Why and How Do Banks Lay Off Credit Risk?

The Choice between Loan Sales versus Credit Default Swaps

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Abstract

This paper investigates why banks use different credit risk transfer (CRT) instruments to hedge the credit risk of syndicated loans. We examine banks' decision to insure, sell or continue to hold a loan by considering specific characteristics of both lenders and borrowers. We find that loans to borrowers with low credit quality are more likely to be sold in the secondary loan market while loans to those with high credit quality are more likely to be hedged using credit default swaps (CDS), especially when they face binding financial or regulatory constraints, which is consistent with the predictions of the theoretical literature. Interestingly, we find that bank lenders are more likely to use CDS as a hedge instrument, for relatively good quality borrowers, if monitoring costs are relatively high. Finally, our results show that CRT instruments are less likely to be used by reputable lenders for high quality borrowers.

Key Words: Credit Risk, Loan Sales, Credit Default Swaps, Syndicate Loans, Hedging, Monitoring Cost, Lender Reputation, Binding Financial Constraints, Regulatory Constraints.

JEL Classifications: G21, G32

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I. Introduction

As the banking industry has come under increasing scrutiny during the recent financial crisis, one of the most heated public debates has been about the deterioration in the quality of bank loans. This issue is addressed in an article in the New York Times in May 2009: *"[The] overall loan quality at American banks is the worst in at least a quarter century, and the quality of loans is deteriorating at the fastest pace ever, according to statistics released this week by the Federal Deposit Insurance Corporation"*.[1] Concerns have been particularly raised about how banks perceive and manage the credit risks associated with their loan portfolios. These concerns are compounded by discerning that the recent explosive growth in the credit derivative and the loan sale markets which has equipped the banking industry with a variety of tools to lay off their credit risk.

Despite these concerns about how banks manage their credit risks, very few theoretical studies and empirical work have investigated this issue. One important question that is unanswered by empirical research is under what circumstances a bank would lay off its credit risk exposure using either loan sales or Credit Default Swaps (CDS)? This paper aims to answer this question by taking into consideration the special characteristics and constraints of borrowers as well as their lenders.

The theoretical literature addresses this issue by investigating: (i) why do banks use credit risk transfer (CRT) for some of the loans?, and (ii) if banks choose to use CRT, why do they choose loan sales versus CDS? Based on the set up of the theoretical model, the existing evidence provides different explanations/predictions for these two questions. On one hand, Duffee and Zhou (2001); and Parlour and Winton (forthcoming) state that the quality of the

[1] "Troubled Bank Loans Hit a Record High", Floyd Noriss, Off the Charts, The New York Times, May 29, 2009.

loans, the costs of monitoring, and the status of the borrower are the main factors influencing banks' decision to lay off credit risk. On the other hand, Pennacchi (1988); and Allen and Carletti (2006) argue that binding financial and regulatory restrictions of the banks, specifically regulatory capital ratios and liquidity, might be inducing banks to use CRT. The latter view is justified by the fact that banks must act within certain restrictions imposed by regulatory bodies and/or liquidity needs of depositors. Accordingly, based on these predictions it could be either the characteristics of the lenders, or the characteristics of the borrowers, or a combination of the two that determines the bank's choice of CRT instruments.

This is the first paper to investigate empirically this question by using a unique hand collected dataset that incorporates both the lenders' characteristics (for example, capital constraint, liquidity, reputation, and etc.) and the borrowers' characteristics (for example, their credit quality, monitoring cost, and etc). Unlike prior empirical studies that mainly focus on the benefits/losses of CRT for borrowers (see for example Drucker and Puri, 2009; and Berndt and Gupta 2009), one of the main purposes of this paper is to investigate the aforementioned issues from the lenders' perspective.[2] To incorporate the borrowers' and the lenders' characteristics in the banks' decision making process, we merge five different datasets including Loan Pricing Corporation's (LPC) primary loan market, loan sales, credit default swaps (CDS) transactions, COMPUSTAT (financial accounting data for borrowers), and quarterly financial statement (call reports) filled with Federal Depository Insurance Corporation (FDIC). There is no common ID

[2] Most of previous studies in the field of CRT, especially the secondary market, focus on the benefits/losses of CRT for borrowers. Dahiya, Puri and Saunders (2003) find significant negative stock returns for the borrower on the loan sale announcement. Berndt and Gupta (2009) show borrowers whose loans are sold underperform their peers significantly over three years after first loan sale. Drucker and Puri (2009) show that borrowers whose loans are sold are more likely to receive loans in the future from the original lead lenders. Gande and Saunders (forthcoming) argue that a benefit of trade in the secondary market to the borrower firm is that it could alleviate the borrower's financial constraint. Aligned with their findings, Kamstra, Roberts and Shao (2010) provide evidence that for low quality borrowers, the benefits of access to cheap funding, overweight the costs of reduced monitoring efforts following the loan sale.

code between FDIC quarterly filing and LPC database, between COMPUSTAT and LPC database, and between COMPUSTAT and CDS data. We carefully hand collected these codes.

Investigating why and how banks lay off the credit risk associated with their loan portfolios has important implications for regulators. In particular, it provides explanations as to what extent banks are responsible for the deteriorating quality of loans and for the financial crisis, and whether CRT instruments were misused. An arising important question from the regulator perspective is: do lending banks participate in CRT for hedging purposes or for exploiting their private information about the borrowers?[3] The focus of this paper is to investigate reasons for banks' choices of CRT rather than their consequences on the lenders. Since banks are repeat players in private debt markets, we also examine the impact of the bank's reputation on CRT choices.

In light of the theoretical literature predictions we propose to test four hypotheses. In examining these hypothesis we consider three possible CRT choices banks have to manage credit risk associated with syndicate loans originated by them: loan sale, loan insurance (CDS), or no CRT. In our tests we consider a variety of methodologies including: univariate tests, logistic regressions, and multinomial logit models.

Consistent with some of the theoretical predictions, our results show that loans to low credit quality borrowers are more likely to be hedged using loan sales rather than CDS. We measure high and low credit quality in relation to S&P's long and short term issuer credit ratings (ICR), andAltman Z-Score. In some tests we restrict high credit quality borrowers to those borrowers that have investment grade credit rating. Additionally, we find that bank lenders sell

[3] Another related question from regulatory perspective is; what are the negative consequences of banks' participations in the CRT markets? This question is about the severity and magnitude of moral hazard and adverse selection problems that arise from lenders' lack of incentive to further monitor the borrowers after transferring their credit risk which is investigating by Berndt and Gupta (2009) and Purnanandam (2011).

the loan of the low credit quality borrowers especially when their financial or regulatory constraints are binding. Moreover, we find that bank lenders are more likely to use CDS as a hedge instrument for relatively good quality borrowers especially if monitoring costs are relatively high which is consistent with Parlour and Winton (forthcoming)'s model predictions. Our proxies for monitoring cost are relationship lending, relative Bid-Ask Spread and tangibility. Finally, our results show that CRT instruments are less likely to be used by reputable lenders for high quality borrowers.

We conduct a variety of additional tests to examine the robustness of our results. First, we investigate whether our results are robust to selection bias arising from the characteristics of loans that are insured or sold in the secondary loan market. Current literature argued that loans contracts with strict covenants are more likely to be sold, e.g. Drucker and Puri (2009). Same argument applies for loans with collateral since both tools reduce the monitoring cost, e.g. John, Lynch and Puri (2003) and Boot, Thakor, and Udell (1991). Additionally, the 2003 report by BIS committee on the Global Financial System stated that *"[The] market in single name credit derivatives is, broadly speaking, confined to names which are already rated"*. To address this issue we restrict our sample to those loans that has long-term rating, issued with financial covenants or collateral. Our results stay qualitatively the same. Second, to make our results comparable to the existing empirical evidence on loan sale (e.g. Dahiya, Puri and Saunders, 2003; Berndt and Gupta, 2009; Drucker and Puri, 2009; and Gande and Saunders, forthcoming), we conduct additional tests by only considering banks' choice of loan sale versus no-loan sale. Consistent with previous literature, our results show that banks are more likely to sell loans for low credit quality borrowers. One of our main contributions to existing empirical literature is demonstrating that banks are more likely to sell loans especially when they face binding financial and regulatory constraints.

The remainder of the paper is organized as follows. Background information about CRT instruments is presented in Section II. Predictions from the related theoretical literature and the associated hypotheses are discussed in Section III. Data description and sample selection are presented and discussed in Section IV. Methodology and results are presented in Section V. Robustness tests are presented in Section VI. Finally, Section VII provides the conclusion.

II. Some Institutional Details

The Global CRT markets are being used to transfer credit risk within the banking system and from banks to non-banks, such as insurance companies and investment funds. Initially CDS were over the counter bilateral derivative contract in which the hedgers pays a fixed periodic fee in return for a contingent payment by the risk buyer triggered by a credit event on a reference asset. Credit events can be the failure by the reference entity (corporations, banks, etc.) to compensate the hedgers for their losses based on contract terms. It is also called single name CDS since it is issued for a single reference entity. In general, this contract is demand driven and usually issued for a reference entity with public credit rating.

There was an explosive growth in the CDS market between the period from 2002 to 2007 as a results of creating CDS indices (CDX). The market size of CDS had a notional value of $45 trillion in 2007 (ISDA Market Survey year-end 2008). Given this enormous growth in the CDS market since they are the building block for these indices, the market started to demand standardizing of the single name CDS across dealers. In 2009 the SNAC protocol standardized coupons for single-name CDS. Accordingly, the deliverable obligations and credit event timing would be the same for all market participants. This of course contributed to the maturation of the corporate single name CDS.

Additionally, the Loan Syndications and Trading Association (LSTA) (2007) reports that since the 1990s the secondary loan market has grown at an exponential rate in both the par and the distressed areas. In the fourth quarter of their 2009 report, Thomson Reuters LPC states that leverage loan lending issuance reached over $400 billion in 2007.

Although loan sale and CDS are alternative CRT instruments that could be used by banks to reduce their credit risk exposure associated with a loan contract, their impact on the liquidity and the regulatory capital of the banks are very different. In general regulatory capital encourages banks to use CDS to reduce their credit risk capital requirements. In 2003, a working Group established by Basel Committee on the Global Financial System carried out a survey on the regulatory frameworks and supervisory approaches currently used by its members to tackle CRT activities. One of the main focuses of the survey is to investigate whether existing regulatory systems allow banks to reduce the capital requirements when they hedge their credit risk using CDS. They find that when CDS purchased for hedging purpose, all surveyed supervisors allow the purchasing bank to substitutes the risk weight of the protection seller for that of the underlying reference entity (this is the so-called substitution approach).[4] For example, under Basel I, the risk-weight for corporate loan is 100%. If the bank hedges this loan by purchasing a CDS referencing the same company name from an OECD bank, the purchasing bank is allowed to substitute its original corporate loan risk weight to 20% risk-weighted. Accordingly, such a transaction allows the credit hedging bank to reduce its capital requirements by a factor of five. For comparison, when a bank sells its corporate loan, it gets 100% capital relief.

III. Predictions from the related Theoretical Literature and the Associated Hypotheses

[4] The survey included representatives from Board of Governors of the Federal Reserve System, Federal Deposit Insurance Corporation, Federal Reserve Bank of New York, New York Insurance State Department, Office of the Comptroller of the Currency, and Securities and Exchange Commission.

