Why Do Loan Contracts Obligate Borrowers to Engage in Interest Rate Protection?

Anne Beatty
beatty.86@osu.edu, 614-292-5418
Fisher College of Business
The Ohio State University
442 Fisher Hall
2100 Neil Avenue
Columbus, OH 43210

Reining Chen
chen_994@fisher.osu.edu, 614-292-7245
Fisher College of Business
The Ohio State University
340 Fisher Hall
2100 Neil Avenue
Columbus, OH 43210

Haiwen (Helen) Zhang*
zhang_614@fisher.osu.edu, 614-292-6547
Fisher College of Business
The Ohio State University
436 Fisher Hall
2100 Neil Avenue
Columbus, OH 43210

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Abstract

Previous interest-rate risk management research assumes that derivative use is voluntary and ignores the obligation in many loan contracts for borrowers to use derivatives to fix the rate on their debt. We study 2,449 bank loans including 278 that require borrowers to enter interest rate protection agreements after loan origination and 147 where derivatives are voluntarily used. Our findings that loan contracts are more likely to include interest rate protection covenants when borrowers' default risk is high and when economic conditions are weak suggest that these covenants are used to reduce the agency costs of debt. Consistent with the findings in Rajan and Zingales (1998) and Braun and Larraine (2005) that high quality accounting can alleviate moral hazard and adverse selection problems for firms that rely heavily on external financing, we also find that mandatory derivative use is more likely for firms more dependent on external financing but that this effect is mitigated for firms with higher accounting quality. In addition, our finding that banks charge lower interest rates on loans for mandatory derivative users but not for voluntary users provides the first large-sample evidence that credible commitment in hedging activities enhances credit quality.

1. Introduction

Previous empirical research examining firms' hedging behavior has typically assumed that firms use derivative instruments to hedge their exposure to risk (e.g. Visvanathan, 1998; Nance, Smith, and Smithson, 1993; Mian, 1996). Recent studies argue that firms may choose their interest rate risk exposure either to hedge the sensitivity of their cash flows to interest rate movements or to time the market based on the steepness of the yield curve (e.g. Faulkender, 2005; Vickery, 2008). A common feature of this research is the assumption that firms voluntarily choose to manage their interest-rate risk exposure, making it difficult for firms to credibly commit to hedge. This literature ignores the fact that many bank loan agreements explicitly include interest rate protection covenants that require borrowers to enter interest rate protection programs to fix their borrowing rate. In this paper, we study a sample of 278 mandatory and 147 voluntary derivative users in a sample of 2,449 bank loans to address the following two research questions. First, why do some loan contracts require borrowers to enter interest rate protection programs? Second, how does the inclusion of the interest rate protection covenant affect borrowers' financing cost?

In summarizing the effect of hedging on the agency costs of debt, Sercu and Uppal (1995) argue that hedging can be used to reduce shareholder-bondholder conflicts that lead firms approaching bankruptcy to make decisions that benefit shareholders but reduce overall firm value. Since the agency costs of debt increase with default risk, we hypothesize that loan contracts are more likely to include interest rate protection agreements when borrowers exhibit higher default risk.

In addition to firm-specific factors, Figlewski, Frydman, and Liang (2008) demonstrate that default risk and credit rating downgrades also depend on macroeconomic factors. Assuming that borrower's likelihood of distress changes through time with changes in the economy, we predict that loan contracts are more likely to include interest rate protection agreements when the macroeconomic conditions are expected to be weak.

Froot, Sharfstein, and Stein (1993) argue that hedging activities generate more stable internal cash flows and therefore mitigate the underinvestment problems arising from a reliance on costly external financing to fund future investment opportunities. We expect that borrowers more dependent on external financing are more likely to enter loan contracts that include interest rate protection covenants designed to generate more stable internal cash flows and to reduce the agency cost of debt.[1]

Braun and Larraine (2005) find that firms relying heavily on external finance are hit harder during economic downturns due to increased information asymmetry. They show that the growth rates of industries that rely on external finance decrease more during recessions and that the differential impact of recessions across industries is smaller in countries that apply international accounting standards (IAS) and for industries that have higher levels of tangible assets. Both of these attributes are associated with higher accounting quality. Barth, Landsman, and Lang (2007) find that firms that apply IAS have less earnings management, more timely loss recognition, and more value relevance of accounting. Bharat, Sunder, and Sunder (2008) find that tangibility consistently and

[1] Changes in interest rates can affect borrowers' internal cash flow from either liabilities or assets. However, Covitz and Sharp (2005) note that cash flows from non-financial firms' operating assets are not directly affected by changes in interest rates. Instead, their measurable exposure to interest rates arises from liabilities. Thus, for most non-financial firms, variable-rate loans increase cash flow variability.

highly significantly increases with their factor analysis-based measure of accounting quality. Similarly, Barton and Waymire (2004) find that balance sheet transparency based on separate reporting of tangible from intangible assets is the factor most highly correlated with their factor analysis-based measure of accounting quality. Based on the results in Braun and Larrain (2005), we predict that the effect of macroeconomic conditions and external finance dependence on the likelihood of an interest rate protection covenant will depend on the quality of the borrower's accounting.

Consistent with these predictions about when interest rate protection covenants are likely to be used, Smith and Stultz (1985) argue that hedging activity alleviates the agency conflicts between creditors and shareholders. However, they further note that "although hedging increases the firm value, it also redistributes wealth from shareholders to bondholders in a way that makes shareholders worse off." Therefore, "without an incentive to hedge, despite promising to do so, it will be difficult for the firms to make a credible announcement that it will hedge." To determine whether the interest rate protection covenant provides a credible commitment to hedge, we examine how inclusion of the interest-rate protection agreement affects borrowers' cost of debt. If interest rate protection covenants provide a more credible commitment than voluntary hedging, then we expect to find that banks only reduce interest rate on loans that include interest rate protection covenants.

To examine our research questions, we construct a sample of 278 mandatory derivative users and 147 voluntary users in a sample of 2,449 bank loans. We find that mandatory derivative use is more likely when borrowers have higher default risk than non-users and when the macroeconomic indicators suggest an increased risk of recession

and default risk. Specifically, we find that mandatory derivative users are significantly smaller, less profitable, have higher leverage and lower credit ratings prior to the loan initiation. Further comparison of loan characteristics indicates that loans with interest rate protection covenants are more likely to be secured, more likely to be term loans, include more covenants, and have longer maturities.

Consistent with Faulkender (2005) and Vickery (2008), we find that borrowers are more likely to fix their interest rate when the yield curve is flat. However, we also find that mandatory derivative use is associated with higher VIX (Chicago Board Options Exchange Volatility Index) and USDX (U.S. Dollar Exchange Rate) indices and that the sensitivity of derivative use to the yield spread is significant only in the absence of loan specific controls for default risk or of other macroeconomic indicators. These findings suggest that, instead of the market-timing motive proposed by Faulkender (2005), the sensitivity of derivative use to the yield spread for mandatory users likely reflects a desire to reduce increased agency costs of debt associated with a higher probability of future recession and defaults. Since loan contracts can contain alternative structures and covenants to protect creditors' interests, the role of the yield spread as a determinant of derivative use becomes insignificant when loan characteristics are included in the regression.

For firms that rely heavily on external debt financing, we find borrowers with a higher proportion of tangible assets are less likely to enter loan contracts that include interest rate protection agreements. We also provide evidence that borrowers with higher accrual quality are less likely to be required to enter into interest rate protection agreements when the macro economy is expected to be weak.

Consistent with a reduction in credit risk for mandatory derivative users, we find that banks charge lower interest rate for loans with an interest rate protection covenant. We do not find that a lower interest rate is charged for loans where borrowers voluntarily fix their interest rate after the loan initiation. This finding supports Smith and Stultz's (1985) conjecture that only hedging activities with credible commitments help alleviate the agency conflicts of debt.

To provide additional insights on the interest rate protection covenant, we also compare the firm and loan characteristics of loans where interest rate protection is required for all outstanding debt with loans where the interest rate protection applies to the outstanding principle of the new issuance. We find loan contracts are more likely to require borrowers to protect their entire outstanding debts when borrowers have speculative-grade ratings, make greater capital expenditures, and have higher ratios of fixed-rate to total debt. Since hedge accounting requires each derivative position be explicitly linked to an underlying hedged transaction, borrowers without any fixed-rate debt are less likely to enter a fixed-to-variable rate derivative contract and qualify for hedge accounting treatment. Therefore, the above findings suggest both the level of default risk and how easily a borrower can unwind the interest rate hedge position are important in designing the interest rate protection covenant.

Our paper makes two major contributions. First, this study is the first to examine how lending banks directly affect corporate risk-management behavior. In contrast, previous research examining corporate hedging and market-timing incentives assumes

that firms voluntarily engage in derivatives programs.[2] We provide evidence that loan contracts require borrowing firms to enter interest rate derivative contracts to fix the rate on their debt to reduce the agency costs of debt. Understanding the role that loan contracts play in the use of derivatives adds to the growing research on how financing decisions and debt heterogeneity affect corporate capital structure, debt structure, and investment decisions (e.g. Faulkender and Petersen 2006; Rauh and Sufi 2008; Roberts and Sufi 2007; Nini, Smith, and Sufi 2008). In addition, our finding that accounting quality mitigates the importance of dependence on external finance in the likelihood of mandatory derivative use suggests that accounting quality can substitute for derivative use in reducing the agency costs of debt.

Second, we provide the first large-sample evidence that borrowers who credibly commit to interest-rate risk management enjoy reduced costs of debt. Our finding is consistent with Smith and Stultz's (1985) conjecture that, due to agency conflicts between creditors and shareholders, the benefits of hedging arising from reduced costs of financial distress are only realizable when borrowers can credibly commit to hedge after the debt issuance.

The paper proceeds as follows. Section 2 provides background information for our study. We develop our empirical strategy in Section 3 and describe our sample selection and research design in Section 4. We present our empirical results in Section 5 and discuss our sensitivity tests in section 6. We conclude in Section 7.

2. Background

[2] One exception is Geczy, Minton, and Schrand (1997) who recognize that lenders may require borrowers to hedge. They note that at least four of their sample firms have interest rate hedge covenants. However, Geczy et al. (1997) do not specifically investigate these mandatory derivative users.

