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Pricing and usage: An empirical analysis of lines of credit[☆]



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ABSTRACT

The hypothesis that committed revolving credit lines with fixed spreads can provide firms with interest rate insurance is a standard feature of models on these credit facilities' interest rate structure. Nevertheless, this hypothesis has not been tested. Its empirical examination is the main contribution of this paper. To perform this analysis, and given the unavailability of data, we hand-collect data on usage at the credit line level itself. The resulting dataset enables us also to take into account characteristics of credit lines that have been ignored by previous research. One of them is that credit lines can have simultaneously fixed and performance-based spreads.

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1. Introduction

Committed revolving credit facilities are a major source of corporate financing (Sufi, 2009). A large fraction of them are provided by syndicates of lenders in which the participation of banks and other finance institutions from different countries is common (Carey et al., 1998, Carey and Nini, 2007). Loan syndication is indeed an important means to channel funds internationally (Xu and La, 2015).

According to models on the interest rate structure of revolving lines of credit, one of the reasons for the demand of these loan commitments is that they can provide firms with interest rate insurance (Campbell, 1978, Thakor et al., 1981). From the borrowers' perspective, the protection provided by credit lines can be twofold: against the volatility of general market interest rates, such as the London Interbank Offered Rate (LIBOR), and against increases in firms' borrowing costs due to poor performance. Fixed rate agreements hedge both types of risk, whereas fixed spread commitments (i.e., those where the interest rate on drawdowns is the sum of a benchmark rate plus a fixed spread) protect against rises in firms' spot risk premiums. However, no interest rate protection is expected to be provided under performance-sensitive credit lines, since they are designed to make the interest rate on revolving loans close to the spot rate.

The view of revolving credit lines as interest rate hedging instruments suggests that firms whose credit quality deteriorates behave differently depending on the type of interest rate structure. A higher credit risk increases the firm's spot risk premium. Therefore, if the firm has a fixed rate or spread commitment, drawing down from the credit line may eventually become relatively cheaper and, hence, the firm would use the facility more intensively. In contrast, if the interest on

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revolving loans is equal to a benchmark rate plus a performance-sensitive markup, usage is not expected to increase when the firm is financially distressed, since there would be no significant difference between the spot and commitment prices.

The empirical analysis of these differences across interest rate structures is the main aim of this paper; that is, leaving fixed rate credit lines aside, which are infrequent, our central question is whether credit line usage is affected by their interest rate structure as corporate creditworthiness deteriorates. To the best of our knowledge, this question has not been previously investigated. Examination of the relation between corporate creditworthiness and usage is the closest previous research has come to our approach. Indeed, [Berg et al. \(2016\)](#) find a negative relation between firms' credit risk and facility usage, but their analysis is conducted at the firm level, with no reference to the interest rate structure. However, the attempt to test whether credit lines provide interest rate insurance actually requires both performing the analysis at the facility level and taking into consideration pricing schedules. If data on credit line usage at the line level are not employed, the interest rate structure of a concrete credit line cannot be linked to how this facility is used. Indeed, the unavailability of data on usage at the credit line level is probably one of the reasons why the relation between interest rate structures and usage has not been previously studied. The reason why interest rate structures must be taken into account is also straightforward: Not all interest rate structures provide interest rate protection.

To perform our analysis, nevertheless, we must refine the taxonomy of interest rate structures. In particular, the standard, dichotomous separation between credit lines with either fixed or variable spreads must be qualified. In this sense, no previous academic work has paid attention to a common feature of credit lines: Most (about 90% in our sample) offer the borrower the choice between two different interest rates that differ in whether the benchmark rate is LIBOR or, as it is commonly called in credit contracts, an alternate base rate (ABR). As [Wight et al. \(2007: 224\)](#) put it, "A borrower can elect to borrow either [alternate] base rate loans or LIBOR loans, or both simultaneously, under a credit agreement, and the borrower can switch back and forth between the two types of loans." According to our data, the most common categories of interest rate structures are xp (the spreads on ABR and LIBOR loans are fixed and performance sensitive, respectively), xx (the spreads on ABR and LIBOR loans are both fixed), and pp (the spreads on ABR and LIBOR loans depend on corporate performance).

Based on this classification, we can now be more specific regarding our main research aim. According to the view of fixed spread credit lines as providers of interest rate insurance, we examine whether creditworthiness-deteriorating firms use their revolving lines more intensively if the latter have xp or xx interest rate structures. However, since performance-sensitive pricing does not hedge against rising risk premiums, we do not expect to observe a similar effect for pp lines.

Our analysis focuses on a random sample of US publicly traded corporations included in the Standard & Poor's (S&P) Compustat database that, according to Thomson Reuters Loan Pricing Corporation's DealScan database, have at least one active credit line in the sample period, which goes from 2006:Q1 to 2012:Q2. Nevertheless, the requirement to use data on credit line usage at the level of the facilities themselves raises two main problems. On the one hand, the only commercial database that provides information on credit line usage is the S&P Capital IQ database, but it does so at the firm level. Therefore, we use 10-Q and 10-K US Security and Exchange Commission (SEC) filings to build a unique dataset on the quarterly usage of credit lines at the facility level. On the other hand, large firms that use credit lines tend to have a considerable number of them simultaneously and they usually disclose information about usage in an aggregate manner. To overcome this problem, we focus on firms with assets below \$20 billion, which rarely have more than two revolving credit facilities active at the same time and usually report them separately. The \$20 billion threshold implies that our sample firms are comparable, in terms of asset size, to mid- and small-cap firms.

Besides collecting data on credit line usage from SEC filings, we use the agreement contracts uploaded in the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system to obtain information on credit facilities that was incomplete or missing in DealScan. The search process to collect these contracts reveals a relevant limitation of DealScan: This database does not include a relatively large number of amendments to credit agreements.

Our results show that the relation between corporate financial distress and facility utilization is positively affected by xp lines. This finding suggests that this type of facility protects firms against increases in corporate spot risk premiums generated by deteriorating quality; that is, it supports the hypothesis that fixed spread credit lines provide firms with interest rate insurance. Accordingly, risk-increasing borrowers with xp lines appear to use them to shift risk to their lenders ([Jensen and Meckling, 1976](#), [Duran and Lozano-Vivas, 2014, 2015](#)). Such risk shifting could help explain a striking finding: At the start of the 2008 crisis, the relative frequency of xp lines began a continuous decline that has led to a situation where this type of interest rate structure seems to have virtually vanished from the market.

Regarding xx lines, our empirical evidence indicates that this pricing schedule causes no differential effect on how facility usage relates with corporate creditworthiness, that is, the way in which xx lines are used seems to contradict the hypothesis that fixed spread credit lines provide a hedge against fluctuations in corporate risk premiums. We also find that having an xx line reduces usage. The differences between our results for xp and xx highlight that the standard dichotomy between fixed and variable spreads is insufficient to analyze the interest rate structure of credit lines.

In tune with our probit analysis of the variables that affect the probability of observing the different interest rate structures, our results for xx lines seem to be caused by lenders resorting to xx lines to protect themselves from borrowers with deteriorating quality. In this sense, having no S&P corporate credit rating or being rated speculative grade substantially increases the probability of having an xx line. Our probit estimation also helps us to address potential endogeneity concerns.

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