In this section, we discuss some of the related predictions of the theory models and outline the associated testable hypotheses. Duffee and Zhou (2001) provide a novel theoretical model incorporating both loan sale and credit derivative markets. Their model predicts that when there is no credit derivative market, high-quality and low-quality loans are hedged by loan sale. In the existence of adverse selection, loan buyers treat good and bad loans alike; therefore it is costly for the holders of good loans to enter the sale market. With the introduction of credit derivatives, banks that hold high-quality loans may choose to hedge part of their risk with credit derivatives, destroying the pooling equilibrium in the loan-sale market. If adverse selection cost is severe, their model predicts that banks use the credit derivative markets for good loans and the secondary loan market for bad loans. As a result, the secondary loan sale market may cease to exist. Parlour and Winton's (forthcoming) model provide similar prediction. Accordingly, our first hypothesis states that:

H1: Bank lenders are more likely to use loan sales rather than CDS as a hedging instrument for low quality borrowers.

When a bank uses CDS as a hedge instrument it decrease its regulatory capital by a maximum of 80% of the hedged loan while it may not improve its liquidity because the bank still have his capital tied to the loan and the bank has to pay CDS spread based on the CDS contract terms. One of the upside of using CDS as CRT instrument is that the bank can keep the revenue from the loan. Accordingly, banks benefit partially from hedging its risk using CDS in terms of easing its financial constraints. In comparison to CDS, loan sale increases bank liquidity from the proceeds from the loan sale and consequently can reduce its regulatory capital (100% of sold loan). One of the downside of using loan sale as CRT instrument is that the bank losses the revenue generated from this specific loan. Accordingly, one could argue that loan sale is favourable over CDS when banks face binding financial and regulatory constraints. Additionally,

Pennacchi (1988); and Allen and Carletti (2006) argue that binding financial and regulatory restrictions of the banks, specifically regulatory capital ratios and liquidity, might be inducing banks to use CRT. Therefore, we hypothesis that binding financial or regulatory constraints play important role in the decision of the lender to sell these loans. Accordingly, our second hypothesis states that:

H2: Bank lenders are more likely to use loan sales for low credit quality borrowers especially when their financial and regulatory constraints are binding.

With respect to monitoring costs, in general, banks prefer not to use CRT for high credit quality loans and instead they monitor the borrowers themselves. However, if monitoring costs are relatively high they might use CRT instruments. Parlour and Winton (forthcoming)'s model predicts that CDS is more likely to be used for cases in which monitoring cost is high for relatively high credit quality borrowers. In their model, loan sales do not have any advantage in the existence of high monitoring costs, because the new loan buyers also will not have an incentive to monitor after they perceive costs are high, i.e. there is no monitoring equilibrium in the secondary market. Additionally, hedging using CDS allows the transaction to remain anonymous to the borrower so lender-borrower relationship is not affected directly.[5] Accordingly, we hypothesis that CDS is more likely to be used as a hedging instrument especially for loans with high monitoring costs and relatively good credit quality. Our third hypothesis states that:

[5] Minton, Stulz and Williamson (2009) by looking at the use of credit derivatives by US bank holdings, ask a relevant question: "How much do banks use credit derivatives to hedge loans?" They find that lemons problem has made the CDS market not a very popular tool for risk hedging of low quality loans as the protection seller is always concerned that lenders want credit protection because they have adverse information about the borrower on which they want to buy protection. Therefore banks try CDS market when its borrower is of a high credit quality with a credit rating since adverse selection problems is minimal.

H3: Bank lenders are more likely to use CDS as a hedge instrument for relatively good quality borrowers especially if monitoring costs are relatively high.

Parlour and Winton's (forthcoming) provide more thorough analysis for the usage of CDS for good credit quality borrowers. In particular, they argue that when the quality of the borrower is relatively high, banks prefer not to use CRT. The reason is that a history of defaults on loans to a bad borrower is not a clear signal that banks did not perform good monitoring. However, a history of defaults on good borrower loans would be perceived by the market as a signal of banks' low ability to monitor, or the lack of incentive to monitor due to the hedging of the credit risk. This perception by the market has a negative reputation effect for banks. Therefore, banks choose not to use the credit risk transfer markets when their loan belongs to a good borrower. They prefer to monitor the borrower themselves. They suggest that only when the cost of capital, or the cost of monitoring the borrower is sufficiently high the lender might use CDS for a loan to a borrower with high credit quality. Accordingly, our fourth hypothesis states that:

H4: Reputable Bank lenders are less likely to use CRT instruments for high quality borrowers especially if their financial or regulatory constraints are not binding.

IV. Data and Sample Selection

In this section, we provide a detailed discussion about how we construct our sample from combining five different databases including: primary loan data from Reuters Loan Pricing Corporation's Dealscan, the borrower financial reporting from COMPUSTAT, lender financial reporting from call reports, loan sale data from secondary loan pricing data and Credit Default Swap data from Markit CDS dataset. In addition, we explain the construction of our key variables.

IV.1. Primary Loan Data

Our primary dataset for this study comes from Reuters Loan Pricing Corporation's Dealscan (Henceforth LPC). LPC provides comprehensive information on the majority of US syndicated loan contract terms at deal and facility (loan) levels. It also provides the identities of the borrower and lenders. Our sample period is from January1, 2005 to December 31, 2008. We are restricted to this time period given our limited access to the CDS data. Our CDS sample is only available from 2006 to 2008. LPC Sample includes 64,221 facilities (loans)[6]. This number of facilities belongs to 41,883 deals (packages). Each deal consists of one or more facilities with different terms and lender structures packaged as one deal. After eliminating all non-North American issuers (borrowers) and those facilities for which the facility amount is not in $US currency, the sample size drops to 24,643 facilities related to 16,132 deals. We omit facilities without lender information then match borrowers of the remaining facilities with COMPUSTAT through a combination of different matching criteria including company name, location (state, city, and postal code), ticker, and fiscal year. As a result, we have 2,818 issuers with unique gvkeys and 7,919 facilities related to 5,679 deals remained. Each facility can have one or more lenders. Our final sample includes 61,263 facility-lender relationships and the total number of lenders in our sample is 2,052.

Our analysis is performed at the facility (loan) level not deals as the secondary loan dataset is at the facility levels (facilities are actually traded in the secondary markets not deals). This approach is similar to Drucker and Puri's (2009), Bushman, Smith and Wittenberg-Moerman's (2011) and Wittenberg-Moerman's (2008) approach. In our sample, there are 3,940

[6] Also called tranches

deals (about 69% of all deals) refinancing deals.[7] Our key variables for loan Characteristics include loan amount (we have used natural log of loan amount), number of lenders, number of relationship banks and other characteristics. Table 1, Panels A and B provides some summary statistics at the deal (package) level. Descriptive statistics at the facility (loan) level can be found in Table 2. Variable definitions are presented in the Appendix A.

IV.2. Borrower Data

The borrowers' financial information is obtained from COMPUSTAT-Fundamentals Quarterly dataset. To ensure that we use most recent accounting information available at the time of loan initiation, we use the accounting data related to the last quarter before facility activation date. Our key variable for borrower characteristic is credit quality. For credit quality we consider three alternative measures S&P's long-term, S&P's short-term, and Altman z-score (more detailed information about this variable is relegated to Appendix A). Table 1, Panel C, provides our key variables of borrower characteristics and other control variables such as total assets, Asset Book Equity, and Market Equity.

IV.3. Loan Sale Data

Our third dataset includes secondary loan pricing data and it is obtained from the Loan Syndications and Trading Association (LSTA). The dataset provides average bid and ask quotes, mean of average bid and ask quotes, number of quotes, date, type of facility, loan identification number and borrower name and ID. More details about this dataset are available in Bushman, Smith, and Wittenberg-Moerman (2011). We followed Drucker and Puri (2009) and Wittenberg-Moerman (2008) approach in merging the Loan Sale dataset with LPC primary loan dataset through using facility IDs and/or Loan Identification IDs (LINs). As shown in Table 2, Panel B,

[7] Refinancing deals is hand checked from the borrowers filing with SEC forms 10K, 10Q or 8Ks (768 deals). This variable is important in controlling previous relationships between borrower and lenders.

out of 7,919 facilities, we obtained the quotes of the 1,426 (18%) facilities that have been traded in the secondary loan market.

To keep record of the facilities that were potentially sold we create an indicator variable equals one for the loans that are potentially sold during the life of the loan contract (we call it loan sale dummy). In general, if a loan has a record in the loan sale dataset (LSTA) then this is an indicator that there are some interests in trading these loans. Accordingly, our loan sale dummy is equal one when the loan facility has a record (a quote or multiple quotes) the LSTA dataset and zero otherwise. Our approach is similar to Drucker and Puri (2009).

IV.4. Credit Default Swaps Data

Our forth dataset, including Credit Default Swap data, is obtained from Markit CDS dataset. Our key variable from this database is CDS spread. In general, the higher a CDS spread, the greater is a company's perceived default or insolvency risk exposure in our case debt restructuring exposure. Markit provides mark-to-market CDS spreads as derived from market makers. CDS data are available by entity, term structure, currency and restructuring clause. The information provided at the contract level includes: the CDS spread, credit ratings, credit event types, seniority, and currency.

The CDS spread data are available from January 2006 to September 2008. During that period there are 20,568,845 observations of which 7,059,689 observations are US dollar based. 3,840 single firms are identified in the sample.[8] These firms belong to 101 countries across the globe. Out of 3,840 borrowers in the whole CDS sample, 1,597 are US borrowers[9]. Our main sample has 2,818 borrowers. Borrowers in both datasets are matched using combination of

[8] By comparing to Hull, Predescu and White (2004)'s sample that covers the period from January 5, 1998 to May 24, 2002 with 233,620 observations and 1,599 named entities one can see how CDS market has grown exponentially over time.

[9] 332 are Japanese, 275 are from the United Kingdom, and the rest belong to Germany, Canada, France, and others.

company names/first 8 letters of company names, with tickers. After each round of matching, the accuracy of match is rechecked manually. In total, 779 common borrowers were identified. Following Acharya and Johnson (2007), we consider the CDS spreads of five-year maturity contracts, which is usually the most liquid contract, with the U.S. dollar as the underlying currency and restructuring of the debt as the event of default.[10] Our final sample includes 1,399 facilities with the relevant CDS transactions data.

We use the change in CDS spreads as a proxy for the lender trading activities to hedge its credit risk exposure. In general, when lenders issue new loans they might decide to hedge their credit risk exposure to a borrower by buying CDS contracts. Accordingly, the market demand for CDS contracts increases around the facility initiation date and as a result one would expect to observe an increase in the CDS spreads. Acharya and Johnson (2007) have also used this measure as an indication of lender banks trading on information related to a borrower credit quality.

To limit our measure to hedging in relation to the event of the loan origination, we consider the cumulative abnormal change in the CDS spread in a [-5, +30] trading day interval around the facility's initiation date. If cumulative abnormal change in spread during the event period is positive there is a possibility that the CDS has been used for hedging purposes. If the CDS cumulative abnormal change is negative we can be sure that the CDS is not used to hedge against the loan. The reason is that if a bank wants to hedge against a loan, the increase in the

[10] Achariya and Johnson (2007) mention CreditTrade as their data source. In our dataset seniority level is reported under the variable name 'Tier'. We have chosen Tier='SNRFOR' which represents 'Senior Unsecured Debt (Corporate/Financial), Foreign Currency Sovereign Debt (Government)'. Markit CDS data based on how a CDS contract cover restructuring events (reported as Document Clause Types) provides different spreads. These clause types include CR which is Cum (With) Restructuring or Old Restructuring, MR which is Modified Restructuring, MM which is Modified-Modified Restructuring, and XR which is Ex-Restructuring or Without Restructuring. A contributor's spreads must follow the inequality XR < MR < MM < CR. We noticed that MR is more frequently traded and used than others in North America, So we used MR as the main document clause type, and since we compare trades of each security by itself among different trading dates and not with other securities we used XR whenever MR was not available.

demand for the related CDS contracts will lead to positive cumulative spread change. We are using this proxy since the buyers and sellers of the CDS contracts and trade volumes are *not* available from this database. We create CDS hedging dummy which is a binary variable equals one when cumulative abnormal CDS spread is positive and 0 otherwise. Additional discussion and information about how we construct this variable is relegated to Appendix A.