2.1 Literature Review

2.1.1 Derivative Use and Hedging

The hedging literature proposes several theories of how hedging could increase firm value by reducing creditor-shareholder conflicts. Smith and Stulz (1985) argue that hedging reduces the probability and cost of financial distress by reducing cash flow variance. However, they point out that, since hedging activities also redistribute wealth from shareholders to debt holders, it is difficult for the firm to make a credible commitment that it will hedge after the debt issuance. Chidambaran, Fernado, and Spindt (2001) show that bundled hedges can reduce this commitment problem. Using Freeport McMoran's gold depository share issuance, which bundles a gold hedge with financing, they demonstrate that "a strategy that bundles financing and derivatives is superior to a strategy that separates the two transactions." They argue that "bundling financing and risk management …is not identical to financing while concurrently managing risk by conventional means" and provide the example that issuing floating rate debt is not always equivalent to issuing fixed rate debt and entering into an interest rate swap.

Froot et al. (1993) further propose that by creating more stable cash flows, hedging can mitigate underinvestment problems that arise when firms with investment opportunities face financial constraints. Morellec and Smith (2007) model firms' financing, investing, and hedging decisions simultaneously. They demonstrate that proper combination of financing and hedging policies alleviates both creditor-shareholder conflicts and manager-shareholder conflicts because the ability to pre-commit to financing and hedging policies substitutes for an ability to pre-commit to (unobservable) investing policies.

Empirical research examining the benefit of corporate risk management generally assumes that derivative use and hedging are synonymous and ignores the commitment issue. A common research design is to estimate a cross-sectional regression of the notional amount of derivatives (or an indicator variable of derivatives use) on various firm characteristics, such as leverage, R&D, BM ratio, size. For example, Nance et al. (1993) find that derivative users are larger and face more convex tax functions but find no evidence that they face more financial constraints as proxied by higher leverage ratios. Geczy et al. (1997) find that firms with higher R&D and lower quick ratios are more likely to use currency derivatives. Haushalter (2000) finds the leverage ratio to be the most significant factor explaining the hedge ratio for 100 oil and gas producers. Overall, these mixed research findings do not provide clear inferences due to difficulties in identifying hedge positions and to endogeneity issues. This literature ignores the fact that many bank loan agreements explicitly include interest rate protection covenants that require borrowers to enter interest rate protection programs to fix their borrowing rate. We separately analyze mandatory derivative users and voluntary users and explicitly examine how credible commitments to corporate risk- management policies affect the cost of creditor-shareholder conflicts.

2.1.2 Business Cycle, Credit Channel, and Accounting Quality

Vickery (2008) discusses the effect of the business cycle on firms' hedging incentives created by the credit channel of monetary policy. He argues that the availability of finance for bank dependent firms becomes scarcer relative to investment during periods of monetary contraction. The credit channel theory proposes that a negative monetary policy shock reduces both banks' ability to provide funds and

borrowers' ability to generate internal funds. The resulting increase in the differential cost between internal and external funds enhances the impact of the original shock on real economic activities (See Bernanke and Gertler 1989; Bernanke and Blinder 1988).

Finding an appropriate measure of financial constraint has proven to be difficult and controversial. Vickery (2008) uses four variables to capture financial constraints. These variables are: firm size, firm age, banking relationship, and profits scaled by firm size. Using these variables to capture financial constraint is controversial because they may measure other firm characteristics and because they may be endogenously determined. For example, Vickery (2008) points out that Kaplan and Zingales (1997) argue that profits likely contain information about investment opportunities as well as current cash flows.

Rajan and Zingales (1998) develop an industry-based measure of reliance on external finance that they use in their study of how high quality accounting and institutional governance can reduce the relative cost of external to internal funds by alleviating moral hazard and adverse selection problems. Rajan and Zingales (1998) argue that their industry-based measure of external finance reliance eliminates the endogeneity problem associated with firm specific measures of financial constraints. Using this measure they find that the impact of external finance dependence on long-term growth is lower for firms in countries with higher quality accounting rules.
Braun and Larrain (2005) extend this work by showing that recessions have a larger impact on industries that rely on external finance, but that the differential impact of recessions across industries is smaller in countries that apply international accounting standards and for industries that have higher levels of tangible assets.

Vickery (2008) estimates a linear model of firms' hedging behavior that includes these financial constraint measures and macroeconomic measures. However, he does not allow the coefficients on the financial constraint variables to vary based on either the macroeconomic conditions or other institutional factors such as accounting quality, both of which Braun and Larrain (2005) suggest might be important.

The accounting literature has extensively studied whether higher firm-level accounting quality reduces information asymmetry and alleviates adverse selection problems. However, little attention has been paid to how shifting macroeconomic conditions affect the role of firm-level accounting quality. In this paper, we follow the argument in credit channel theory and examine whether accounting quality affects the impact of macroeconomic conditions on the likelihood of including an interest rate protection covenant in a bank loan contract, especially for firms that rely heavily on external financing.

2.1.3 Derivative Use and Market Timing

In contrast to earlier research that assumes firms always use derivatives to hedge, recent studies explicitly consider the possibility that firms use derivatives to speculate (e.g. Geczy, Minton, and Schrand, 2007; Adam and Fernando, 2006; Faulkender, 2005). In particular, Faulkender (2005) investigates whether interest rate swap use is primarily affected by the firms' concerns with asset/liability matching or with timing the market. He examines 275 debt issuances in the chemical industry from 1994 to 1999 and finds that swap use is largely driven by the slope of the yield curve at the time the debt is issued instead of interest rate sensitivity of the firm's cash flow. Firms are more likely to enter variable-to-fixed rate swaps when the yield curve is flat. Faulkender (2005)

concludes that "interest rate risk management practices are primarily driven by speculation or myopia, not hedging considerations."

Following Faulkender (2005), Chernanko and Faulkender (2007) argue that debt market timing is driven by firms' attempts to meet consensus earnings forecasts and by the compensation structure of the firm's management. Faulkender, Jenkins, and Seethamraju (2007) further examine the market reaction to earnings announcements when earnings targets are met by strategic use of interest rate swaps. Chava and Purnanandam (2007) study the floating-to-fixed ratio of debt and provide evidence that the chief financial officer (CFO)'s compensation structure is the key determinant of a firm's floating-to-fixed rate debt ratio. We have observed a growing research interest in firms' speculating behavior with interest rate derivatives. Given that it is not obvious why lenders would contractually obligate borrowers to time the market, it is important to examine the role of loan contracts in firms' risk management activities.

2.1.4 Financing Decisions and Operating Decisions

There is a growing literature examining how corporate financing decisions affect firms' capital structure, debt structure, and investment decisions. For example, Nini et al. (2008) find that capital expenditure restrictions from bank loan contracts cause a significant reduction in firm investment. Faulkender and Peterson (2006) document that firms with bond market access have significantly higher leverage ratio after controlling for firm characteristics. We contribute to the literature by documenting how bank loan contracts affect firms' risk management behavior.

2.2 Characteristics of the Syndicated Loan Market

In the Handbook of Loan Syndications and Trading, Taylor and Sansone (2006) summarize the characteristics of loans in the syndicated loan market as follows:

> *Floating Interest Rate: The market convention today is a rate that is quoted as a spread over a floating-rate index. That index is the three- or six- month LIBOR (London Interbank Offered Rate). In the past, other indexes have been used, such as the prime rate, banker's acceptance rates, or even the fed funds rate. …*
>
> *Prepayment without penalty: Since the loans are floating rate, they carry the "free option" of being "called." In other words, the loans can be repaid at any time without penalty. Those prepayments generally occur at interest payment dates to avoid the breakage cost of the index rate setting.*

Given that loans made in the syndicated loan market are made of floating rates, this suggests that if firms want to borrow in the syndicated loan market but they would like to borrow at a fixed rate then they will have to enter into an interest rate protection agreement to fix the rate on their syndicated loan. The handbook suggests that the use of floating rate loans in the syndicated loan market arises from the desire to have loans that can be prepaid without a penalty or call premium. This is in contrast to the public debt market where the debt is typically fixed and requires a call premium.

Vickery (2008) provides two alternative rationales for why banks might prefer to lend at floating rates. First he argues that in periods of rising rates there is an outflow of deposits from the banking system, which banks cannot costly replace by other sources of finance. Lending at a floating rate would at least partially hedge this funding risk. Second, he argues that floating rate business loans can be used to hedge the maturity mismatch between deposits and long-term mortgage loans.

We do not explore these alternative explanations for why syndicated loans are made at floating rates, but instead take this as a given in the market that we are studying.

2.3 Contractually Required Interest Rate Protection

Bank loans typically include both affirmative and negative covenants. Affirmative covenants specify certain actions that the borrower must take. Among the affirmative covenants that are often included in bank loans is the requirement that the borrower enter into interest rate protection agreements. For example, Lecroy's 2004 Credit Agreement requires that:

The Borrower will, within 90 days from the Funding Date, enter into one or more Interest Rate Protection Agreements covering the interest payable with respect to at least 50 percent of the outstanding principal amount of the Term Loan for a period of at least three years.

Where an

"*Interest Rate Protection Agreement" shall mean any interest rate swap agreement, interest rate cap agreement, interest rate collar agreement, interest rate hedging agreement or other similar agreement or arrangement.*

2.4 Macro Economic Indicators of Recession

Nickell, Perraudin and Varotto (2000) show that macroeconomic conditions are important in explaining credit rating downgrades and defaults. Specifically, they find that large down-grade probabilities for non-investment grade debt during business cycle trough years, where a trough is defined as GDP growth in the bottom third of all sample years. Figlewski et al. (2008) extend this analysis by allowing the hazard rate for a given issuer to be a function of both firm-specific factors and macroeconomic conditions. The firm specific and macro-economic variables enter their model separately and they do not examine interactions between these variables. Rather than trying to select the best measure of the overall strength of the economy *a priori*, they consider a wide variety of macroeconomic factors that have a broad impact on the economy and that they expect would affect most firms' creditworthiness. They consider three classes of variables related to the overall level of economic activity: the overall health of the macro economy,

the direction that the economy is moving, and conditions in the financial markets. They use a backward selection procedure and retain only statistically significant variables. Like Figlewski et al. (2008) we consider a variety of macroeconomic variables that may be important in predicting recession and increased rates of expected default.

