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The effects of corporate bond granularity ☆

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ABSTRACT

We investigate whether and how firms manage their rollover risk by having a dispersed bond maturity structure (granularity). Granularity can be achieved or maintained by frequently issuing sets of bonds with different maturities. We find that firms with higher granularity have higher availability of financing, lower cost of financing, lower financial constraints and lower stock return volatility. The effects are stronger for firms that face higher rollover risk. The evidence suggests that spreading out bond maturities is an effective corporate policy to manage rollover risk.

1. Introduction

Managing rollover risk is essential for the success of a firm. Rollover risk arises when a firm cannot meet its financing needs – either being unable to rollover its debt at maturity or being unable to finance new investment opportunities (e.g., Diamond, 1991). When a firm faces severe rollover risk, it may be forced to search for expensive alternative financing sources, undertake a costly debt restructuring process, or even liquidate its assets, possibly at fire-sale prices (e.g., Brunnermeier and Yogo, 2009). Survey evidence suggests that, when deciding on debt issues, one of the primary concerns for CFOs is to avoid the clustering of debt maturity dates (e.g., Graham and Harvey, 2001; Servaes and Tufano, 2006). Ideally, firms with a well-spread maturity structure of outstanding debt expect to straddle the rollover risk as they have to refinance only a small fraction of their total debt at any point of time. Despite its popularity in practice, research on corporate debt maturity granularity is scarce.

In this paper we examine which firms create and maintain a dispersed bond maturity structure through new bonds issues and what the impact of granularity is on key aspects of corporate finance. Our analysis complements and extends the study of Choi et al. (2014) and studies on the interplay of rollover risk and credit risk, especially for financially constrained firms and during the financial crisis (e.g., Gopalan et al., 2014; Almeida et al., 2012; Duchin et al., 2010).

We focus on publicly listed firms from the United States to study whether and how the bond maturity structure is used to manage rollover risk. We consider firms' financing with public debt for several reasons. First, different from the equity financing which has infinite maturity debt financing has fixed maturity. This gives repeatedly rise to rollover risk, making debt finance a logical choice to study firms' maturity management. Second, in contrast to the private debt market the public debt market is characterized by a large number of bond investors. This makes public debt renegotiation extremely costly if not impossible when firms face large rollover risk, as it requires unanimous bondholder consent under the "Trust Indenture Act" (Smith and Warner, 1979; Buchheit and

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Gulati, 2002). As the costs of rollover risk of bond financing are higher, firms have an additional incentive to actively manage the bonds maturity structure to prevent the higher costs associated with rollover risk. Third, previous research shows that due to the market frictions, firms that have access to public debt market are the ones that are subject to less informational asymmetries (e.g., Myers, 1984; Diamond, 1991; Denis and Mihov, 2003). Public bond offerings are sold to public at a fixed "take-it-or-leave-it basis" (Kwan and Carleton, 2010). Therefore firms that borrow in the bond market have a stronger position vis-à-vis their investors, and there is little input from public investors especially with respect to the design of bond contract features. This implies that those firms would have more flexibility in building up a desired maturity structure using bond financing.

We base our analysis on data on corporate bond taken from the Mergent FISD database. We merge the bond data with a wide set of firm characteristics collected from Compustat. In practice, firms build up and maintain their bond maturity structure at a certain level through managing new bonds issues. The example illustrated in Fig. 1 shows that the granularity and the frequency of firms' bonds issues are two important dimensions of firm's incremental bond maturity choice when it issue bonds. Following the studies of Guedes and Opler (1996), Denis and Mihov (2003), we focus on firms' incremental maturity decisions when they issue new bonds. This approach has several advantages and can be seen as complementary to the analysis of the maturity structure of outstanding bonds shown in Choi et al. (2014). The latter is a cumulative result of a sequence of incremental decisions made by firms at the time of bond issuances in the past. The incremental analysis makes it possible for us to link a firm's maturity choices at issuance with firm characteristics measured before the issue. Moreover, this approach is well-suited to capture changes in a firm's incremental maturity choice due to the time-variation in firm characteristics. We look at firms' bond issue activities and investigate the types of firms that maintain a dispersed maturity structure over time by frequently issuing a set of bonds with heterogeneous maturities. We find that firms with larger total assets, higher leverage, and a well-spread maturity structure of already outstanding bonds at issuance issue more frequently, and are more likely to issue multiple bonds with different maturities. A combination of these two financing policies leads to a highly granular maturity structure of outstanding bonds. The results complement and extend the study of Choi et al. (2014) that focuses on the granularity of outstanding corporate debt.