IV.5. Lender Information

Most of the previous empirical work related to loan syndication has focused mainly on borrower characteristics. A handful of studies, however, have investigated only few features of the lead lender characteristics available from LPC Reuters database such as lending relationships, lenders' market share, reputation and type of lenders (see for example Bharath, Dahia, Saunders and Srinivasan, 2009, and B; Sufi, 2007; Güner, 2006; Drucker and Puri; 2009, Massoud, Nandy, Saunders and Song (2011), and Kamstra, Roberts and Shao, 2010). The limited interest in the lender side characteristics in the empirical research is mainly due to the difficulty in matching the lenders names from LPC Reuters with other databases of lenders. The first challenge is related to the diversity of lenders in a syndicated loan. It varies from regulated industries such as commercial banking to less-regulated lenders such as hedge funds. This makes the comparison between lenders more difficult. Also having access to all private lenders is not possible. Secondly, there is no unique common numerical identifier for each lender in the different data bases. The matching is based on name, address and ticker if it was available. Accordingly, this matching has to be done manually. Thirdly, there is more than one participant lender for each loan facility.

This paper deals with these issues by focusing on loan deals extended *purely by banks*. We manually checked the identity of each bank from different databases. Secondly, to deal with

the cases in which the facility has more than one lender we construct indices for the variable of interest for each facility.

We collect the accounting data for banks from the Reports of Condition and Income forms that banks must file quarterly with the Federal Deposit Insurance Corporation (FDIC) under Section 1817(a)(1) of the Federal Deposit Insurance Act. This data are available from Bank Regulatory dataset on Wharton Research Data Services (WRDS).[11] As bank names are quoted differently on different datasets, we need to use bank unique identifications such as RSSD IDs to match different datasets. The RSSD ID is a unique identifier assigned to institutions by the Federal Reserve. Available information about Lenders' RSSD identification numbers were extracted from the National Information Center manually.[12] If we cannot match banks from our loan dataset to Bank Regulatory dataset directly we move upward in the hierarchy of bank's parents and use the information of the first parent that can be matched. Thereafter we look up each RSSD in WRDS' Bank Regulatory Dataset either in the commercial bank section or Bank Holding Section to extract the most recent Quarterly Accounting Data before each loan initiation.

Our major key financial variables at the lender level include financial risk; capitalization and measures of liquidity. Our accounting data refers to the latest quarter preceding the facility activation date. In general, if the facility has more than one lender we construct indices for the financial and regulatory constraints of the lenders: a capital ratio and liquidity index for each facility.

[11] The original formats of reports are provided by the Board of Governors of the Federal Reserve Systems. The reports that are used in this paper are either "Consolidated Reports of condition and Income for A Bank with Domestic and Foreign Offices" or "Consolidated Financial Statements for Bank Holding Companies".
[12] Available on http://www.ffiec.gov/nicpubweb/nicweb/NicHome.aspx. "The National Information Center (NIC) provides comprehensive information on banks and other institutions for which the Federal Reserve has a supervisory, regulatory, or research interest including both domestic and foreign banking organizations operating in the U.S."

We consider two alternative measures of capital ratios (Tier 1 and Tier1 and 2), and liquidity ratios (loans to assets and liquid assets to deposits). To build our capital and liquidity index, we first rank all lenders in LPC database based on capital or liquidity ratio during each year of sample period and put them in quintiles. The lowest quintile is the group of lenders with relatively lower liquidity and capital ratio. For each variable, we constructed a dummy variable equal 1 for group of lenders in the lowest quintiles and zero otherwise. The interaction of liquidity dummy and capital dummy is the binding financial and regulatory constraints dummy which equals one if capital and liquidity in lowest quintile, and zero otherwise. For each loan facility, if one of the lenders satisfies this criterion then we consider this facility belongs to lenders with binding financial constraints. Appendix A provides more detailed description and discussion of these variables and Table 3 provides summary Statistics of lenders' key accounting variables.

There are 21,507 lender-borrower pairs across 2,595 facilities. Out of 21,507 lender-borrower relationships, 3,732 and 5,105 are lead arranger-borrower relationships based on lead arranger credit and lender role definitions, respectively. We construct different variables to characterize lenders relationship with the borrowers, lenders role, and reputation. Extra discussion about how construct our key variables is relegated to Appendix A.

V. Methodology and Results

In this section we present our methodology and results for each hypothesis. We consider three different methodologies including: univariate tests, logistic regressions and multinomial use dichotomous choice multinomial logit models. To test our different hypotheses using the multiva**Error! Bookmark not defined.**riate approach we consider this general model:

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$$\begin{aligned} Choice\ Variable = & A_0 + A_1(borrower\ characteristics) + A_2(Lender\ characteristics) + \\ & A_3(Loan\ characteristics) + A_4(Other\ control\ Variables) + Error\ Term, \end{aligned} \quad (1)$$

where A_i's are model coefficients and the dependent variable is a choice variable of using two or three possible choices of CRT (loan sale, CDS or none). Our key variables that are related to the borrower characteristics include credit quality (Long-term, Short-term and Altman z-score) and a control of the borrower size, Log (Borrower Market Equity). The second group of key variables that is related to the lenders characteristics includes financial constraints as measured by capital ratio and liquidity, Lender Illiquidity (loan to deposit), and lender liquidity (liquid assets to total assets). The third group of explanatory variables that are related to the loan characteristics includes loan size measured through log(facility amount), number of lenders, and whether the loan is refinanced or renegotiated. We introduce two variables in the other control variables to capture macroeconomic conditions: Crisis Dummy and LIBOR rate. Our measure of the crisis dummy equals one for the crisis period and zero otherwise. Ivashina and Scharfstein (2010) argued that August 2007 marked the beginning of the subprime crisis. To capture the cost of borrowing we consider the average monthly LIBOR rate during the year of loan initiation. In our discussion we only focus on the key variable(s) and the significant results in all specifications. In Panel A of Table 4, we present summary statistics for all variables used in the multivariate tests. In Table 5 we discussed the key variables for each hypothesis, the multivariate methodology, and the expected results. In Panels B and C of Table 4, we group loans facilities based on loan sale, CDS, and no-loan sale. In Panel B, we show the mean differences in lender characteristics for loan sale sample versus CDS sample while in Panel C we show the mean difference for loan sale sample versus no-loan sale. As you can see there are significant differences between the characteristic of the lenders who uses loan sale versus CDS especially for financial constraints. In particular, the lender illiquidity (loan to asset) and binding financial constraint are significantly larger while the lender reputation and relationship lending are significantly lower for sold loans in comparison to insured loans using CDS. Additionally, binding financial constraint is significantly larger for loan-sale sample in comparison no-sale sample (all other loan facilities not in the loan sale sample). Moreover, the credit quality, measured by S&P long-term issuer credit rating, and Altman z-score, of borrowers whose loans are sold are significantly lower than those in the CDS or no-sale

samples. Sold loans are smaller than those insured with CDS but larger than no-sale loans. Finally, loans that are sold have less number of lenders, and more financial covenants or collaterals than those insured with CDS, and they belong to less reputable lenders.

V.1 Testing Hypotheses 1&2 (H1&H2)

To test H1and H2 we employ univariate and multilogit tests.

A. Univariate Tests (H1)

In the Univariate tests, for each loan facility, we construct four categories of potential usages of CRT: (i) loans that are only sold, (ii) loans that are only hedged with CDS, (iii) loans that are both sold and hedged with CDS, and (iv) loans that are neither sold nor hedged with CDS. Borrowers are ranked into two groups of bad and good borrowers (above investment grade). We consider the two alternative variables to measure the credit quality of borrower at the time of loan origination Standard & Poor's short- and long-term issuer credit ratings. Based on these measures, borrowers are ranked into two groups of bad and good borrowers across the four categories of CRT instruments. In Table 6, for each rank of borrower across the CRT categories, we report, the number of loans and the percentage of total number of loans within the sample period. Table 6 Panel A reports the Standard & Poor's long-term issuer credit ratings while Panel B reports Standard & Poor's short-term issuer credit ratings. The *p* scores are related to a one-tailed 2-sample binomial test of equal proportions.[13]

To test hypothesis 1, our key variables are the CRT choice of loan sale versus CDS for good versus bad borrowers. In the percentage of loan sale column 'sale', one can observe that proportion of loan sales in the bad borrower category is significantly higher than those in the good borrower category while it is the opposite in the CDS column --proportion of CDS in the

[13] Binomial test is used when data in each category is dichotomous and we want to know if the proportion of observations falling in each category differs from each other.

bad borrower category is significantly lower than those in the good borrower category. These results are robust to using alternative measures of the borrowers' credit quality. For example, in Panel A, loan sale is 24.3% for low quality borrowers while it is 0.9% for high quality ones and the difference is significant at 1%. Therefore the univariate test provides support to the first hypothesis that Bank lenders are more likely to use loan sales versus CDS as a hedging instrument for low quality borrowers.

B. Multivariate Tests for H1 &H2 (using long-term rating for credit quality)

In order to test H1 and H2 we use dichotomous choice multinomial logit models. The dependent variable is CRT instrument which is a categorical variable. It equals one if the lenders have chosen no CRT, equals two if they have chosen CDS, and three if they have chosen loan sales.[14] Since our hypotheses compares the usage of CDS versus loan sale, the base for comparison in these multinomial logit regressions is usage of CDS, that is CRT instrument equal to 2. In equation 1 our choice variable is log of the ratio of the two probabilities, it is either *P(NO CRT=1)/P(CDS=2)* or *P(Loan sale=3)/P(CDS=2).*

Our multinomial logit results are presented in Table 7. We report the results for the choice variable of loan sale versus CDS and for No CRT versus CDS. We report the raw regression coefficients of the multinomial logit analysis together with the elasticity (economic importance) for each of the explanatory variables described above. Following Petersen (2006), we adjust the robust standard errors for the impact of firm-level clustering. We also control for time fixed effect. In Table 7, we examine two models in two panels, starting with a simple model for which observations are available for most of the sample (i.e., 994 observations). Model 2 includes all the other control variables. We report the two models using Loans/Assets with Tier1

[14] Facilities that are both sold and hedged through CDs are dropped from the regression.

ratio and Liquid Assets/deposits with Tier1and2 ratio as measures of lenders' liquidity and capital in Panels A and B, respectively.

To test hypotheses 1 &2, our key binary choice variable is Sale versus CDS. For H1, our key explanatory variable is the credit quality of the borrower. For H2, our key explanatory variables are the credit quality of the borrower and the interactive variable *"Binding Financial and Regulatory Const"* that is equal one if lenders' Tier1 in the lowest quintile and lender's illiquidity in the highest quintile for loan to deposits measure (Panel A) or lenders' Tier1and2 in the lowest quintile and the lender's liquidity in the lowest quintile for liquid assets to deposits measure (Panel B). (Detailed explanation of the construction of this variable is in Appendix A). We only report the long-term credit quality since the short-term credit rating has much less coverage in our sample, see Panel B of Table 6.