The shape of the yield curve has long been considered an important predictor of future macro economic conditions. Estrella and Hardouvelis (1991) find that the slope of the yield curve is positively associated with not only future spot interest rate but also future real economic activities. Estrella and Mishkin (1998) find that the slope of yield curve outperforms all other variables for out-of-sample prediction of U.S. recessions beyond one quarter. More recently, King, Levin, and Perli (2007) have found that bivariate recession prediction models that include both credit spreads and yield spreads outperform models that only include yield spreads both in-sample and out-of-sample.

Calculated from the implied volatilities of various S&P 500 index 30-day put and call options that trade on the Chicago Board Options Exchange (CBOE), the VIX volatility index is another measure that commonly used to capture macroeconomic conditions. Mackenzie (2006) states "the most widely followed measure of equity market volatility is the VIX index." He notes that Mark Kiesel, portfolio manager at Pimco says "a rise in volatility should lead to less willingness to take risk and wider credit spreads." Garcia-Herriro and Ortiz (2006) confirm this view.

Finally, Brouwer (2008) argues that U.S. Dollar exchange rate is an important indicator of recession and notes that the 2001 U.S. recession coincided with the strongest point for the dollar during the last decade. He argues that changes in interest rates drive this association. Specifically, higher interest rates lead to both a stronger dollar and

recession while lower interest rates lead to a weaker dollar but stronger economic growth.

The US Dollar Index (USDX) provides a general indication of the international value of the US Dollar. The USDX does this by averaging the exchange rates between the US dollar and six major world currencies. These countries whose currencies are represented in the USDX constitute the bulk of international trade with the United States, and have well-developed foreign exchange markets with rates freely determined by market participants. In addition, many currencies not included in the USDX move in close correlation with those that are included.

3 Empirical Strategy

3.1 Probit Models of Derivative Use

To examine how loan contracts affect interest rate risk management practices, we first estimate Probit regressions of derivative use mandated by interest rate protection covenants (Equation 1). We hypothesize that mandatory use designed to reduce the agency cost of debt will be related to borrowers' default risk and to the extent of potential underinvestment problems. In our models we consider firm specific measures of default risk and underinvestment problems, loan characteristics related to default risk, industry based measures of interest rate sensitivity and reliance of external finance, and the expected effect of the macro economy on default risk.

$$MAND_{i,t} = Intercept + A*Firm\ characteristics_{i,t} + B*Loan\ characteristics_{i,t} + \Gamma*Industry\ characteristics_{i} + \Lambda*\ Macroeconomic\ indicators_{t} + \varepsilon_{i,t} \quad (1)$$

where MAND equals 1 for mandatory derivative users and 0 for non users.

We use size, leverage, profit margin, and S&P credit ratings as firm specific measures of default risk. Size is measured as the log of annual sales [log(data12)];

leverage is total debt divided by the sum of market value of equity plus total debt [(data9+data34)/ (data199*data25+data9+data34)]; profit margin is measured as gross profit divided by sales [data13/data12]; S&P credit rating is the transformed S&P rating (data 280) which equals 0 for firms who do not have ratings and ranges from 1 for AAA to 22 for D for firms who have ratings. We also include a dichotomous variable to capture whether a firms has an S&P credit rating (set to 1) or not (set to 0).

If hedging reduces underinvestment costs by permitting positive NPV projects to be financed by smoothing the availability of internal funds (Froot et al., 1993), then the value of hedging will be increasing in the investment opportunity set. We use spending on R&D [data46/data12] and advertising [data45/data12] to measure investment opportunities. We also include capital expenditures [data128/data12] to control for the relation between hedging and current investment spending.[3]

In addition to firm characteristics, we include loan characteristics that depend on borrower's default risk in the Probit regression.[4] The characteristics we consider are: whether the loan requires collateral, the maturity of the loan (in months), whether the loan is a term loan, whether the loan includes tranches that are sold in the secondary market, whether the loan is used for takeover purpose, the number of covenants in the loan, the number of lenders, and the loan size measured as the ratio of total loan amount to total assets.

We also control for the correlation of the firm's total revenue to interest rate. When firms' revenue co-vary positively with interest rates, they have a natural hedge

[3] We follow the literature in our choice of variables (Geczy et al. 1997; Graham and Rogers 2002; Faulkender 2005).

[4] A loan deal usually contains several facilities. All the loan characteristics are the means of the facilities that make up the loan deal.

against interest-rate risk, and thus banks should be less likely to require them to fix the borrowing rate. Following Vickery (2008), we use industry-level revenue betas to measure interest rate sensitivity. Specifically, we regress a firm's annual net sales (data12) scaled by total assets (data6) on the 12-month treasury interest rate contemporaneously and lagged one period, as well as a constant, time trend, and log time trend. Each regression is estimated at 2-digit SIC industry level over the past 30 years. The sum of estimated coefficients on current and lagged treasury interest rate measures the correlation between sales and interest rate at industry level (sales beta).[5]

Finally, we examine the impact of the expected state of the economy on mandatory derivative use. If a borrower's likelihood of distress changes over time with economic changes, then expected economic strength may affect banks' decision regarding the interest rate exposure of the borrower. Since the likelihood of distress is higher during economic downturns, banks may prefer stable interest payments when recession is more likely. To test this hypothesis, we include several measures of macroeconomic conditions in our Probit regressions.

The first macroeconomic indicator is yield spread. Following Faulkender (2005), we measure the yield spread as the difference in the monthly 10-year and 1-year yield on the Treasury bonds. The likelihood of a subsequent recession is higher when the yield spread is lower (i.e., the flatter the yield curve). Our second macroeconomic measure is credit spread. The credit spread is measured as the monthly difference between the BAA and AAA corporate bonds. Credit spread provides information about default risk. A widening of credit spreads is an advance warning of deterioration in macroeconomic

[5] Untabulated results show that, of the 62 2-digit SIC industries, the estimated sales beta is significant at 5% level or better for 37 industries.

conditions. In addition to yield spread and credit spread, we include the VIX and USDX indices. VIX is measured as the monthly close price on the Volatility Index of the CBOE. An increase in VIX reflects higher risk aversion, and banks may be less willing to take on interest rate risk (i.e., more likely to require fixed interest payments from borrowers). We use Federal Reserve Board's trade-weighted dollar index as USDX index. Historical data suggests a strong USDX to be a sign of oncoming economic weakness.

3.2 Derivative Use Models Including Interaction Effects

In addition to our Probit models of mandatory derivative use, we provide further cross-sectional analysis of how macroeconomic conditions affect mandatory use of derivatives for firms with varying levels of reliance on external financing and accounting quality. In addition to including these interaction variables, this analysis includes all variables in our probit models as control variables.

Ai and Norton (2003) show that the magnitude of the interaction effect in nonlinear models does not equal the marginal effect of the interaction term and can be of opposite sign. Therefore, we use OLS estimation when we examine the interaction terms in this analysis.

Following Rajan and Zingales (1998), we measure a firm's dependence on external finance as capital expenditure (data128) minus cash flow from operating activities divided by capital expenditures. Similarly, the dependence on external equity finance is defined as the ratio of the net amount of equity issues (data108-data115) to capital expenditures (data128). To reduce measurement error, we aggregate the above two measures across firms within each industry over the 11-year period from 1995 to 2005. We then construct an indicator variable measuring industries' reliance on external

debt finance, which equals 1 for industries that rely heavily on external finance (above the median) but not on external equity finance (below the median) and 0 otherwise.

Braun and Larrain (2005) find that industries that are more dependent on external finance are hit harder during recessions but that the observed difference in the behavior of industries is reduced for firms with higher quality accounting. We use the borrowing firms' accrual quality and tangibility as measures of accounting quality and examine the differential impact of the macroeconomic indicators on the likelihood of including interest rate protection covenants for firms with different accounting quality. We measure accrual quality as -1 times the absolute abnormal accrual estimated for each firm-year. We follow Kothari, Leone, and Wasley (2005) and use modified Jones model adjusted for performance to estimate abnormal accrual. We measure tangibility as Net PPE/total assets (data8/data6). Although tangibility might proxy for availability of collateral in addition to capturing the transparency of the balance sheet as argued by Barton and Waymire (2004), our models include SECURE as a control variable. This variable captures whether the loan contract requires collateral and therefore our tangibility variable captures the importance of the proportion of tangible assets holding constant the effect of the collateral requirement in the loan.

3.3 Interest Rate Spread Models

After examining the determinants of mandatory derivative use, we examine how including an interest rate protection covenant in the loan contract affects the interest rate charged on the loan. If the interest rate protection covenant provides a credible commitment to hedge that reduces the agency costs of debt, we would expect a lower interest rate for loans with this covenant compared to that of a sample of otherwise

identical loans that do not have the covenant. If the voluntary use of derivatives provides a less credible commitment to hedge, then the rate charged on loans that require derivative use should also be lower than for those with voluntary use. Alternatively, if derivatives are used to time the market, we would expect that the interest rate charged on the loan would be higher for loans with interest rate protection covenants.

We use Heckman's (1976) self-selection methodology and an instrumental variable approach to control for potential self-selection bias. Finding proper instruments is always challenging. Our first stage regression uses the same Probit regression described above. We exclude sales beta and advertisement expenditure in the second stage interest rate regression because these two variables do not directly affect interest rate charged on a loan. We also include the real federal funds rate and spread between the commercial paper and the Treasury bill (CP spread) in the second stage regression. In the discussion of "a primer on the federal funds rate," Friedman (2001) points out that a reduction in the federal funds rate adds to bank liquidity, which increases the availability of loans. However, it also tends to stimulate the economy, which increases the demand for loans. The latter effect becomes dominant if monetary expansion is continued at a high rate. As a result, "the immediate and long-run effects of monetary policy on interest rates generally are in opposite directions". The spread between the commercial paper and the Treasury bills is a common measure of funding risk and have been interpreted as a proxy for short run disintermediation, or credit crunches, in some empirical work.[6]

[6] For example, Gertler, Hubbard, and Kashyap (1990) find evidence that the spread between the commercial paper and Treasury bill increases when information costs increase, such as during periods of uncertainty. Although default risk on prime non-financial commercial paper is extremely low even during recessions, creditors may seek shelter in the more liquid treasury market during such periods. This reduces

We conduct the same set of tests on firms who voluntarily use derivatives to fix the borrowing rate after loan origination. We compare and contrast our results on the mandatory use to those on the voluntary use.