We then investigate potential effects of bond granularity. Our results indicate that having a granular maturity structure improves the availability of finance, lowers the cost of finance, lowers financial constraints and lowers the stock return volatility. Firms that have a dispersed bond maturity structure are more likely to meet their (re-)financing needs arising from bonds expiries or new investment opportunities, and face lower cost of financing when they issue new bonds. Those firms ultimately become less financially constrained and also reduce their stock market risk. Interestingly, we find that the effect is strongest for firms with high rollover risk, i.e., firms that are bank-dependent or that have a large proportion of bonds maturing in the short term.

Our study contributes to the literature on the link between rollover concerns and firms' choice of debt maturity structure. Diamond (1991) points out that managing rollover risk is an important consideration when firms decide about debt maturity. He defined liquidity risk as the risk of a borrower being forced into inefficient liquidation because refinancing is not available. Morris and Shin (2009) argue that liquidity risk could also be seen as the probability of a default due to a run by short-term creditors when the firm would otherwise have been solvent. Theory and empirical evidence suggests that the use of short-term debt exposes firms with rollover risks and higher chance of inefficient liquidation (Diamond, 1991; Guedes and Opler, 1996; Brunnermeier, 2009; Cheng and Milbradt, 2012; He and Xiong, 2012a). Carvalho and Santikian (2012) argue that firms within an industry manage rollover risk in an interdependent way and their debt maturity decisions also reflect the situation in the industry. Gopalan et al. (2014) show that the rollover risk associated with having long-term debt maturing within one year reduces firms' current credit quality. Our study contributes to this strand of literature by showing that firms can actively manage rollover risk by spreading out the maturity of their bond finance.

Moreover, our paper provides evidence on recent theoretical work about the costs and benefits of maturity granularity (Choi et al., 2014; He and Xiong, 2012b; Acharya et al., 2011). Empirical evidence on the granularity of bond maturity structure is scarce. The survey of Graham and Harvey (2001) indicates that many firms aim at dispersing their bond maturity structure to "limit the magnitude of refinancing in any given year". The latter has also been emphasized by Servaes and Tufano (2006) as the primary concern for CFOs when making decisions on the bond maturity. The recent studies by Gopalan et al. (2014) and Almeida et al. (2012) show an adverse impact on credit quality and investment for firms that have a large proportion of debt maturing within one year. For comparison, our paper considers the granularity of firms' entire bond maturity structure. The theoretical model of Choi et al. (2014) describes the firm's choice between a concentrated or "granular" bond maturity structure as a trade-off between flexibility benefits and transaction costs. Our findings are in line with their model: We show that firms that consistently maintain a well-spread maturity structure over time are the ones that face higher rollover risk and they can afford the transaction costs of maintaining the dispersed maturity structure. The two main differences to Choi et al. (2014) are that we focus on the incremental maturity choice of new bond issues conditional on the maturity structure prior to the issue, and that we investigate the impact of granularity on the availability and cost of finance.

The rest of the paper proceeds as follows. In Section 2 we describe the data and the measurement of granularity. In Section 3 we present the empirical analysis. In Section 4 we summarize the findings of additional checks. Section 5 concludes.

2. Data and measurement

2.1. Data

Our data comprise information on firm characteristics, bond characteristics, and stock returns. We collect yearly data on firms' accounting variables and S&P long-term debt ratings from Compustat. We start with all publicly listed firms from the US and exclude utility and financial companies (SIC 4000-4999 or 6000-6999). We collect data on bond issues and maturity structure from the Mergent FISD database and merge it with the Compustat data using firms' CUSIPs. We then use the permno-gvkey concordance key provided by WRDS to merge the sample with firms' yearly stock return volatility constructed using daily and monthly stock return during each year from CRSP database. As the FISD database has only sufficient coverage from the early 1990s, we limit the sample period of our analysis from January 1, 1991 to December 31, 2011. The final sample comprises 16,857 firm-year observations from 2388 firms.

We winsorize all accounting variables from Compustat at 1% and 99% level to limit the impact of potential outliers. Table 1 displays definitions, data source and summary statistics on the main variables.