As you can see from Panel A the credit quality coefficient is negative and significant at 1% in all two models in the two Panels. These result is also economically significant, for example, using the elasticity, in Model 1 of Panel A, a 1% increases in long-term Credit quality decreases the probability of using loan sales (versus CDS) by -0.0256%.[15]

For the choice between loan sale versus CDS, H2 predicts that the coefficient of borrower's credit quality to be negative while the coefficient on the interactive variable to be significantly positive, see Table 4. We also expect the capital ratio and lender liquidity to be positive while lender's illiquidity measure to be negative. As you can see from Table 7, our results support these predictions. The coefficient on interactive variable (Binding Financial and

[15] Using the raw coefficients in Model 1 of Panel A, we can say that for one unit change in the variable credit quality of the borrower, the log of the ratio of the two probabilities, P(Loan sale=2)/P(CDS=1), will be decreased by -0.487. Therefore, we can say that, in general, the lower the credit quality the more likely a lender prefers loan sale.

Regulatory Const) is positive and significant at 10% in Model 2 of Panels A and B. As expected the lender illiquidity is negative and significant at the 10% level in Model 2 of Panel A.

Interestingly, for the choice between no CRT versus CDS, Panels A and B, the banks (as lenders) are more likely to choose no CRT (versus CDS) for borrowers with lower credit quality. Additionally, in Panel A, the lender illiquidity is positive and significant at 1% and 5% level in models 1 and 2, respectively, while it is negative and significant at 1% and 1% level in models 1 and 2 for credit quality measure. This implies that banks are more likely to choose no CRT versus CDS when the credit quality of the borrower is low and their liquidity is quite low.

C. Multivariate Tests (using Altman z-score for credit quality)

In Panel C of Table 7, for robustness we repeat our tests in Panel A model 2 by replacing the credit quality of the borrower by Altman Z-score and we add a credit rating dummy (equals one for firms with long-term credit rating and zero otherwise) to the regressions. The sample size increased from 994 to 1,547, 55% increase.

As you can see for the sale choice versus CDS, the Altman Z-score and credit rating dummy is negative and significant at 1% and 5% level, respectively. This provides support to H1. The results for H2 are even stronger, as the interactive dummy (Binding Financial and Regulatory Constant) is positive and significant at 1% level.

The results are robust for the no-CRT choice versus CDS. In particular, lender illiquidity and the interactive dummy are positive and significant at 1% and 5% level, respectively, while the credit rating dummy is negative and significant at 1% level.

In summary, our results provide strong support to H2 &H2. *Bank lenders are more likely to use loan sales for low credit quality borrowers especially when their financial and regulatory constraints are binding.*

V.2 Testing Hypothesis 3 (H3)

In this section, we also employ multinomial logit tests to test H3, *"Bank lenders are more likely to use CDS as a hedge instrument for relatively good quality borrowers especially if monitoring costs are relatively high"*. Our multinomial logit results are presented in Table 8. Our key binary choice variable is CDS versus no CRT.

In the literature the degree of information opacity is linked to the level of monitoring cost. For example, Sufi (2007) suggests a useful description of opacity *". . . of the degree to which a financial institution must investigate and monitor the borrowe*r." Accordingly, to quantify monitoring cost we focus on measures that capture the degree of information opacity of the borrowers. We consider three alternative measures that captures the degree of borrower's information opacity: relationship lending, bid-ask spread (e.g. Amihud and Mendelson ,1986) and tangibility (Marosi and Massoud, 2008). Diamond (1984) and Bhattacharya and Thakor (1993) discuss the importance of monitoring services provided by the relationship lender in resolving information asymmetries between borrowers and lenders. Accordingly, a potential source of benefits of relationship banking to lenders is to reduce their monitoring cost.

We present our multilogit results using relationship lending as a proxy for monitoring cost in panel A while relative bid-ask spread and tangibility in Panel B. In Panel A, our key variables are relationship lending (a binary variable equals one when the lead lender had previous loans with the borrower before loan initiation and zero otherwise), and interactive variable between first relationship with a good borrower (a binary variable equals one for high

credit quality borrowers that has no previous relationship with lenders (high monitoring cost) while it is zero high credit quality borrowers that has previous relationship with lenders (low monitoring cost).

To test H3, for the binary choice of CDS versus no CRT, we expect the coefficient on the interactive variable, and the tangibility variable to be negative while to be positive for the relative bid-ask spread and the credit quality. As expected (see Panel A of Table 8) the interactive variable (first relationship with a good borrower) is negative and significant at 5% level and the credit quality variable is positive and significant at 5% level. Interestingly, banks are more likely to use CDS when they have good relationship with their borrowers (the relationship dummy is positive and significant at 10% level), and when they have more liquid assets (the illiquidity variable is negative and significant at 5% level). Our results are robust for alternative proxy of monitoring cost. In Panel B, the coefficient on the relative bid-ask spread and the credit quality variable are positive and significant both at 1% level.

In summary, our results provide support to the argument that bank lenders are more likely to use CDS as a hedge instrument for relatively good quality borrowers especially if monitoring costs are relatively high.

V.3 Testing Hypothesis 4 (H4)

To test H4 we employ the univariate and logit tests, "*Reputable Bank lenders are less likely to use CRT instruments for high quality borrowers especially if their financial or regulatory constraints are not binding*".

To test H4 we use logit models in which the dependent variable is a binary variable (using a CRT instrument) equals one if the lenders have chosen at least one CRT instrument

(CDS or loan sale) and equals 0 they have not chosen to use any CRT instrument. The key explanatory variables to test hypothesis 4 are borrower's credit quality, Lender's reputation, lender's capital adequacy (tier1 ratio) and lender's illiquidity (loans to assets ratio). In addition, we create an interactive variable (reputable lender with a good quality borrower) equals one for combination of good quality borrowers and reputable lenders and zero otherwise. Reputation is measured by lender's market share in the primary market. We consider two alternative measures of lenders' reputations; reputation based on total value of loans (Model 1) and reputation based on total number of loans (Model 2). Lenders' with top 5% market shares in the primary market over 2000-2005 are counted as reputable banks.

We present our results in Table 9. In Model 1 we represent the results using reputation based on total value of loans, and in Model 2 using reputation based on total number of loans. There are 951 observations. We report the logit model coefficients as well as its elasticity and the robust standard error. Following Peterson we cluster our error term at the bank level and we control for time fixed effect.

As you can see from Model 1 and 2, the coefficient on the lender reputation is positive and significant at 1% and 5% levels respectively for Model 1 and Model 2 while the coefficient on the interactive variable is negative and significant at 5% for both models. These results provide support to H4, reputable banks are less likely to use CRT instruments for relatively good quality borrowers when they face lower illiquidity.

VI. Robustness tests

In this section we conduct a variety of additional tests to examine the robustness of our results. First, we investigate whether our results are robust to selection bias arising from the characteristics of loans that are insured or sold in the secondary loan market. Second, to make

our results comparable to the existing empirical literature on loan sale, we conduct additional tests by considering bank's choice of CRT instruments as loan sale versus no-loan sale.

VI.1. Selection Bias (H1 and H2)

One could argue that there are certain types of loans that can be tradable in the secondary loan market or can be used for a single name CDS contract. As a result, our comparison of CRT choices for different loan facilities by banks might be subject to sample selection bias arising from the inclusion of loans that cannot be sold in the secondary loan market or is not eligible for a single name CDS contract. The current empirical literature showed that loans with less monitoring costs are more likely to be sold, e.g. Drucker and Puri (2009). A loan with strict covenants reduces information asymmetry problem between borrowers and lenders and consequently monitoring cost for two reasons. First, a lender can observe with minimum effort the violation of covenants since it is linked directly to observable financial data. (See for example Berlin and Loeys, 1988). Second, when a firm violates the terms of its loan covenant, it is in "technical default" and the lender has the right to demand full payment of the loan. As a result the loan contract is either renegotiated or terminated since the lender can limit losses when the firm performs poorly, information asymmetry problem is reduced. (See for example Chen, and Wei, 1993; Beneish, and Press, 1995; and Chava, and Roberts, 2008). Drucker and Puri (2009) showed that sold loans have more restrictive covenant.

Similarly, a loan with posted collateral reduces information asymmetry (hidden moral hazard problem) arises when lenders cannot observe the borrower's behaviour after the loan is granted. This is because collateral is used as an incentive device to reduce strategically default motives by borrowers. As a result collateral reduces monitoring cost by lenders. (See for example John, Lynch and Puri ,2003, and Boot, Thakor, and Udell, 1991). Additionally, the

2003 report by BIS committee on the Global Financial System stated that *"[T] he market in single name credit derivatives is, broadly speaking, confined to names which are already rated"*.

Accordingly, control for the sample selection bias issue we restrict our sample to those loans that has long-term credit rating, issued with financial covenants or collateral. We present our results to the first two main hypotheses: H1 and H2. Our multinomial logit results are presented in Table 10. in total we have 516 facilities that satisfy these restrictions. This subsample represents 52% of the aggregate sample in Panel A of Table 7. We present our results in two Panels: Panel A using loans/assets as a measure of lenders' illiquidity while Panel B using liquid assets/deposits as a measure of lenders' Liquidity. Our binary choice variable is loan sale versus CDS.

Our results stay qualitatively the same; we find support to H1 and H2. For example, a 1% increases in the credit quality of the borrowers the usage of CDS versus loan sale decreases by 0.0362% and the result is significant at the 1% level in all models in Panels A and B. The coefficient on interactive variable (Binding Financial and Regulatory Const) is positive and significant at 10% in all specifications (Model 2 of Panels A and B).

VII.2. Logit tests for Loan Sale Versus No-Loan sale choices

To make our results comparable to the existing empirical literature on loan sale (e.g. Dahiya, Puri and Saunders, 2003; Berndt and Gupta, 2009; Drucker and Puri, 2009; and Gande and Saunders, forthcoming), we only focus on the bank's choice of CRT instruments as loan sale versus no-loan sale. One of the main contributions of this paper is that we incorporate the financial and regulatory constraints in the loan sale decision by borrowers. We present our logit results in Table 11. Our binary choice variable is equal one for sold loans and zero otherwise. In Panel A, we present our results for all loans with long-term credit rating (951 loan facility) and in

Panel B, we restrict the sample to loans with long-term rating and with financial covenants or collateral (499 loan facility). We present our results in two models to capture the alternative liquidity measures.

Consistent with previous literature, our results show that banks are more likely to sell loans for low credit quality borrowers and those sold loans are more likely to be larger. Additionally, we show that banks are more likely to make this choice especially when they face binding financial and regulatory constraints. In particular, the coefficient of the credit quality is negative and significant at 1% level in all specification, the interactive dummy (Binding Financial and Regulatory Constant) is positive and significant at either 5% or 10% in all specification.

V. Conclusion

The recent financial crisis once again put a spotlight on banks. In the media, it seems that Thomas Jefferson cries from the grave every now and then and calls banks 'more dangerous than standing armies'.[16] How banks manage the risks associated with their loan portfolios have raised concerns in academia, the financial industry, among regulators, and also in the public media. This study relates to a recent literature that explains how banks lay off the credit risk of their loan portfolio.

The theoretical literature suggests different factors that might have an impact on banks' choice of loan portfolio management. These factors are not only limited to borrowers' credit quality, but they also include costs of raising capital, monitoring costs, reputational concerns and liquidity. In this study, we consider two popular instruments that are specifically designed for credit risk management: credit default swaps and loan sales agreements. We are the first to empirically show under which conditions a bank prefers to transfer control rights to a new owner

[16] Thomas Jefferson in a letter to John Taylor, Monticello, 28 May 1816

through a loan sale agreement, to use insurance through CDS, or not to use risk transfer instruments at all.