4. Data

4.1 Sample Selection

We use Loan Pricing Corporation's Dealscan and SEC's EDGAR databases to construct our sample. The Dealscan "Tear Sheets" provide extensive covenants information for a sub-sample of loans in the database. We identify interest rate protection covenants in 445 of the 2,188 Tear Sheets from 1995 to 2005. We supplement the Tear Sheets sample by conducting a key-word search of all credit agreements included as material contracts exhibits in 10-K filings during the same time period. Our key-word search identified 10,059 credit agreements, of which 1,188 had interest rate protection covenants. We manually verify the accuracy of the key-word search results by reading the covenant section of the 1,188 credit agreements identified with interest rate protection covenants. We further require our sample firms to be non-financial firms covered by LPC and COMPUSTAT. Using these selection criteria, we obtain a sample of 4,018 total loans, of which 415 include interest rate protection covenants (i.e., mandatory derivative users).[7]

For the 3,603 loans without interest rate protection covenant, we read the companies' 10-K filings to verify whether a company voluntarily enters interest rate

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demand for commercial paper, and thus pushes up the spread.

[7] All the bank loans examined in the study are floating rate loans where the interest rate varies with the LIBOR rate.

protection contracts to fix the interests paid on the new bank loan.[8] We identify 227 loans that are swapped to fixed rate by borrowers voluntarily (voluntary derivative users), and 3,358 loans that are not associated with any derivatives (non users). We drop 18 loans because we do not have enough information to identify whether they are associated with derivative usage.

After requiring non-missing information on firm and loan characteristics used in the regression analysis, we have in total 2,449 bank loans consisting of 278 mandatory users, 147 voluntary users, and 2,024 non users.

4.2 Descriptive Statistics

Table 1 reports the industry distribution for mandatory users, voluntary users, and non users, respectively. A smaller percentage of firms in the mining and construction industry are mandatory users (4.63%) relative to voluntary users (9.09%) and non users (11.37%). Firms from transportation, communication, and utilities are more likely to be mandatory users (20.48%), than voluntary users (15.58%) or non users (13.68%). Overall, all three groups consist of firms across various industries and exhibit similar industry representation.

5. Results

5.1 Time Trends

Table 2 Panel A provides Pearson correlations between the macroeconomic indicators and the quarterly percentage of mandatory and voluntary derivative use.

[8] We can clearly identify voluntary swap users when firms explicitly disclose the purpose of new swap contracts in their 10-K filings. When firms do not disclose the purpose of their swap contracts, following Faulkender (2005), we examine the change in the notional amount of the pay fixed, receive floating swaps between the fiscal year of loan origination and the fiscal year prior to loan origination. If the change in the notional amount is positive, we consider the loan to have been (at least partially) swapped to fixed rate.

Consistent with Faulkender (2005), we find a significantly negative correlation between the yield spread and percentage of firms fixing the rate on their floating rate loans. In addition, the percentage of loans with mandatory derivative use is positively correlated with the USDX and VIX, whereas no such correlation is found for the percentage of voluntary users. These differences in correlations suggest that the incentives for banks to require borrowers to enter interest rate protection covenant may be quite different from the incentives for voluntary users. The strong correlations of percentage of mandatory users with other macroeconomic indicators also suggests that the relation with the yield curve may be capturing general economic conditions rather than market timing behavior as documented in Faulkender (2005). Finally, the correlations among macro indicator variables are mostly consistent with economic theory predictions except for the correlation between yield spread and credit spread. Contrary to the notion that higher credit spread represents lower risk tolerance and higher economic uncertainty, we find that credit spread is significantly positively correlated with yield spread in our sample period. We find this positive correlation puzzling although King et al. (2007) describe a similar pattern.

Figure 1 provides further insight into the correlations between macroeconomic conditions and derivative usage of each type. Panel A plots the movement of the yield curve over the sample period. In general, the movement of the yield spread is in the opposite direction from the movement in mandatory usage. As the yield spread trends down from1995 to 2001, mandatory usage trends up. In 2002 the yield spread started increasing sharply just as mandatory use dropped precipitously. The co-movement between yield spread and voluntary usage is less clear.

Figure 1 Panel B shows that both the USDX and mandatory use increased from 1995 to 2001. The USDX continued to increase for three quarters after the mandatory use began to decline and then the series continue to move together.

Figure 1 Panel C shows that the time trend of the VIX also increased with the increase in mandatory use and continued to rise for 5 quarters after mandatory use began to decline in the first quarter of 2002. Again for both USDX and VIX, the co-movements with voluntary users are not clear.

Table 2 Panel B reports Pearson correlation coefficients among firms and loan characteristics. We find that firms whose sales revenue positively co-varies with interest rate tend to be bigger and rely less on external debt financing. Firms that rely heavily on external debt financing are smaller, have higher leverage ratios and tangible assets, and incur higher capital expenditures. We find that bigger firms have higher accounting quality, are more likely to be rated, and have better credit ratings. Overall, the correlations among firm and loan characteristics are consistent with the prior literature.

5.2 Univariate Analyses

Table 3 reports univariate analyses of firm characteristics, loan characteristics, and the macroeconomic indicators, and tests of differences between the means of these variables for mandatory users, non users, and voluntary users.

The univariate tests for firm characteristics suggest that mandatory users have higher average default risk. Mandatory users are smaller, less profitable, have higher leverage ratios, and are less likely to have S&P credit ratings relative to either non-users or voluntary users. Only 35% of mandatory users have S&P credit ratings, compared with 44% for voluntary users and 50% of non-users.

An examination of loan characteristics also suggests that mandatory users exhibit higher default risk. For example, we find that the interest rate charged for mandatory users is 86.39 basis points higher than the rate charged for non-users and 97.11 basis points higher than for voluntary users. Bank loans in the mandatory user group have a higher number of other covenants, longer maturities, are more likely to be used for takeover purpose, and are more likely to require collateral. We find that 91% of bank loans in the mandatory users group are secured compared with 57% of bank loans that do not impose an interest rate protection covenant. We also find that bank loans with interest rate protection covenants are more likely to be repackaged and sold on the secondary loan market (49% compared with 10% of non users and 16% of voluntary users).

Further comparison of industry characteristics shows that the average sales beta for mandatory users is negative, whereas the average sales betas for both voluntary users and non-users are positive. This difference suggests bank loans are less likely to include interest rate protection covenants when firms' assets exhibit "natural hedging".

Finally, the univariate results for macroeconomic indicators are, in general, consistent with our hypothesis that banks tend to use interest rate protection covenants to fix interest payments when they expect the economy to be weak. For example, the average yield spread for loans requiring derivative use is 81.89 basis points versus 105.54 for nonusers. The significant difference between these two values indicates that mandatory use is more prevalent when the yield curve is flatter. The average yield spread for voluntary users is 77.19. The difference between mandatory and voluntary users is not significant. Moreover, the average VIX and USDX indices for mandatory users are

significantly higher than the averages for either nonusers or voluntary users, suggesting loan contracts are more likely to require interest rate protection covenants when the macroeconomic uncertainty is high. Finally, we find both mandatory and voluntary users tend to fix the rate on their debt when the credit spread is low and when the federal funds rate is high. This result is not surprising given the significant positive correlation between the credit spread and the yield spread and the significant negative correlation between the federal funds rate and the yield spread shown in table 2.

Overall the univariate results suggest that loan contracts are more likely to include interest rate protection covenants when borrowers exhibit higher default risk and when the macroeconomic outlook is uncertain. The difference between mandatory users and voluntary users suggests that the two groups are likely to have very different incentives to enter derivative contracts.

5.3 Mandatory User Probit Models

Table 4 presents the results of our Probit model estimation investigating whether loan contracts are more likely to include interest rate protection covenants when borrowers exhibit higher default risk and when macroeconomic factors indicate potential weak economic conditions. The dependent variable equals one for mandatory users and zero for non users. Model (1) includes firm characteristics, loan characteristics, and industry characteristics as independent variables. To examine the market timing argument proposed in Faulkender (2005), we also include yield spread and credit spread in Model (1). Consistent with the univariate test results, we find that small, highly levered, less profitable, and lower rated firms are more likely to be required to enter interest rate protection agreements. This finding suggests that mandatory users have a

higher probability of financial distress and higher agency costs of debt from taking on interest-rate risk. The coefficients on all of the loan specific variables are significant and consistent with the univariate results in Table 3. Mandatory use is more likely for secured loans, for loans with a longer maturity, for term loans, for loans sold on the secondary market, when the number of lenders is higher, when the number of other covenants is greater, and when the loan is used for take-over purposes. The positive coefficient on the maturity variable is consistent with the probability of default increasing as the time that the loan is outstanding increases. Since affirmative covenants are unlikely to be violated, the positive coefficient on the number of lenders variable could suggest a substitution of affirmative covenants for negative covenants as renegotiation becomes more costly. Inconsistent with the market-timing behavior documented in Faulkender (2005), the coefficient on the yield spread in Model (1) is not significant. In Model (2), we include VIX and USDX indices to proxy for future macroeconomic conditions. We find the USDX index to be significant at the 1% level in Model (2), suggesting loan contracts are more likely to include interest rate covenants when future economic conditions are expected to be weak.

To re-examine the "market-timing" explanation of the sensitivity of derivative use to yield spread more carefully, we replicate Faulkender (2005) with Model (3).[9] Consistent with Faulkender (2005), increases in yield spread lower the probability of fixing the interest rate on the debt. However, when we include VIX and the USDX (Model (4)) in the regression, the coefficient on the yield spread becomes insignificant while the significance on the other variables remains largely unchanged. The reduction in

[9] Except for sales beta, the variables in Model (3) are the same as in Faulkender (2005) Table 3 specification 1. Faulkender (2005) use firm-specific cash flow betas but we use industry-specific sales beta. We obtain very similar results using firm-specific betas.

the association between the yield spread and mandatory derivative use suggests that the association may be capturing the probability of future recession rather than market-timing behavior.

