)	(0.552)	(0.587)	(0.258)	
Inv.	-2.748***						1.025*					
	(0.000)						(0.058)					

Capex		-1.069***	-1.487***	-1.625***	-1.618***	1.510		0.568**	0.425**	0.482**	0.654**	0.875
		(0.000)	(0.000)	(0.001)	(0.003)			(0.035)	(0.041)	(0.050)	(0.033)	
Intg.			-2.779***	-2.728***	-2.631***	0.782			0.321	0.245	0.302	0.254
			(0.001)	(0.001)	(0.001)				(0.101)	(0.124)	(0.130)	
Size			1.310***	1.270***	1.225***	2.634			0.280**	0.325**	0.410*	1.504
			(0.000)	(0.000)	(0.000)				(0.032)	(0.045)	(0.085)	
Int. C			0.001						0.024**			
			(0.248)						(0.024)			
Solv.				0.018***	0.005**	0.976				0.041*	0.034*	0.587
				(0.000)	(0.023)					(0.058)	(0.073)	
ROA	-0.001**	-0.002**	-0.004*	-0.005*	-0.004**	1.005	0.041***	0.032*	0.050**	0.058*	0.062*	0.985
	(0.037)	(0.030)	(0.083)	(0.087)	(0.021)		(0.002)	(0.052)	(0.044)	(0.087)	(0.058)	
Leverage					1.411**	0.612					1.325	0.684
					(0.050)						(0.854)	
Bank Loans			0.035*	0.039*	0.050*	1.307			0.077**	0.089*	0.084*	1.541
			(0.074)	(0.083)	(0.085)				(0.034)	(0.066)	(0.082)	
Likelihood R. Test	951.064***	980.571***	845.082***	867.488***	862.171***		854.024***	880.524***	721.252***	767.254***	725.541***	
p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

The table presents the results for the cox proportional hazard model in Panel A and for private companies in Panel B. In Models (1-5) of both Panels, the dependent viable is the time at which a firm issues public bond for the first time, assuming that there is a probability of issuing bond every year to satisfy the assumption of proportional hazard in which all explanatory variables are time-invariant. In Models (6-10) in Panel A, the dependent viable is the time at which a public firm issues public bond before issuing equity. In Models (6-10) in Panel B, the dependent viable is the time at which a private firm issues public bond before undertaking an IPO. The hazard ratio (H-1 and H-2) is reported for Model (5 and 10, respectively) which indicates the marginal effect of a unit increase in independent variable for continuous explanatory variables and the marginal effect when the event occurs for discrete explanatory variables. If the hazard ratio is greater than one the reference category (here 1) has a shorter time to event and if it is equal to one there is no difference between the groups. The variables are defined in Table 2. p-values are in parentheses. ***, **,* significant at the 1 %, 5% and 10% level, respectively.