We merge five different datasets including LPC primary loan market, loan sales, credit default swaps transactions, COMPUSTAT for borrowers accounting information, and bank regulatory dataset for lenders' accounting information. We then build measures for borrowers' quality and lenders' characteristics, including indices for the capital adequacy, financial liquidity, strength of relationship, and reputation of all lenders in a syndicated loan. Using different methodologies we show that loan sales are more likely to be used by banks to lay off risk when the loan belongs to a poor borrower and especially when a borrowers face binding financial and regulatory constraints. Risk transfer instruments are less likely to be used to lay off risk by banks when credit quality of a loan is high. Additionally, we show that CDS is more likely to be used with good borrowers when they impose higher monitoring costs to lenders. We also show that sold loans are more likely to be larger. Dealing with larger borrowers encourages lenders to use both CDS and loan sale instruments as the benefits of hedging are higher. In sum, we provide conclusive explanations about a bank's mindset in managing portfolio credit risk, and also the benefits of modern risk transfer markets to lenders and borrowers.

Appendix A: Variable construction

In this Appendix we provide additional information or discussion related to our variable construction. In section A.1 we provide the list of our variables and their detailed definitions. In Section A.2

A.1. Variable definitions

Panel A: Borrowers' Characteristics from Compustat's Quarterly Fundamentals and Ratings

Altman Z-Score	Following Altman and Hotchkiss (2006): For manufacturing firms, z = 1.2 (Working Capitals/TotalAssets) + 1.4 (Retained Earnings/TotalAssets) + 3.3 (EBIT/Total Assets) + 0.6 (Market Value of Equity/Book Value of Total Liabilities) + 1.0 Sales/Total Assets. Compustat data items: 1.2 (ACTQ-LCTQ)/ATQ +1.4 (REQ/ATQ) + 3.3 (EBIT/ATQ) + 0.6 (CSHOQ*PRCCQ)/LTQ + 1.0 (SALEQ/ATQ). For non-manufacturing firms, z = 6.56 (Working Capitals/TotalAssets) + 3.26 (Retained Earnings/Total Assets) + 6.72 (EBIT/Total Assets) + 1.05 (Market Value of Equity/Book Value of Total Liabilities) + 1.0 Sales/Total Assets. Compustat data items: 6.56 (ACTQ-LCTQ)/ATQ + 3.26 (REQ/ATQ) + 6.72 (EBIT/ATQ) + 1.05 (CSHOQ*PRCCQ)/LTQ. Altman Z-Scores are sorted and ranked into 4 groups. In the regressions we use Altman Z-Score quartiles since they are more consistent with credit ratings.
Asset	Total Assets (ATQ)
Book Equity	Total Assets- [Total Liabilities + Preferred Stock] + Deferred Taxes (ATQ - [LTQ + PSTKQ] + TXDITQ)
Relative Bid-Ask Spreads	Average monthly relative bid-ask spread computes as (Closing Ask – Closing Bid)/(Closing Price/Average of Closing Bid and Closing Ask) over the sample period
Credit Quality (Long-term)	S&P Long-Term Issuer Credit Rating (ICR) refers to loans with maturities of more than one year and ranges from AAA (extremely strong capacity to meet financial obligations) to CC (highly vulnerable). In our analysis we rank long term ratings from 22 to 1, where AAA receives 22 and CC receives 1. (SPLTICRM)
Credit Quality (Short-term)	S&P Short-Term Issuer Credit Rating (ICR) refers to loans with maturities of less than one year and ranges from 10 (assigned to A-1) to 1 (assigned to C). (SPSTICRM)
Current Ratio	The ratio of Current Assets to Current Liabilities (ACTQ/LCTA)
Earnings to Assets	The ratio of Earnings (Income Before Extraordinary items + Depreciation and Amortization) to Assets (DPQ+IBQ)/ATQ
Market Equity	Common Shares Outstanding * Price (CSHOQ*PRCCQ)
Investment Grade (Non-Investment Grade)	A dummy indicating that relatively low (high) risk of default based on S&P long-term credit issuer rating. A borrower with a rating of BBB- and higher is counted as is counted as an investment grade borrower and a borrower with a rating of BB+ and lower is counted as a non-investment grade borrower.
Profitability	The ratio of Earnings Before Interest, Tax, Depreciation and Amortization to Sales (OIBDP1/SALEQ)
Tangibility	The ratio of Property, Plant, and Equipment to Assets (PPENTQ/ATQ)

Panel B: Lenders' Characteristics from the banks filings of Report of Conditions and Income (Call Reports) with FDIC

Min. Lender Capitalization (Tier1)	Tier1 is used as a proxy for lender capitalization. Tier 1 Ratio is the ratio of bank's core (or most reliable) equity capital (showing bank's financial strength from regulator's perspective) to bank's total risk weighted assets (RCFD8274/RCFDA223, if not available: BHCK8274/ BHCKA223). Min. Lender Capitalization refers to the minimum Tier1 across all lenders (syndicate participants) in a loan facility.
Min. Lender Capitalization (Tier1and2)	Tier1and2 is used as a proxy for lender capitalization. Tier1and2 is the sum of Tier1 and Tier2 capital over bank's total risk weighted assets. Tier 2 capital is the ratio of bank's second most reliable equity capital (after Tier 1 capital) from regulator's perspective to bank's total assets ((RCFD8274+RCFD5311)/RCFDA223, if not available: (BHCK8274+BHCK5311)/ BHCKA223). Min. Lender Capitalization refers to the minimum Tier1and2 across all lenders (syndicate participants) in a loan facility.
Max. Lender Illiquidity (Loans to Assets)	The ratio of Loans to Assets is used as a proxy for lender illiquidity. Loans to Assets is the ratio of Net Loans to Assets times 100. Net Loans are calculated as loans and leases, net of unearned income and allowance (RCFDB529/BHCK529). Assets are items RCFD2170/BHCK2170. Max. Lender Illiquidity refers to the maximum Loans to Assets ratio across all lenders (syndicate participants) in a loan facility.
Min. Lender Liquidity (Liquid Assets to Deposit)	As a proxy for lender liquidity, Liquid Assets to Deposits is used, which is the ratio of Liquid Assets to Deposits for a lender times 100. Liquid Assets include cash and balances due from depository institutions (RCFD0081+RCFD0071/BHCK0081+BHCK0395+BHCK0397), securities available for sale (RCFD1773/BHCK1773), Federal funds sold and securities purchased under agreement to resell (RCONB987+RCFDB989/BHDMB987+BHCKB989), total trading assets (RCFD3545/BHCK3545) and loans to depository institutions and acceptance of other banks (RCFDB532+ RCFDB533+ RCFDB534+ RCFDB537 /BHCK1292+ BHCK1296). Deposits are cash and balances due from depository institutions including non-interest bearing balances and currency and coin in addition to interest bearing balances, from domestic and foreign sources (RCON6631+RCFN6631 +RCON6636 + RCFN6636 /BHDM6631 +BHFN6631 + BHDM6636 + BHFN6636). mIN. Lender Liquidity refers to the minimum Liquid Assets to Deposits ratio across all lenders (syndicate participants) in a loan facility.
Lender Reputation	Lender's market share in the primary loan market in five years before loan initiation. In case of multiple lenders the highest market share is used. Also we use binary variables to represent reputations for some of the regressions. Bank lenders are sorted based on their market share during 2000-2005 (five years before our sample data) based on the total amount of loans or the total number of loans they have participated. Lenders that are among top 5% in terms of total amount/number of loans are counted as reputable lenders. If the lead lender of a loan is reputable the reputable dummy equals 1, and 0 otherwise.

Panel C: Syndicate Loan Contracts' Characteristics from LPC data base and market data

AISD	All in Spread Drawn; Describes the Amount the Borrower Pays in Basis Points over LIBOR for each Dollar Drawn Down. It Adds the Spread of the Loan with any Annual (of Facility) Fee Paid to the Bank Group (LPC Definition)
AISU	All in Spread Undrawn; Measures the Amount a Borrower Pays for each Dollar Available under a Commitment. It Adds the Commitment and Annual Fee (LPC definition)
Binding Financial and	All banks in the primary loan sample are sorted independently in each year based on their

Regulatory Constraints (1/2)	capitalization (tier1/tier1and2) and liquidity (loans to assets ratio/liquid assets to deposits). If a bank is in the bottom quintile of both liquidity and capital in the year of loan initiation then the bank is more likely to be under financial or regulatory constraints. Binding Financial and Regulatory Const is a binary variable that equals 1 if at least one member of the syndicate has low capital and liquidity and the borrower is non-investment grade in the sample. (1) is used when we work with tier1, and loan to assets as measures of capitalization and liquidity, and (2) is used when we use tier1and2 and liquid assets to depostis as measurs of capitalization and liquidity.
CDS Transactions	A dummy variable that shows whether or notthere is a record of a firm's CDS on the Markit dataset.
Collateral	A dummy variable that equals 1 if a security held as collateral against the specific facility to protect lenders' claim, and 0 otherwise
Corporate Purposes	Type of Purpose the Deal was Issued for (LPC definition)
CRISIS	A dummy that equals 1 if loan initiation has happened during the financial crisis and 0 otherwise. The crisis dummy is based on the study by Ivashina and Scharfstein (2010) in which they suggest crisis starts with the collapse of the subprime market in the summer of 2007 (August 2007).
Deal Amount	Total Amount that the Deal has received commitments for (LPC definition)
Financial Covenant	A clause in a loan agreement written to protect the lender's claim by keeping the borrower's financial position at some minimum level, e.g. Net Worth Covenant
First Relationship with a Good Borrower	A binary variable showing that the lead lender did not have a previous loan with the borrower and the borrower is of a good credit quality, zero otherwise.
Loan Size	The Actual Amount of the Loan Facility Committed by the Facility's Lender Pool (LPC Definition)
Lead Lender	Lead Lender Arranger in a Facility based on LPC's definition. If the lead arranger credit flag in LPC is 'yes' for a lender then the lender is a lead lender.
Lender's Reputation	Lender reputation is measured in two ways. We use market share of the lender in the primary US loan market over 5 years before loan initiation as one measure (continuous measure). The other measure is based on sorting all bank lenders based on the amount or the number of the loans they have been involved with during 2000-2005 (5 years before our sample). If a lender is among top 5% of lenders in terms of total amount/number of loans then a dummy for lender's reputation would equal 1 and 0 otherwise (dichotomous measure).
LIBOR	Average Monthly London Inter Bank Offered Rate over the year of loan initiation
Maturity	A Calculation of how Long (in months) the facility will be active from Signing Date to Expiration Date (LPC definition)
No of Facilities	Total Number of Facilities in the Package (Deal)
Number of Lenders	Total Number of Participating Lenders in the Facility
Number of Lead Lenders	Number of Lead Lenders in a Facility. See Lead Lender Definitions.
Previous	Previous Relationship represents the number of times borrower and lead lender have

Relationship/ Relationship Lending	previous relationships over 5 years before loan initiation. . See Lead Lender Definitions. Relationship Lending is a dummy variable that equals 1 if the lead lender has had previous loans with the borrower before loan initiation and zero otherwise.
Refinanced Loan	A binary flag indicating whether or not the current Deal refinances a prior Deal. Equals 1 when it does and 0 otherwise.
Reputable Lender with Good Liquidity and Capitalization Dealing with a Good Quality Borrower	A binary variable showing that the lender reputation is over sample's median, Borrower's long-term debt is investment-grade, the lender has over median tier1 capital and under median loans to assets ratio. Zero otherwise.
Senior	A Binary Variable that indicates whether the facility has seniority in the company's over debt structure (1 for senior, 0 otherwise).
Share in Loan	Lender Share in a loan facility wherever it is available

A.2 Borrower Variables

Our key variable for borrower characteristic is credit quality. For credit quality we consider two alternative measures S&P's Long-Term Issuer Credit Ratings (ICR) and short term ICR in addition to Altman Z Score. Long-term and short-term ICRs are provided in a monthly frequency showing credibility of the underlying firm in fulfilling its long term or short term obligations.[17] Long-term refers to those loans with maturities of more than one year and short-term refers to maturities of one year or less. Long term ICRs range from AAA (extremely strong capacity to meet financial obligations) to CC (highly vulnerable). In our analysis we rank long term ratings from 22 to 1, where AAA receives 22 and CC receives 1. Short-term ICRs range from A-1 (strong capacity to meet financial obligations) to C (currently vulnerable). Likewise, we rank short-term credits from 10 (assigned to A-1) to 1 (assigned to C). Altman Z-Score is an alternative variable that measures overall financial health and the probability of bankruptcy of a firm. The methodology to calculate Z-Scores in this study follows Altman and Hotchkiss (2006). However, as Z-Scores are noisier than credit rating for consistency reasons we use Altman Z-Score quintiles for our multivariate analysis. That is, Z-Scores are sorted and assigned into 5 groups, where group 1 has the lowest Z-Scores and group 5 has the highest ones.