Overall, the results in Table 4 suggest that loan contracts tend to require borrowers to fix their interest payments when the borrower has high default risk and when an economic slowdown is expected. This finding indicates that the sensitivity of derivative usage to yield spread cannot be unambiguously interpreted as timing the interest rate market.

5.4 Mandatory User OLS Models Including Interaction Effects

Table 5 presents the OLS regression results of how the likelihood of including an interest rate protection covenant is affected by interactions among macroeconomic indicators, external finance dependence, and accounting quality. We do not use Probit estimation in table 5 because Ai and Norton (2003) show that the magnitude of the interaction effect in nonlinear models does not equal the marginal effect of the interaction terms and can sometimes have the wrong sign.

We use firm-level accrual quality and tangibility as measures of accounting quality. In Table 5 Model (1) and (2), we follow Rajan and Zingales (1998) and exclude macroeconomic indicators in the regression. In Model (1), we find that a higher level of tangible assets significantly reduces the likelihood of including interest rate protection covenants in bank loan contracts. In Model (2), we find external financing dependence significantly increases the likelihood of including an interest rate protection covenant in the loan contract. However, the coefficient on the interaction term of external finance dependence and tangibility is significantly negative. This suggests that the impact of

external financing dependence on mandatory use is less important for firms with more transparent balance sheets. Following Braun and Larrain (2005), we include macroeconomic indicators in Model (3) and (4). We find that banks are more likely to include interest rate protection covenants in loan contracts when future economic conditions are expected to be weak, especially for firms that rely heavily on external debt finance. Again, this impact is alleviated for firms with higher accruals quality. Overall, our evidence is consistent with the credit channel theory that negative economic shocks are more likely to affect firms that rely on external finance and that reducing financial frictions through higher accounting quality helps alleviate the agency conflicts and therefore reduces the overall impact of negative economic shocks.

5.5 Effect of Mandatory Derivative Use on Interest rates

We investigate whether including the interest rate protection provision reduces the interest rate charged on the loan using both a Heckman self-selection model and an instrumental variable approach.

Table 6 column 2 and 3 reports the results of the self-selection correction model. The positive coefficient on the inverse mills ratio is consistent with riskier loans being more likely to include interest rate protection provisions. Consistent with our prediction that this covenant reduces credit risk, the coefficient on *MAND* is significantly negative. By accepting interest rate protection covenants, borrowers receive an average 45.10 basis point reduction in the loan rate. The results for the control variables are consistent with those found in previous research. Specifically, smaller borrowers and borrowers that have high leverage, low profitability, low accrual quality, and low debt ratings are charged a higher rate. We find larger spreads for loans that require collateral, for term

loans, and for loans that are used for takeovers. We also find that a lower interest rate is charged on loans with a longer maturity and loans with a larger number of lenders. This would be expected if less risky borrowers are allowed to enter into longer maturity loans and are more suitable for larger syndicates.

Table 6 column 4 and 5 present the results of the instrumental variable model. We find qualitatively similar results in this model as in the self-selection model. Overall, the results in Table 6 support the Smith and Stultz (1985) conjecture and provide evidence that interest-rate risk management activities with credible commitments help reduce cost of debt for risky borrowers.

5.6 Effect of Voluntary Derivative Use on Interest Rates

In Appendix II, we report the regression results of our first stage Probit model comparing voluntary derivative users with non users. The specification is the same as Model (2) in Table 4.

We estimate the effect of voluntary derivative use on the interest rate charged on the loan and report the results in Table 7. We find no evidence that the voluntary use is associated with the interest rate charged on the loan, in either the self-selection correction model or the instrumental variable model.[10] This result is expected since, in contrast to mandatory users, voluntary users are not contractually obligated to hedge interest rate risk and therefore do not credibly commit to any risk management activities. The magnitude and significance of the other variables are similar to those reported in our models of the effect of mandatory use on interest rates.

5.7 Analysis of Mandatory Derivative Users by Covenant Types

[10] Untabulated results show that the interest rate charged for mandatory users is significantly lower than that of the voluntary users in both self-selection correction model and the instrumental variable model.

One interesting observation is that some interest rate protection covenants apply to the borrowers' entire consolidated debt whereas others only apply to the new debt issuance. In table 8, we provide descriptive analysis of the firm and loan characteristics of the two types of covenants. Of the 278 loan contracts that include interest rate protection covenants, we are able to identify 69 covenants applied on the borrower's entire debt and 153 covenants applied only on the principle of the new debt, we cannot identify the remaining 56 covenants due to the ambiguity of the wording of the covenants. We find that, compared with borrowers that are required to hedge their new debt, borrowers that are required to hedge their entire debt are significantly larger, more likely to be rated, and have higher capital expenditures. Conditional on the existence of ratings, borrowers with both covenant types have speculative-grade ratings (an average of C level). If the existence of the debt rating proxies for access to the bond market (Faulkender and Perterson 2006), these findings suggest that borrowers with covenants applied on the entire debt have more access to the bond market and that their public debt most likely falls in the junk bond category. Consistent with the above conjecture, we find that the borrowers with covenants applied on the entire debt have significantly higher leverage ratios but lower variable to total debt ratios and pay significantly higher interest rates (26 basis points) than borrowers with covenants applied on the new issuance.

These results suggest that how easily borrowers can unwind the hedge position specified in the covenant is important in designing the contract. Hedge accounting requires each derivative position be explicitly linked to an underlying hedged transaction, making it difficult for borrowers without any fixed-rate debt to enter a fixed-to-variable rate derivative contract and qualify for hedge accounting treatment. Therefore, borrowers

with more fixed-rate debt have more opportunity to unwind the hedge required by the covenant if the covenant only applies on the new bank debt.

6. Sensitivity Tests

The inclusion of interest rate protection covenants could arise from certain lead arrangers' preferences rather than borrowers' characteristics. We consider this possibility in our first sensitivity test by examining whether mandatory users share the same lead arrangers. We identify 219 unique banks serving as lead arrangers for the entire sample of 2,449 loan deals. The 278 deals with interest rate protection agreements are arranged by 75 banks compared to the 2,171 deals without interest rate protection agreement that are arranged by all 219 banks. This suggests that per capita there are more lead arrangers for deals with the covenants than for those without. In addition, there is no lead arranger that only arranges deals with interest rate protection covenants. These results suggest that the requirement for borrowers to enter interest rate protection program does not merely reflect specific lead arranger's preference.

To provide further evidence that the sensitivity of derivative usage to yield spread first documented in Faulkender (2005) most likely reflects increased creditor-shareholder conflicts for mandatory derivative users when the probability of future recession is high, our second sensitivity test examines whether the yield spread is also a determinant for banks' inclusion of other covenants that restrict borrowers' use of cash flows. If a flat yield curve indicates higher economic uncertainty and banks react to macroeconomic conditions by requiring borrowing firms to enter interest rate protection programs, we expect those conditions will lead loan contracts to also include additional covenants,

especially the ones that restrict borrowing firms' cash flows. Consistent with our expectations, the probit regression results suggest that banks are more likely to include excess cash flow sweep covenants and interest coverage covenants when the yield curve is flat. The total number of covenants imposed in bank loans also exhibits a similar negative association with the yield spread.

7. Conclusion

Previous research examining non-financial firms' incentives to enter into interest rate derivatives to either hedge or time the market assumes that derivative use is a voluntary borrower choice. The literature ignores the fact that many bank loan agreements explicitly include interest rate protection covenants that require the borrower to enter interest rate protection programs to fix their interest rate. Reasons for including these covenants may differ from reasons that borrowers voluntarily choose to enter into interest rate derivative contracts. We examine why some bank loan contracts include interest rate protection covenants and how the inclusion of these covenants affects the interest rate charged on the loan. In addition, we conduct similar analyses for firms that voluntarily use derivatives to fix the borrowing rate after loan origination.

Our paper makes two important contributions. First, by identifying and examining mandatory derivative use, our paper provides initial empirical evidence on how lenders' preferences directly affect corporate risk-management behavior. We provide evidence that loan contracts require borrowing firms to use interest rate protection agreements to fix the rate on their debt to reduce the agency costs of debt. Understanding the role that loan contracts play in the use of derivatives adds to the

growing research on how financing decisions and debt heterogeneity affect corporate capital structure, debt structure, and investment decisions (Faulkender and Petersen 2006; Rauh and Sufi 2008; Roberts and Sufi 2007; Nini et al. 2008). In addition, our finding that accounting quality mitigates the importance of dependence on external finance in the likelihood of mandatory derivative use suggests that accounting quality can substitute for derivative use in reducing the agency costs of debt.

Second, previous empirical studies that examine whether hedging reduces cash flow variability and thus reduces costs of financial distress ignore the issue of commitment and have produced mixed results due to difficulties identifying the actual hedge positions and to endogeneity problems. In contrast to previous research, we separately examine firms that make a credible commitment to hedge (mandatory users) and firms that do not commit (voluntary users). We provide the first large-sample evidence that borrowers who credibly commit to interest-rate risk management enjoy reduced costs of debt. Our finding is consistent with Smith and Stultz's (1985) conjecture that, due to agency conflicts between creditors and shareholders, the benefits of hedging arising from reduced costs of financial distress is only realizable when borrowers can credibly commit to hedge after the loan issuance.

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Appendix I: Variable definitions

ADV	Advertising expense scaled by annual net sales (data45/data12), 0 when data45 is missing. Measured for the fiscal year prior to loan origination.
AISD	Loan spread over LIBOR calculated for each deal. Simple average if one deal consists of multiple facilities.
AQ	Accounting quality, measured as -1*ABS (abnormal accruals). Abnormal accruals are estimated for the fiscal year prior to loan origination using modified Jone's model adjusted for performance (see Kothari, Leone, and Wasley, 2005 for details).
AQ_R	Rank variable (high, medium, low) based on AQ.
CAX	Capital Expenditure scaled by annual net sales (data128/data12). Measured for the fiscal year prior to loan origination.
C_SPREAD	Difference in yields (basis points) between the 30-year Moody's BAA and AAA corporate bond (monthly data).
CP_SPREAD	Difference in yields (basis points) between 3-month commercial paper and 3-month Treasury bill (monthly data).
COMPRATE	Transformed S&P credit rating (data280), which ranges from 1 for firms that are rated AAA to 22 for firms that are rated D. Missing if a firm does not have a S&P credit rating.
EXTERNAL	Indicator variable equals 1 if a firm belongs to an industry that relies heavily on debt financing over our sample period (1995-2005), 0 otherwise. Following Rajan and Zingales (1998), we measure a firm's dependence on external finance as capital expenditure (data128) minus cash flow from operations (data308) divided by capital expenditures. We measure the dependence on external equity finance as the ratio of the net amount of equity issues (data108-data115) to capital expenditures (data128). We then aggregate the above two measures across firms within each industry (2-digit SIC code) over the 11-year period from 1995 to 2005. An indicator variable measuring industries' reliance on external debt finance equals 1 for industries that rely heavily on external finance (above the median) but not on external equity finance (below the median) and 0 otherwise.
FEDFUND	Federal funds rate (basis points) adjusted for actual inflation (monthly data).
LAMBDA_M	Inverse Mills Ratio calculated from the PROBIT model of mandatory users versus non-users (Table 4 Model 2).
LAMBDA_V	Inverse Mills Ratio calculated from the PROBIT model of voluntary users versus non-users (Appendix II).
LOANSIZE	Total loan amount scaled by the borrower's total assets (data6) at the fiscal year end prior to loan origination.

LEV	Total debt (data9 + data34) divided by the market value of equity (data199 * data25) plus total debt (data9 + data34), measured at the fiscal year end prior to loan origination.
MAND	Equals 1 if a bank loan includes an interest rate protection covenant (mandatory users), 0 for non-users, missing for voluntary users.
MATURE	Number of months between the start and end date of the loan contract.
PM	Gross profit scaled by annual net sales (data13/data12), measured for the fiscal year prior to loan origination.
RATE	Equals 1 if a borrower has S&P credit rating prior to loan origination, 0 otherwise.
RD	Research and development expense scaled by annual net sales (data46/data12), 0 when data46 is missing. Measured for the fiscal year prior to loan origination.
NCOV	Number of covenants included in each loan.
NLENDER	Number of lenders involved in the loan contract.
SECOND	Equals 1 if a "Term Loan" is followed by letter A-H, 0 otherwise.
SECURE	Equals 1 if the loan is secured. 0 if the loan is not secured.
SALEBETA	Correlation between firm's net sales to interest rate. Following Vickery (2008), we regress a firm's annual net sales (data12) scaled by total assets (data6) on the 12-month treasury interest rate contemporaneously and lagged one period, as well as a constant, time trend, and log time trend. Each regression is estimated at 2-digit SIC industry level over the past 30 years. The sum of estimated coefficients on current and lagged treasury interest rate measures the correlation between sales and interest rate at industry level.
SIZE	Log annual net sales (data12) prior to loan origination.
SPRATE	Transformed S&P rating (data280), which equals 0 for firms that do not have ratings and ranges from 1 for AAA to 22 for D for firms who have ratings. Measured at the fiscal year end prior to loan origination.
TAKEOVER	Equals 1 if the loan is used for takeover purpose, 0 otherwise.
TANGIBLE	PPE (data128) / Total assets (data6) at the fiscal year end prior to loan origination.
TANGIBLE_R	Rank variable (high, medium, low) based on TANGIBLE.
TERM	Equals 1 if one of the facilities is term loan, 0 otherwise.

YIELD	Difference in yields (basis points) between 10-year Treasury bond and 1-year Treasury bond (monthly data)
USDX	Federal Reserve Board's trade-weighted dollar index (monthly data). Higher USDX indicates stronger U.S. dollar.
USDX_R	Rank variable (high, medium, low) based on USDX.
VD_TD	Variable rate debt (after considering the effect of derivative contracts) to total debt (data9 + data34) ratio at the fiscal year end prior to loan origination.
VIX	Chicago Board Options Exchange Volatility Index, measured as the implied volatility derived from the option prices of S&P 500 stock index (monthly data).
VOL	Equals 1 if a borrowing firm voluntarily uses derivative contracts to fix the borrowing rate after loan origination, 0 for non-users, missing for mandatory users.

Appendix II: Coefficients *(p-values)* from Probit Model of voluntary users versus non users. First-stage regression for the self-selection correction model in Table 7.

Variable^	Model 1	
	coefficients	*(p-value)*
Intercept	-1.66	***(0.01)*****
Firm characteristics		
SIZE	0.05	*(0.28)*
LEVERAGE	-0.00	*(0.99)*
RD	-1.02	*(0.52)*
ADV	-2.33	*(0.21)*
CAX	0.25	*(0.29)*
PM	0.43	*(0.19)*
AQ	-0.47	*(0.47)*
TANGIBLE	-0.28	*(0.24)*
RATE	-0.08	*(0.79)*
SPRATE	-0.01	*(0.77)*
Loan characteristics		
SECURE	-0.16	*(0.18)*
MATURE	0.01	***(0.01)*****
TERM	0.37	***(0.00)*****
SECOND	-0.09	*(0.59)*
NLENDER	0.02	***(0.09)****
NCOV	0.00	*(0.97)*
TAKEOVER	0.44	***(0.07)****
LOANSIZE	0.40	***(0.01)*****
Industry characteristics		
SALEBETA	2.66	*(0.31)*
EXTERNAL	0.01	*(0.92)*
Macroeconomic indicators		
YIELD	-0.07	*(0.27)*
CSPREAD	-0.36	*(0.28)*
VIX	0.00	*(0.81)*
USDX	-0.02	*(0.81)*
Pseudo R^2	15.92%	

^ All variables are defined in Appendix I.
***, ** and * represent 1%, 5% and 10% significance, respectively.

Figure 1:

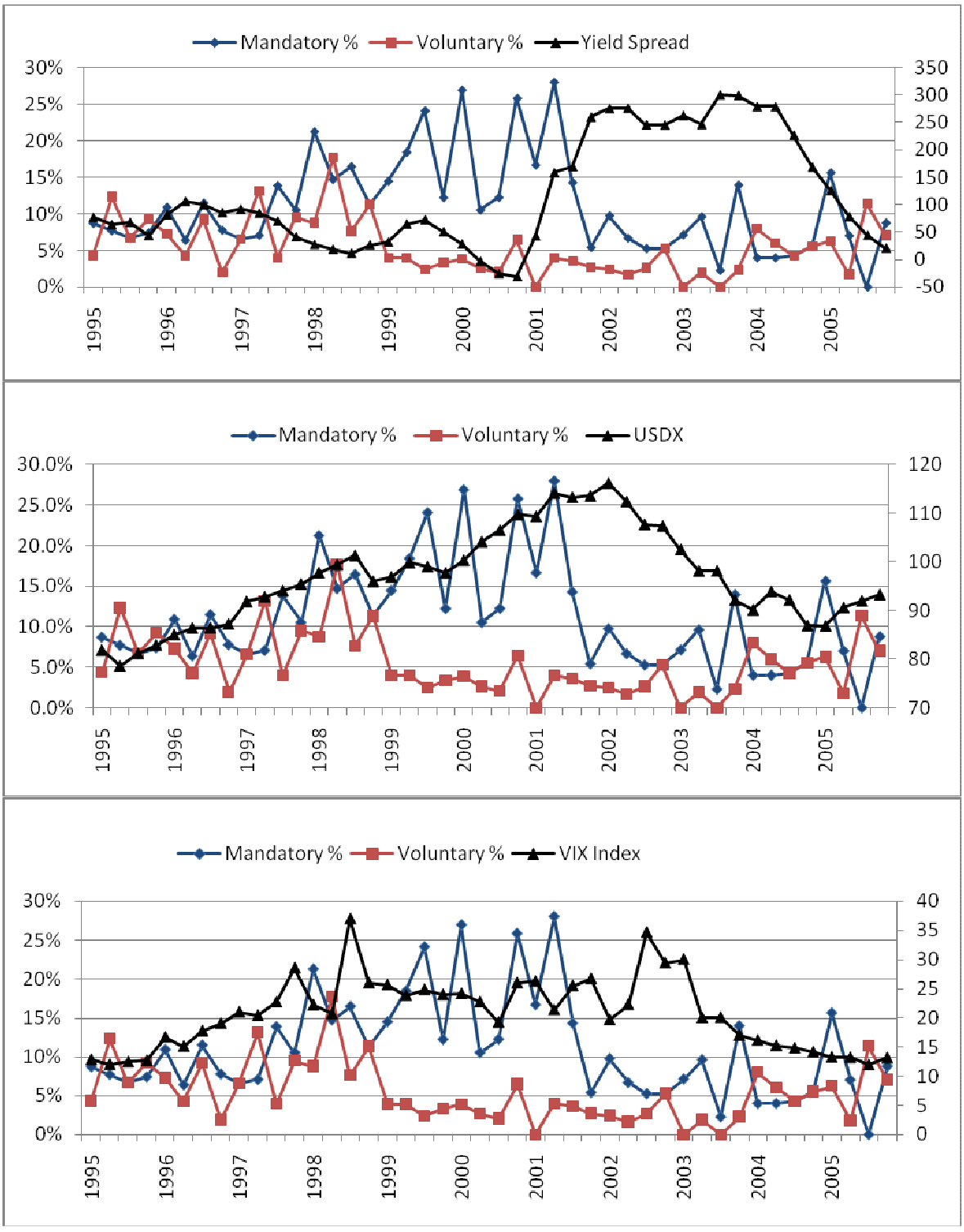
Mandatory %
Voluntary %
Yield Spread
30%
25%
20%
15%
10%
5%
0%
350
300
250
200
150
100
50
0
-50
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
Mandatory %
Voluntary %
USDX
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
120
110
100
90
80
70
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
Mandatory %
Voluntary %
VIX Index
30%
25%
20%
15%
10%
5%
0%
40
35
30
25
20
15
10
5
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005

Table 1: Industry distribution of mandatory users, voluntary users and non users.