A.3 CDS Spread

We use the change in CDS spreads as a proxy for the lender trading activities to hedge its credit risk exposure. In general, when lenders issue new loans they might decide to hedge their credit risk exposure to a borrower by buying CDS contracts. Accordingly, the market demand for

[17] As mentioned in its data guide "The Standard & Poor's Issuer Credit Rating (ICR) is a current opinion of an issuer's overall creditworthiness, apart from its ability to repay individual obligations. This opinion focuses on the obligor's capacity and willingness to meet its long-term (short-term) financial commitments as they come due".

CDS contracts increases around the facility initiation date and as a result one would expect to observe an increase in the CDS spreads.

To limit our measure to hedging in relation to the event of the loan origination, we consider the cumulative abnormal change in the CDS spread in a [-5, +30] trading day interval around the facility's initiation date. If cumulative abnormal change in spread during the event period is positive there is a possibility that the CDS has been used for hedging purposes. One might argue that an observed positive cumulative abnormal spread change can be related to other market participants' increase in demand as a result of loan initiation. This argument cannot be reasonable for the following reason; an increase in the demand by other participants is an indication that their perception about default probabilities has been affected by negative news and as a result they demand more insurance. However, prior studies (see for example, James, 1987; Lummer and McConnell 1989; Best and Zhang, 1993; and Billett, Flannery and Garfinkel, 1995) find positive impact of bank loan origination announcements on borrowers' stock returns at the time of loan origination.

Alternatively, one might argue that market participants increase their demand of the CDS in anticipation of lender's potential hedging activities. In other words, those traders are front-running the bank lenders. This potential trading pattern may not have an impact on the CDS spread because those investors are most likely small or buy small exposure. Additionally, this view is consistent with our argument since those banks are more likely to hedge their loans.

A lender might enter the CDS market much before the event period. In that case, we consider this behavior as speculation rather than hedging because the lender as an informed trader could predict future changes in borrower's credit quality therefore it has traded CDS before it really has experienced any relevant change in its loan portfolio that requires hedging.

One might argue what if trading CDS contracts by a bank is related to another loan that the same borrower has issued with the lender right before the new loan. The probability of two consequent loan issuances with the same lender around specified event periods is very low as the lender tries to satisfy all the borrower's needs all at once in one loan package. (Our sample rules out this possibility). Another concern is related to cases in which the lender has hedged partly or fully against the new renegotiated loan in the CDS market much before the initiation date. If these cases exist in our sample they will make our results much weaker since we focus abnormal increase in CDS spread around loan origination (-5, 30 day window). In addition, in the multivariate analysis we control for renegotiated deals. Accordingly, this concern should not change our conclusions.

Our choice of +30 trading day as the end of the event period is to allow the lender enough time to hedge against its new contract with the borrower and to limit potential changes in borrower's quality (i.e. credit quality of borrower) that might have an impact on CDS spreads. Also, our choice of -5 trading days of the event period is to account for early hedging by lenders. We measure the abnormal change in CDS spread for each facility as the difference between change in 5 year spread from one trading date to next and the average change in 5 year spreads in the control period, where the control period is a 120 trading days around the event date excluding the event period and 20 trading days around the event period i.e. [-60 , -15] U [+40 , +60]. Change is 5 year spread is calculated as follows:

$$\frac{\text{(spread on the trading date t – spread on the last trading date)}}{\text{(spread on the last trading date)} \times \text{(number of trading days between two dates)}}$$

As a result, the cumulative abnormal change is derived as sum of abnormal change during the event period.[18] After that, we create CDS hedging dummy which is a binary variable equals one when cumulative abnormal CDS spread is positive, and 0 otherwise. This binary variable would be our proxy for using CDS as a hedging instrument by lenders.

A. 3 Lender's Key Variables

To measure the binding financial and regulatory constraints of a bank lender, three groups of proxies are utilized. The first group concerns banks capitalization and regulatory constraints, the second group relates to banks financial and liquidity inflexibility, and the third group contains measures that show whether a lender is under both liquidity and capitalization constraints. For the capitalization group we consider two main ratios: Tier1 and Tier1and2. As it is often the case that we have more than one syndicate participant, we choose the minimum capital ratio among the participants as an explanatory variable in the regressions. The reason is that we want to test whether capital constraints is a key factor in the decision to sell a loan/use CDS. Following the same logic for the liquidity group we consider two main ratios that represent the lowest level of liquidity that belongs to loan participants: a ratio of Loans to Assets and a Ratio of Liquid Assets to Deposits, where liquid assets include Cash, Securities for Sale, Federal Funds, Trading Asset and Loans Depository Acceptance. The third group of variables is a dummy variable that shows at least one of the lenders in a syndicate is constrained both in terms of liquidity and also capital. To construct this dummy, we sort all bank lenders independently based on a capitalization and a liquidity ratio. If a lender is on the bottom quintile of both capital

[18] If CDS is not traded in all trading days during event period, the cumulative abnormal change is normalized to create consistent comparisons. For example, for 30 trading days event period, a firm might have CDS spread data for only 14 days out of 30 days. In cases similar to this, we multiply the 14 days cumulative abnormal changes in the CDS spread by 30/14 to make it comparable for 30 day window.

and liquidity then we call that lender, a lender with binding constraints. Loans with at least one of such lenders in their syndicate are assigned a value of 1 for their binding dummy.

One of the important variables for our tests is to identify the lead loan arrangers on a syndicated loan. We use the lead-arranger-credit variable from LPC that shows a lender's status in a loan facility. If this variable is equal to 'Yes' for a lender-facility pair then we consider that the lender is a lead arranger.

To measure a lender's reputation and strength of its relationship with a borrower, we first, follow Bharath et al.'s (2007) approach. Reputation is measured based on the size of the market share of the lender in the primary loan market in the past 5 years. In addition for the purpose of distinguishing reputable lenders from non-reputable ones, we rank all bank lenders based on their market share in the primary US loan market during the period of 2000 to 2005 (i.e. 5 years before our sample). Those at the top 5 percent of market shares are called reputable banks. Sorting is performed separately based on the number of loans a lender is participating or the total amount of loans a lender is participating. Both measures are used to investigate the impact of a lender's reputation on their CRT decision. With respect to relationship lending, we first identify the lead arranger for each facility as explained above then we identify the history of relationships of borrowers and lenders in the past five years. Then we used number of previous relationships (loans) as the measure for the strength of lending relationship. Also in a part of tests we used a dummy variable indicating whether or not a previous relationship exist between lenders and the borrower as another measure.

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Table 1 – Descriptive Statistics of Deals (Packages)

This Table presents descriptive statistics for the sample of 5,679 deals related to 2,818 American borrowers (matched with COMPUSTAT) from January 1, 2005 to December 31, 2008. Panel A presents the descriptive statistics for deal purpose, Panel B presents the descriptive statistics for deal level. Panel C presents accounting data for borrowers of these deals. It includes Total Assets, Leverage as the ratio of long term and current debt to total assets, earnings (Income Before Extraordinary Items+ Depreciation and Amortization) to assets, Profitability which is the ratio of EBITDA on Sales, Tangibility which is the ratio of property, plant, and equipment to total assets, Current Ratio which is the ratio of Current Assets to Current Liabilities, Market to Book that equals to [Total Assets-[Total Liabilities + Preferred Stock]+ Deferred Taxes]/[Common Shares Outstanding × Price]. Also Long-Term (LT) rating and Short-Term (ST) rating are based on S&P's Issuer Credit Ratings. Altman Z-Score is measured based on the methodology provided in Altman and Hotchkiss (2006). (For more information visit Appendix A)

Panel A : Deal Purpose

Deal Purpose	No of Deals	Deal Purpose	No of Deals
Corporate Purposes	2,686	*CP[*] backup LBO*	120
Working Capital	1,476	*Real Estate*	77
Takeover	393	*Stock Buyback*	49
Acquisition Line	327	*Dividend Recap*	47
LBO	164	*Debtor in Possession*	41
Debt Repayment	156	*Other*[**]	77

Panel B : Deal Characteristics

	Number	Mean	Std. dev.	1st Percentile	Median	99th Percentile
No of Facilities	5,679	1.4	0.7	1.0	1.0	2.0
Deal Amount ($ millions)	5,679	724.3	1,629.9	0.4	250.0	600.0
Refinancing Indicator	4,781	0.8	0.4	0	1	1

Panel C : Borrower Characteristics at Firm Level

Assets ($millions)	5,448	14,048.8	68,186.6	26.12	1,654.8	350,432.6
Leverage	4,994	0.30	0.26	0.0	0.26	1.11
Earnings to Assets	4,882	0.02	0.05	-1.16	0.02	0.11
Profitability	4,934	0.02	5.97	-0.69	0.15	0.80
Tangibility	5,062	0.32	0.26	0.00	0.24	0.91
Current Ratio	4,561	2.01	7.03	0.29	1.50	7.79
Market to Book	4,168	3.91	22.39	0.45	1.99	22.88
LT Rating	3,113	12.39 (BB+)	3.48	2 (C)	13 (BBB-)	20 (AA)
ST Rating	1,086	7.97 (A-2)	1.68	3 (B-3)	8 (A-2)	10 (A-1+)
Altman Z Score	1,737	4.175	5.603	-9.079	2.925	32.172

[*] CP stands for Commercial Papers

[**] Other includes Spinoff, Exit Financing, Capital Expenditure, Project Finance, IPO Related Financing, Equipment Purchase, Lease finance, and Other

Table 2 – Summary Statistics of Loans (Facilities)

This Table presents descriptive statistics for the sample of 7,919 loans with American borrowers (matched with COMPUSTAT) from January 1, 2005 to December 31, 2008. Panel A provides information about loan characteristics. Facility Amounts are in million dollars. Maturity measures the duration of the loan in a number of months between facility active date and maturity date. AISD or All in Spread Drawn describes the amount the borrower pays in basis points over LIBOR for each dollar drawn down. AISU or All in Spread Not Drawn al measures the amount a borrower pays for each dollar available under a commitment. Senior equals one if the facility has seniority in company's overall debt structure, it equals zero otherwise. Number of Lenders shows how many lenders a facility has. Number of Lead Lenders (Lead Arrangers) is based on LPC's definition. If the lead arranger credit flag in LPC is 'yes' for a lender then the lender is counted as a lead lender. Relationship Lending is a dummy variable that equals one if there is previous relationship with lead arrangers over 5 years before loan initiaiton, and 0 otherwise). If Credit Default Swaps of the underlying borrower is traded then CDS transactions equals 1, otherwise it equals zero. Our CDS data starts from January 2006 to November 2008. If a specific loan is traded on the secondary loan market then its secondary market transactions equals 1 and 0 otherwise. All Lenders Bank is a dummy that is assigned 1 if all the lenders involving in a facility are domestic or foreign banks. If the facility has at least one non-bank lenders e.g. a hedge fund then this dummy equals 0.