	Mandatory Users (%)	Voluntary Users (%)	Non Users (%)
01-09 Agriculture	0.00	0.00	0.48
10-17 Mining and Construction	4.63	9.09	11.37
20-34 Manufacturing(not heavy machinery)	20.04	27.27	22.79
35-39 Industrial machinery & equipment	21.14	15.58	19.37
40-49 Transportation& Utilities	20.28	15.58	13.68
50-59 Whole sale and retail	13.44	16.45	15.17
70-99 Services	20.26	16.02	17.14

Table 2: Pearson correlation coefficients among main variables. Numbers in bold indicate 5% level of significance or less.

Panel A: Pearson correlation coefficients among mandatory use, voluntary use and macroeconomic indicator variables^

	Mandatory %	Voluntary %	YIELD	C_SPREAD	USDX	VIX	CP_SPREAD	FEDFUND
Mandatory %	1.00							
Voluntary %	-0.06	1.00						
YIELD	**-0.47**	**-0.34**	1.00					
C_SPREAD	-0.27	**-0.43**	**0.66**	1.00				
USDX	**0.32**	**-0.38**	0.22	**0.56**	1.00			
VIX	**0.30**	-0.16	0.00	**0.31**	**0.67**	1.00		
CP_SPREAD	**0.32**	0.29	**-0.83**	**-0.57**	-0.25	0.08	1.00	
FEDFUND	**0.43**	**0.34**	**-0.81**	**-0.59**	-0.12	0.20	**0.82**	1.00

^ All variables are defined in Appendix I.

Panel B: Pearson correlation coefficients among firm and loan characteristics.

	SALEBETA	EXTERNAL	SIZE	LEV	RD	ADV	CAX	PM	AQ	TANGIBLE	RATE	COMPRATE	SECURE	MATURE	TERM	SECOND	NLENDER	NCOV	TAKEOVER
SALEBETA	1.00																		
EXTERNAL	**-0.28**	1.00																	
SIZE	**0.25**	**-0.15**	1.00																
LEV	**0.16**	**0.13**	**0.06**	1.00															
RD	**-0.08**	**-0.15**	-0.03	**-0.22**	1.00														
ADV	**0.05**	**-0.07**	**0.09**	**-0.06**	0.00	1.00													
CAX	**-0.25**	**0.48**	**-0.33**	0.00	**-0.09**	**-0.09**	1.00												
PM	**-0.06**	**0.22**	0.02	-0.02	**-0.07**	**-0.05**	**0.24**	1.00											
AQ	**0.13**	0.02	**0.26**	**0.11**	**-0.13**	-0.02	**-0.07**	**0.11**	1.00										
TANGIBLE	**0.08**	**0.35**	**-0.06**	**0.16**	**-0.24**	**-0.13**	**0.50**	**0.38**	**0.12**	1.00									
RATE	**0.13**	**0.07**	**0.55**	**0.25**	**-0.05**	**0.06**	-0.02	**0.13**	**0.20**	**0.12**	1.00								
COMPRATE	**-0.22**	**0.16**	**-0.57**	**0.53**	**-0.11**	**-0.11**	**0.14**	**-0.11**	**-0.17**	-0.02		1.00							
SECURE	**-0.14**	**0.06**	**-0.44**	**0.24**	**-0.05**	-0.03	**0.07**	**-0.11**	**-0.15**	**-0.05**	**-0.22**	**0.66**	1.00						
MATURE	-0.01	**0.07**	**-0.09**	0.00	**-0.13**	-0.02	0.01	**0.05**	**0.05**	-0.01	-0.03	**0.27**	**0.17**	1.00					
TERM	-0.01	0.00	**-0.17**	**0.15**	-0.03	-0.02	0.01	**-0.04**	-0.01	**-0.06**	**-0.08**	**0.38**	**0.39**	**0.41**	1.00				
SECOND	0.02	0.02	-0.02	**0.17**	**-0.04**	0.00	0.00	**-0.04**	0.02	**-0.07**	**0.05**	**0.31**	**0.32**	**0.38**	**0.58**	1.00			
NLENDER	**0.12**	**0.05**	**0.52**	**0.04**	**-0.05**	0.04	-0.03	**0.12**	**0.14**	**0.06**	**0.39**	**-0.26**	**-0.25**	**0.15**	-0.01	**0.04**	1.00		
NCOV	**-0.07**	0.02	**-0.26**	**0.04**	**-0.09**	**-0.06**	0.01	-0.04	-0.02	**-0.05**	**-0.20**	**0.35**	**0.28**	**0.32**	**0.32**	**0.24**	-0.01	1.00	
TAKEOVER	0.00	0.01	-0.01	-0.01	-0.03	-0.04	-0.04	0.01	**0.05**	-0.02	0.00	0.01	**0.08**	**0.15**	**0.14**	**0.22**	0.02	**0.09**	1.00
LOANSIZE	**-0.13**	**0.11**	**-0.51**	**-0.14**	**-0.06**	-0.02	**0.14**	**-0.04**	**-0.19**	0.03	**-0.32**	**0.17**	**0.16**	**0.15**	-0.02	-0.04	-0.03	**0.19**	-0.01

^ All variables are defined in Appendix I.

Table 3: Descriptive statistics for sample of firms entering into bank loan agreements during the period from 1995-2005 by derivative use.

Variables^	Means for Mandatory Users	Means for Non-Users	*(p-value for difference between mandatory and Non-Users)*	Means for Voluntary Users	*(p-value for difference between mandatory and voluntary users)*
Firm Characteristics					
SIZE	5.85	6.56	***(0.00)******	6.41	***(0.00)******
LEV	0.37	0.29	***(0.00)******	0.27	***(0.00)******
RD (%)	0.91	1.40	***(0.02)*****	1.05	*(0.58)*
ADV (%)	0.73	0.97	***(0.09)****	0.71	*(0.91)*
PM	0.13	0.16	***(0.01)******	0.19	***(0.01)******
CAX	0.15	0.13	*(0.19)*	0.16	*(0.95)*
AQ	-0.07	-0.06	*(0.21)*	-0.07	*(0.94)*
TANGIBLE	0.31	0.37	***(0.00)******	0.37	***(0.00)******
RATE	0.35	0.50	***(0.00)******	0.44	***(0.09)****
COMPRATE	13.02	10.24	***(0.00)******	10.23	***(0.00)******
Loan Characteristics					
AISD	242.49	156.10	***(0.00)******	145.38	***(0.00)******
SECURE	0.91	0.57	***(0.00)******	0.58	***(0.00)******
NCOV	5.20	3.79	***(0.00)******	4.25	***(0.00)******
TERM	0.82	0.27	***(0.00)******	0.47	***(0.00)******
SECOND	0.49	0.10	***(0.00)******	0.16	***(0.00)******
TAKEOVER	0.08	0.01	***(0.00)******	0.05	*(0.28)*
LOANSIZE	0.39	0.31	***(0.00)******	0.43	*(0.29)*
NLENDER	11.23	9.87	***(0.02)*****	12.56	*(0.21)*
MATURE	61.11	43.82	***(0.00)******	54.15	***(0.00)******
Industry Characteristics					
SALEBETA	-0.003	0.0001	***(0.02)*****	0.0001	***(0.05)*****
EXTERNAL	0.23	0.18	***(0.04)*****	0.20	*(0.38)*
Macro Economic Indicators					
YIELD	81.89	105.54	***(0.00)******	77.19	*(0.56)*
C_SPREAD	75.56	79.49	***(0.00)******	72.36	***(0.09)****
VIX	22.09	20.72	***(0.00)******	20.49	***(0.01)******
USDX	97.04	95.60	***(0.00)******	93.74	***(0.00)******
CP_SPREAD	41.89	37.39	***(0.00)******	41.53	*(0.85)*
FEDFUND	232.08	179.07	***(0.00)******	236.56	*(0.78)*

^ All variables are defined in Appendix I.
***, ** and * represent 1%, 5% and 10% significance, respectively.

Table 4: Coefficients *(p-values)* from Probit Models of mandatory users versus non users.

Variable^	Model 1		Model 2		Model 3		Model 4	
	coefficients	*(p-value)*	coefficient	*(p-value)*	coefficient	*(p-value)*	coefficient	*(p-value)*
Intercept	-2.32	***(0.00)*****	-4.09	***(0.00)*****	-0.17	*(0.43)*	-1.61	***(0.00)*****
Firm characteristics								
SIZE	-0.09	***(0.05)****	-0.09	***(0.01)*****	-0.14	***(0.00)*****	-0.14	***(0.00)*****
LEV	0.44	***(0.02)****	0.41	***(0.04)****	0.72	***(0.00)*****	0.69	***(0.00***
RD	-1.05	*(0.48)*	-0.96	(0.51)	-2.07	***(0.08)****	-2.14	***(0.08)****
ADV	-1.57	*(0.39)*	-1.62	(0.38)	-1.26	*(0.40)*	-1.46	*(0.33)*
CAX	0.06	*(0.77)*	-0.02	(0.89)	-0.21	*(0.13)*	-0.26	***(0.08)****
PM	-0.28	*(0.29)*	-0.26	(0.30)	-0.48	***(0.01)*****	-0.47	***(0.02***
AQ	-0.63	*(0.26)*	-0.59	(0.28)				
TANGIBLE	-0.48	***(0.03)****	-0.44	***(0.05)****				
RATE	-0.92	***(0.02)****	-0.99	***(0.02)****				
SPRATE	0.05	*(0.11)*	0.06	***(0.08)****				
Loan characteristics								
SECURE	0.25	***(0.05)****	0.24	***(0.07)****				
MATURE	0.01	***(0.00)*****	0.01	***(0.00)*****				
TERM	0.67	***(0.00)*****	0.67	***(0.00)*****				
SECOND	0.39	***(0.00)*****	0.35	***(0.00)*****				
NLENDER	0.02	***(0.00)*****	0.02	***(0.00)*****				
NCOV	0.12	***(0.00)*****	0.13	***(0.00)*****				
TAKEOVER	0.44	***(0.03)****	0.38	***(0.07)****				
LOANSIZE	0.03	(0.86)	0.04	(0.37)				
Industry characteristics								
SALEBETA	-2.52	*(0.31)*	-2.23	*(0.37)*	-3.25	***(0.09)****	-3.03	(0.11)
EXTERNAL	0.12	*(0.33)*	0.13	*(0.27)*				
Macroeconomic indicators								
YIELD	-0.07	*(0.28)*	-0.01	*(0.82)*	-0.12	***(0.02)****	-0.07	*(0.21)*
C_SPREAD	-0.05	*(0.86)*	-0.64	***(0.04)****	-0.14	*(0.51)*	-0.69	***(0.01)*****
VIX			-0.00	*(0.57)*			0.00	(0.73)
USDX			0.02	***(0.00)*****			0.02	***(0.00)*****
Pseudo R^2	46.75%		47.46%		11.05%		12.53%	

^ All variables are defined in Appendix I.
***, ** and * represent 1%, 5% and 10% significance, respectively.