	No of Loans	Mean	Std. dev.	1st Percentile	Median	99th Percentile
Panel A: Loan Characteristics						
Facility Amount ($ millions)	7,919	512.6	1,151.3	4.3	200.0	5,000.0
Maturity (months)	7,672	51.15	22.05	4.0	60	96
AISD (basis points)	7,162	187.87	156.32	15.00	150.00	780.00
AISU (basis points)	7,919	27.33	27.73	4.00	25.00	100.00
Senior	7,919	0.49	0.50	0	0	1
Panel B: Lender Relationship						
Number of Lenders	7,919	7.7	8.1	1	6	34
Number of Lead Lenders	7,919	1.45	0.55	1	1	2
Relationship Lending	7,919	0.56	0.49	0	1	1
CDS Transactions	7,919	0.37	0.47	0	0	1
Secondary Market Transactions	7,919	0.18	0.38	0	0	1
All Lenders Bank	7,919	0.45	0.50	0	0	1

Table 3 – Lenders Reputation/Relationship Characteristics and Financial Status

The Table presents descriptive statistics for the Lenders of 50,927 lender-loan pairs in which lenders are all banks and their borrowers are matched with COMPUSTAT. The sample is from January 1, 2005 to December 31, 2008. Table reports lenders' reputation and relationship characteristics together with their capitalization and liquidity status at the time of loan initiation. Lender's Reputation provides lender's share in the US primary loan market over the five years preceding loan activation date. Previous Relationship is the number of previous loans both the lender and the borrower were involved over previous 5 years. Lead Lender is a dummy variable that equals one if the lender is a lead arranger in a loan contract (see Appendix A). Tier1 is Tier1 ratio calculated as Tier1 capital over total risk-weighted assets. Tier1and2 is the summation of Tier1 and Tier2 capital divided by total risk-weighted assets. Lender's illiquidity is measured as its loan to asset ratio; finally lender's liquidity is measured as its ratio of liquid assets to deposits and liquid assets to assets.

	No of Loans	**Mean**	**Std. dev.**	**1st Percentile**	**Median**	**99th Percentile**
Bank Lenders' Characteristics						
Lender's Reputation	50,341	0.146	0.149	0.000	0.095	0.592
Previous Relationship	50,927	1.678	2.764	0	0	13
Lead Lender	50,927	0.197	0.397	0	0	1
Tier1	28,246	0.090	0.080	0.065	0.083	0.273
Tier1and2	28,246	0.120	0.078	0.102	0.112	0.276
Lender Illiquidity (Loan to Asset)	28,189	52.999	14.569	14.816	54.763	80.255
Lender Liquidity (Liquid Assets to Deposits)	27,905	60.173	35.606	13.361	50.652	129.356
Lender Liquidity (Liquid Assets to Assets)	28,189	35.000	16.536	1.473	33.980	77.036

Table 4 – Summary Statistics of Variables Used in our Regressions

The Table presents descriptive statistics for the variables used in the multinomial logit, and logistic analyses. We group our variables into four groups based on the relevant characteristics of facilities (loans), borrowers, lenders, and the market. Sample includes 2,318 loans that belong to American borrowers with available accounting information on COMPUSTAT, initiated with a syndicate of lenders that are all banks, with available liquidity and capital data. The sample is from January 1, 2005 to December 31, 2008. Panel A reports statistics for all variables used in our regressions across all observations. Panels B and C present mean, SD, mean difference, T-test, and Wilcoxon Rank Sum statistic for sale versus CDS, and sale versus non-sale observations, respectively. In Panel A, we report the number of loans that are not hedged through sale or CDS, the number of loans that are sold, the number of loans that are insured with CDS, log (loan size), number of syndicate participants, whether or not the loan is a refinanced loan, whether or not the loan has any financial covenant and whether or not the loan has a collateral. Borrower characteristics include measures for the credit quality of the borrower including Standard and Poor's long-term issuer credit rating and Altman Z-Score. Average relative bid-ask spread over the sample period and tangibility as measures of monitoring cost are also reported, in addition to log(market equity). As for lender measures for capitalization or liquidity are related to the minimum capitalization (measures by tier1 ratio) or liquidity (measured by the ratios of loans to assets or liquid assets to deposits) across the loan's syndicate participants. The proxies for binding financial and regulatory constraints indicate that borrower is non-investment grade and at least one of the syndicate participants have poor capital and liquidity when compared to other lenders that are active in the primary market in the year of loan initiation. Reputation represents lender's market share in the primary market over 5 years before the loan initiation. Relationship lending indicates that the lead lender has a previous loan with the borrower. LIBOR is the average monthly London Inter Bank Offered Rate in the year that loan is initiated. Crisis dummy equals one for the period related to the recent financial crisis. Panels B and C also provide statistics for mean differences with according t-test and Wilcoxon rank sum test results. The definitions of all variables are available in Appendix A.

Panel A – All Observations

	No of Loans	Mean	Std. dev.	1st Percentile	Median	99th Percentile
Facility (Loan)						
No CRT is used with the facility	2,318	0.805	0.396	0	1	1
Sold	2,318	0.085	0.280	0	0	1
Insured (CDS)	2,318	0.095	0.294	0	0	1
Log (loan size)	2,318	18.717	1.519	14.914	18.826	22.122
Number of Lenders	2,318	4.469	3.757	1	3	18
Refinanced Loan	2,318	0.625	0.484	0	1	1
Financial Covenant	2,318	0.551	0.497	0	1	1
Collateral	2,318	0.442	0.497	0	0	1
Borrower						
Credit Quality (S&P Long-term Issuer Credit Rating)	1,108	12.567 (BB+/BBB-)	3.684	5 (CCC)	13 (BBB-)	22 (AAA)
Investment Grade	564	15.562 (BBB+/A-)	2.245	13 (BBB-)	15 (BBB+)	22 (AAA)
Non-Investment Grade	544	9.461 (B+/BB-)	1.860	2 (D)	10 (BB-)	12 (BB+)
Altman Z Score	1,737	4.175	5.603	-9.079	2.925	32.172
Altman Quartile	1,737	1.500	1.118	0	2	3
Average Relative Bid-Ask Spread	2,194	0.465	0.820	0.058	0.191	4.358
Tangibility	2,152	0.298	0.263	0.000	0.212	0.928
Log (Borrower Market Equity)	2,159	6.988	1.910	1.833	6.994	11.633
Lender						
Min. Lender Capitalization (Tier1) Across Syndicate Participants	2,101	0.078	0.016	0.062	0.077	0.111
Max. Lender Illiquidity (Loan/Asset) Across Syndicate Participants	2,101	41.306	13.719	13.335	34.436	75.595
Min. Lender Liquidity (Liquid assets/Deposit)	2,101	45.740	33.427	12.362	31.466	129.35
Binding Financial and Regulatory Const.(1)	2,318	0.041	0.198	0	0	1
Binding Financial and Regulatory Const.(2)	2,318	0.040	0.197	0	0	1
Relationship Lending	2,318	0.556	0.497	0	1	1
First Relationship with a Good Borrower	1,108	0.106	0.309	0	0	1
Reputation (Market Share in terms of total value of loans in Primary Market)	2,318	0.320	0.198	0.000	0.287	0.552
Market						
LIBOR	2,318	0.047	0.010	0.025	0.052	0.058
Crisis	2,318	0.403	0.491	0	0	1

Panel B – Sale versus CDS

	Sale			CDS			Sale - CDS		
	N	Mean	Std Dev	N	Mean	Std Dev	Mean Difference	T-Score	Wilcoxon Rank Sum Z
Facility									
Log (loan size)	198	19.333	1.058	221	19.794	1.292	-0.461	-4.0***	-3.7***
Number of Lenders	198	4.263	3.369	221	5.914	3.970	-1.651	-4.6***	-4.8***
Refinanced Loan	198	0.631	0.484	221	0.597	0.492	0.034	0.7	0.7
Financial Covenant	198	0.551	0.499	221	0.344	0.476	0.207	4.3***	4.2***
Collateral	198	0.712	0.454	221	0.100	0.300	0.613	16.4***	12.8***
Borrower									
Credit Quality (S&P Long-term Issuer Credit Rating)	138	9.594	1.637	217	14.908	3.265	-5.314	-17.7***	-13.3***
Investment Grade	138	0.486	2.518	217	12.945	6.713	-12.459	-20.9***	-13.4***
Non-Investment Grade	138	9.109	2.291	217	1.963	4.080	7.146	18.8***	12.4***
Altman Z Score	156	2.498	3.920	161	2.689	2.233	-0.192	-0.5	-2.6***
Altman Quartile	156	1.026	1.095	161	1.248	0.955	-0.223	-1.9**	-2.3**
Average Relative Bid-Ask Spread	178	0.305	0.378	208	0.204	0.509	0.101	2.2**	5.5***
Tangibility	194	0.303	0.234	194	0.317	0.227	-0.014	-0.6	-0.8
Log (Borrower Market Equity)	172	6.860	1.591	207	8.907	1.492	-2.046	-12.8***	-11.7***
Lender									
Min. Lender Capitalization (Tier1) Across lenders	172	0.078	0.008	204	0.076	0.007	0.001	1.6	1.7*
Max. Lender Illiquidity (Loan/Asset) Across lenders	172	38.886	11.295	204	32.634	8.860	6.253	6.0***	4.6***
Min. Lender Liquidity (Liquid assets/Deposit)	172	52.044	38.271	204	58.228	39.739	-6.183	-1.5	-2.0**
Binding Financial and Regulatory Cons. (1)	198	0.101	0.302	221	0.036	0.187	0.065	2.7***	2.6***
Binding Financial and Regulatory Const. (2)	198	0.106	0.309	221	0.036	0.187	0.070	2.8***	2.8***
Relationship Lending	198	0.530	0.500	221	0.769	0.422	-0.239	-5.2***	-5.1***
First Relationship with a Good Borrower	138	0.000	0.000	217	0.175	0.381	-0.175	-5.4***	-5.1***
Reputation (value of loans)	198	0.320	0.187	221	0.377	0.157	-0.057	-3.4***	-3.5***