Table 5: Coefficients *(p-values)* from OLS Models of mandatory users versus non users, including interaction terms.

Variable^	Model 1		Model 2		Model 3		Model 4	
	Coeffi cients	*(p-value)*	Coeffi cient	*(p-value)*	Coeffi cient	*(p-value)*	Coeffi cient	*(p-value)*
USDX_R					0.06	***(0.03)*** **	0.09	***(0.00)*** ***
EXTERNAL	0.08	*(0.13)*	0.25	***(0.00)*** ***	-0.03	*(0.67)*	0.20	***(0.07)*** *
AQ_R	0.01	*(0.73)*	-0.00	*(0.86)*	-0.01	*(0.83)*	-0.00	*(0.91)*
TANGIBLE_R	-0.04	***(0.02)*** **	-0.02	*(0.40)*	-0.04	***(0.02)*** **	0.01	*(0.75)*
USDX_R* EXTERNAL					0.12	***(0.05)*** **	0.05	(0.53)
EXTERNAL* AQ_R	-0.05	*(0.21)*			0.05	*(0.44)*		
EXTERNAL* TANGIBLE_R			-0.17	***(0.00)*** ***			-0.16	***(0.02)*** **
USDX_R* AQ_R					0.01	*(0.56)*		
USDX_R* TANGIBLE_R							0.03	(0.21)
USDX_R* EXTERNAL* AQ_R					-0.09	***(0.05)*** **		
USDX_R* EXTERNAL* TANGIBLE_R							0.01	(0.89)
Controls	Yes		Yes		Yes		Yes	
R^2	21.47%		21.91%		22.16%		22.52%	

^ All variables are defined in Appendix I.
***, ** and * represent 1%, 5% and 10% significance, respectively.

Table 6: Analysis of the effects of interest rate protection provisions on the interest rates (as a spread over LIBOR) of syndicated loans.

	Self-selection Correction Model		IV Model	
Variable^	Coefficient	*(p-value)*	Coefficient	*(p-value)*
Intercept	108.28	***(0.00)*** ***	108.78	***(0.00)*** ***
MAND	-45.10	***(0.03)*** **	-50.78	***(0.03)*** **
LAMBDA_M	46.81	***(0.01)*** ***		
LAMBDA_M * MAND	-23.17	*(0.11)*		
Firm characteristics				
SIZE	-13.86	***(0.00)*** ***	-13.77	***(0.00)*** ***
LEV	108.88	***(0.00)*** ***	108.20	***(0.00)*** ***
RD	-16.10	*(0.71)*	-15.64	*(0.72)*
CAX	17.41	***(0.02)*** **	18.47	***(0.01)*** ***
PM	-98.30	***(0.00)*** ***	-99.32	***(0.00)*** ***
AQ	-55.89	***(0.01)*** ***	-54.24	***(0.01)*** ***
TANGIBLE	-0.32	*(0.97)*	-0.06	*(0.99)*
RATE	-77.45	***(0.00)*** ***	-76.95	***(0.00)*** ***
SPRATE	6.21	***(0.00)*** ***	6.19	***(0.00)*** ***
Loan characteristics				
SECURE	77.74	***(0.00)*** ***	77.18	***(0.00)*** ***
MATURE	-0.75	***(0.00)*** ***	-0.77	***(0.00)*** ***
TERM	42.85	***(0.00)*** ***	41.17	***(0.00)*** ***
SECOND	60.40	***(0.00)*** ***	60.51	***(0.00)*** ***
NLENDER	-0.30	*(0.19)*	-0.30	*(0.19)*
NCOV	1.54	*(0.16)*	1.35	*(0.21)*
TAKEOVER	45.61	***(0.00)*** ***	47.19	***(0.00)*** ***
LOANSIZE	-14.19	***(0.01)*** ***	-14.60	***(0.01)*** ***
Macroeconomic indicators				
YIELD	-1.43	*(0.64)*	-1.47	*(0.63)*
C_SPREAD	11.27	*(0.30)*	11.78	*(0.28)*
VIX	0.01	*(0.99)*	0.00	*(0.99)*
USDX	1.12	***(0.00)*** ***	1.10	***(0.00)*** ***
CP_SPREAD	23.07	***(0.04)*** **	22.99	***(0.04)*** **
FEDFUND	-10.25	***(0.00)*** ***	-10.26	***(0.00)*** ***
R^2	64.76%		65.21%	

^ All variables are defined in Appendix I.
***, ** and * represent 1%, 5% and 10% significance, respectively.

Table 7: Analysis of the effects of voluntary interest rate protection on the interest rates (as a spread over LIBOR) of syndicated loans.

	Self-selection Correction Model		IV Model	
Variable^	Coefficient	*(p-value)*	Coefficient	*(p-value)*
Intercept	124.05	***(0.00)*** ***	126.00	***(0.00)*** ***
VOL	0.52	*(0.99)*	13.18	*(0.86)*
LAMBDA_V	-25.02	*(0.68)*		
LAMBDA_V * VOL	25.62	*(0.60)*		
Firm characteristics				
SIZE	-11.81	***(0.00)*** ***	-11.86	***(0.00)*** ***
LEV	105.66	***(0.00)*** ***	105.73	***(0.00)*** ***
RD	-2.40	*(0.96)*	-6.03	*(0.90)*
CAX	19.03	***(0.02)*** **	19.44	***(0.02)*** **
PM	-86.07	***(0.00)*** ***	-85.23	***(0.00)*** ***
AQ	-47.22	***(0.04)*** **	-48.17	***(0.04)*** **
TANGIBLE	-0.52	*(0.95)*	-1.01	*(0.90)*
RATE	-79.16	***(0.00)*** ***	-79.42	***(0.00)*** ***
SPRATE	6.64	***(0.00)*** ***	6.61	***(0.00)*** ***
Loan characteristics				
SECURE	75.93	***(0.00)*** ***	75.43	***(0.00)*** ***
MATURE	-0.92	***(0.00)*** ***	-0.89	***(0.00)*** ***
TERM	32.04	***(0.00)*** ***	33.10	***(0.00)*** ***
SECOND	49.11	***(0.00)*** ***	48.89	***(0.00)*** ***
NLENDER	-0.56	***(0.05)*** **	-0.58	***(0.04)*** **
NCOV	0.83	*(0.41)*	0.84	*(0.42)*
TAKEOVER	34.43	***(0.00)*** ***	35.53	***(0.01)*** ***
LOANSIZE	-12.74	***(0.02)*** **	-12.87	***(0.02)*** **
Macroeconomic indicators				
YIELD	-2.61	*(0.42)*	-2.82	*(0.37)*
C_SPREAD	18.25	*(0.11)*	17.48	*(0.12)*
VIX	0.09	*(0.77)*	-0.10	*(0.75)*
USDX	0.80	***(0.00)*** ***	0.81	***(0.00)*** ***
CP_SPREAD	26.04	***(0.03)*** **	25.92	***(0.03)*** **
FEFFUND	-11.38	***(0.00)*** ***	-11.34	***(0.00)*** ***
R^2	62.41%		63.15%	

^ All variables are defined in Appendix I.
***, ** and * represent 1%, 5% and 10% significance, respectively.

Table 8: Descriptive statistics for mandatory users by covenant types.

Variables^	Covenant applies to total debt (N=69)	Covenant applies to new issuance (N=153)	*(p-value for difference in means)*
Firm Characteristics			
SIZE	6.07	5.66	***(0.02)*** **
LEV	0.42	0.35	***(0.09)*** *
RD (%)	0.71	0.96	*(0.50)*
ADV (%)	0.70	0.73	*(0.94)*
PM	0.10	0.13	*(0.27)*
AQ	-0.08	-0.07	*(0.72)*
TANGIBLE	0.31	0.29	*(0.42)*
CAX	0.31	0.10	***(0.00)*** ***
RATE	0.54	0.25	***(0.00)*** ***
SPRATE	13.27	13.42	*(0.75)*
VD_TD (%)	29.08	40.51	***(0.02)*** **
Loan Characteristics			
AISD	263.64	237.67	***(0.05)*** **
SECURE	0.91	0.94	*(0.44)*
NCOV	5.36	5.31	*(0.78)*
TERM	0.81	0.86	*(0.40)*
SECOND	0.59	0.48	*(0.13)*
NLENDER	13.10	10.11	***(0.04)*** **
TAKEOVER	0.04	0.09	*(0.22)*
LOANSIZE	0.30	0.45	***(0.00)*** ***
MATURE	64.29	61.81	*(0.27)*
Industry Characteristics			
SALEBETA	-0.006	-0.002	*(0.18)*
EXTERNAL	0.38	0.15	***(0.00)*** ***
Macroeconomic Indicators			
YIELD	95.71	79.86	*(0.24)*
VIX	21.35	22.59	*(0.15)*
USDX	97.62	96.62	*(0.39)*
C_SPREAD	77.54	74.47	*(0.26)*
CP_SPREAD	38.16	43.16	***(0.08)*** *
FEDFUND	202.16	238.81	*(0.13)*

^ All variables are defined in Appendix I.
***, ** and * represent 1%, 5% and 10% significance, respectively.