Panel C – Sale versus No Sale

	Sale			No Sale			Sale – No Sale		
	N	Mean	Std Dev	N	Mean	Std Dev	Mean Difference	T-Score	Wilcoxon Rank Sum Z
Facility									
Log (loan size)	198	19.333	1.058	2,120	18.660	1.543	0.673	6.0***	6.6***
Number of Lenders	198	4.263	3.369	2,120	4.488	3.792	-0.226	-0.8	3E-2
Refinanced Loan	198	0.631	0.484	2,120	0.624	0.484	0.007	0.2	0.2
Financial Covenant	198	0.551	0.499	2,120	0.551	0.497	-0.001	-2E-2	-2E-2
Collateral	198	0.712	0.454	2,120	0.417	0.493	0.296	8.1***	8.0***
Borrower									
Credit Quality (S&P Long-term Issuer Credit Rating)	138	9.594	1.637	970	12.990	3.700	-3.395	-10.6***	-11.1***
Investment Grade	138	0.486	2.518	970	8.979	7.890	-8.494	-12.5***	-11.2***
Non-Investment Grade	138	9.109	2.291	970	4.010	4.852	5.098	12.1***	10.5***
Altman Z Score	156	2.498	3.920	1,581	4.340	5.717	-1.843	-3.9***	-5.6***
Altman Quartile	156	1.026	1.095	1,581	1.547	1.110	-0.521	-5.6***	-5.5***
Average Relative Bid-Ask Spread	178	0.305	0.378	2,016	0.479	0.846	-0.174	-2.7***	-2.4**
Tangibility	194	0.303	0.234	1,958	0.297	0.266	0.006	0.3	1.1
Log (Borrower Market Equity)	172	6.860	1.591	1,987	6.999	1.935	-0.138	-0.9	-0.1
Lender									
Min. Lender Capitalization (Tier1) Across lenders	172	0.078	0.008	1,929	0.078	0.017	1E-4	0.2	1.4
Max. Lender Illiquidity (Loan/Asset) Across lenders	172	38.886	11.295	1,929	41.521	13.897	-2.635	-2.4**	-1.9*
Min. Lender Liquidity (Liquid assets/Deposit)	172	52.044	38.271	1,929	45.178	32.913	6.866	2.6***	1.1
Binding Financial and Regulatory Const (1)	198	0.101	0.302	2,120	0.035	0.185	0.066	4.5***	4.4***
Binding Financial and Regulatory Const. (2)	198	0.106	0.309	2,120	0.034	0.182	0.072	4.9***	4.9***
Relationship Lending	198	0.530	0.500	2,120	0.558	0.497	-0.028	-0.7	-0.7
First Relationship with a Good Borrower	138	0.000	0.000	970	0.122	0.327	-0.122	-4.4***	-4.3***
Reputation (value of loans)	198	0.320	0.187	2,120	0.320	0.199	-0.001	-4E-2	0.2

Table 5: Key Variables for Each Hypothesis, its Multivariate Methodologies, and the Expected Results

	H1	**H2**	**H3**	**H4**
	Bank lenders are more likely to use loan sales rather than CDS as a hedging instrument for **low borrower quality**	Bank lenders are more likely to use loan **sales** for **low credit quality** borrowers **especially when they face binding and regulatory constraints**	Bank lenders are more likely to use **CDS** as a hedge instrument for relatively **good quality** borrowers **especially if monitoring costs are relatively high**	**Reputable** bank lenders are **less likely to use CRT instruments** for **high quality** borrowers **especially if their financial and regulatory constraints are not binding**
Main Model	Multinomial Logit	Multinomial Logit	Multinomial Logit	Logit
Dependent Base/Key Variable	Base = CDS Key= Sale	Base = CDS Key = Sale	Base = None Key = CDS	CRT
Featured Independent Variables:	**Credit Quality**	**Binding Financial and Regulatory Const.**	**First Relationship with a Good Borrower/Other monitoring proxies such as bid-ask spread or tangibility**	**Reputable Lender with Good Liquidity and Capitalization dealing with Good Quality Borrower**
Expected sign for the featured independent variable	Negative	Positive	Positive	Negative

Table 6– Hypothesis1- The Effect of Borrower's Credit Quality on Lenders' CRT Decision (Univariate Tests)

This Table presents univariate tests for hypothesis 1. Borrowers are ranked based on their credit quality into two groups of high and low. Two measures of credit quality have been used: in Panel A we use long-term issuer's credit rating (ICR) while in Panel B we use short-term ICR. Both measures are provided by Standard and Poor's. The former refers to borrower's capacity to meet long-term (over one year) financial obligations and the latter refers to borrower's capacity to meet short-term (less or equal to one year) financial obligations. Number and Percentages of loans are provided based on four possible credit risk transfer methods applied by banks: using loan sale, using CDS, using both CDS and Loan Sale and none (not to use any risk transfer instrument). Percentages are based on the proportion of each category to the total number of facilities in each ranking group. We report the significance signs based on one-way binomial test, where the null hypothesis is that the proportion of low (high) quality borrowers in a credit risk transfer category is more than those of high (low) quality borrowers.

Credit Risk Transfer (CRT) Choice

		Sale		CDS		Both Sale and CDS		No CRT Instrument		Total
		Number of Loans	Percentage of Loans	Number of Loans	Percentage of Loans	Number of Loans	Percentage of Loans	Number of Loans	Percentage of Loans	
Panel A: Long-Term Credit Quality										
Borrower's Credit Quality (Long-term)	**Low**	137	**24.3%**	43	**7.6%**	33	**5.9%**	351	**62.2%**	564
	High	5	**0.9%**	165	**30.3%**	3	**0.6%**	372	**68.3%**	545
	Low minus High		**23.4%*** **		**-22.7%**		**5.3%*** **		**-6.0%**	
	High minus Low		**-23.4%**		**22.7%*** **		**-5.3%**		**6.0%** **	
Panel B: Short-Term Credit Quality										
Borrower's Credit Quality (Short-term)	**Low**	16	**7.4%**	48	**22.3%**	14	**6.5%**	137	**63.7%**	215
	High	0	**0.0%**	74	**45.4%**	1	**0.6%**	88	**54.0%**	163
	Low minus High		**7.4%*** **		**-23.1%**		**5.9%*** **		**9.7%*** **	
	High minus Low		**-7.4%**		**23.1%*** **		**-5.9%**		**-9.7%**	

*** significant at 1% level ** significant at 5% level * significant at 10% level

Table 7– Hypothesis 1 and 2 - The Effect of Borrower's Credit Quality and Lender's Capital/Liquidity on Lenders' CRT Decision (Sale vs. CDS)

This Table presents multivariate tests for hypothesis 1 and 2. Three Groups of Multinomial Logit models have been used to show the impact of different factors on lender banks risk transfer decision. The dependent variable is CRT Instrument which is a categorical variable. It equals 1 if the lenders have chosen no CRT, equals 2 if they have chosen CDS, and 3 if they have chosen loan sales. Facilities that are both sold and hedged through CDs are dropped from the regression (less than 5% of total facilities). The base for Multinomial Logit regressions is CRT Instrument equal to 2, i.e. using CDS. The results for sale and none are reported in Panels 1 and 2 respectively. Therefore the coefficients in Panel 1 (2) shows what the effect of one additional unit change in the independent variable is on the odds of being sold (using no CRT instrument) rather than using CDS as a CRT instrument. We also report *"Elasticity"* which is calculated as d(lnF)/d(lnx), where d is the first derivative, ln(F) is the natural logarithm of the density function and ln(x) is the natural logarithm of the explanatory variable and is evaluated at the sample means of the explanatory variables. The main focus of this analysis is the decision to sale versus using CDS. The main independent variable to test hypothesis 1 and 2 are borrower's credit quality and Lender's Capital and Liquidity and their binding financial and regulatory constraints. Borrower's credit quality is measured by S&P long term issuer credit ranking in (in Panels A and B) and as a robustness check with borrower's Altman Z-Score quintiles (in Panel C). Lenders' capitalization is measured by the lowest Tier1 in Panel A and the lowest Tier1and2 in Panel B that belong to lenders (syndicate participants). Loans to assets ratio is used as the main measure of illiquidity (Panels A and C) and as a robustness check, liquid assets to deposits is used as a measure of liquidity (Panel B). Binding financial and regulatory constraints are binary variables that equals one if the syndicate includes at least one lender with relatively weak capital and liquidity. Those are Lenders in the bottom quintile of all bank-lenders in the sample when they are sorted based on their liquidity and capital within each year. The dummy for binding financial and liquidity constraints is the interaction of having at least one weak lender with low quality borrowers. We have used different lender, borrower, market and contract characteristics for controls. Also all models control for borrower and time fixed effects. The descriptions for all variables can be found in Appendix A.

Panel A – Loans/Assets as a measure of Lenders' Liquidity

CRT Instrument	Model 1			Model 2		
	Coefficient	**Std. E.**	**Elasticity**	**Coefficient**	**Std. E.**	**Elasticity**
Panel A.1. – Choosing Sale vs. CDS						
Credit Quality (Long-term)	**-0.4870*** **	*(0.0487)*	-0.0256	**-0.4843*** **	*(0.0773)*	-0.0272
Min. Lender Capitalization (Tier1)	**4.3550**	*(19.026)*	0.3328	**34.7030**	*(29.144)*	1.1946
Max. Lender Illiquidity (Loan to Asset)	**0.0121**	*(0.0139)*	-0.0010	**0.0217**	*(0.0160)*	0.0001
Binding Financial and Regulatory Const. (1)				**1.2262***	*(0.6759)*	0.0448
Log (loan size)				**0.3964*** **	*(0.1513)*	0.0232
Log (Borrower Market Equity)				**-0.1592**	*(0.1792)*	0.0036
Number of Lenders				**0.0331**	*(0.0511)*	0.0016
Refinanced Loan				**0.0708**	*(0.3660)*	0.0030
LIBOR				**18.899**	*(44.300)*	2.0093
Crisis				**0.6797**	*(0.6743)*	-0.0272
Constant	**4.2588****	*(1.7338)*		**-6.6093***	*(3.9286)*	
Panel A.2 – Choosing no CRT vs. CDS						
Credit Quality (Long-term)	**-0.1790*** **	*(0.0311)*		**-0.0901****	*(0.0457)*	
Min. Lender Capitalization (Tier1)	**-0.1054**	*(12.417)*		**20.459**	*(15.707)*	
Max. Lender Illiquidity (Loan to Asset)	**0.0308*** **	*(0.0105)*		**0.0243****	*(0.0114)*	
Binding Financial and Regulatory Const. (1)				**0.7834**	*(0.5869)*	
Log (loan size)				**0.0562**	*(0.1211)*	
Log (Borrower Market Equity)				**-0.2616****	*(0.1273)*	
Number of Lenders				**0.0113**	*(0.0287)*	
Refinanced Loan				**0.0303**	*(0.2262)*	
LIBOR				**-14.083**	*(25.207)*	
Crisis				**0.3955**	*(0.3939)*	
Constant	**2.7662****	*(1.0810)*		**1.1589**	*(2.6945)*	
Control for borrower fixed effects	**Yes**			**Yes**		
Control for Time fixed effects	**Yes**			**Yes**		
Number of Observations	994			926		
Wald Chi Square	12.50***			139.44***		
Pseudo R Square	0.1199			0.1335		

*** significant at 1% level ** significant at 5% level * significant at 10% level

Panel B – Liquid Assets/Loans as a measure of Lenders' Liquidity

CRT Instrument	Model 1			Model 2		
	Coefficient	**Std. E.**	**Elasticity**	**Coefficient**	**Std. E.**	**Elasticity**
Panel B.1 – Choosing Sale vs. CDS						
Credit Quality (Long-term)	**-0.4804*** **	*(0.0472)*	-0.0247	**-0.5078*** **	*(3.7434)*	-0.0273
Min. Lender Capitalization (Tier1and2)	**22.948**	*(36.230)*	0.1737	**66.861**	*(0.0774)*	2.5811
Min. Lender Liquidity (Liquid Asset to Deposit)	**-0.0060**	*(0.0049)*	1.3E-6	**-0.0104***	*(42.3012)*	-0.0002
Binding Financial and Regulatory Const. (2)				**1.2670***	*(0.0060)*	0.0641
Log (loan size)				**0.4259*** **	*(0.6486)*	0.0238
Log (Borrower Market Equity)				**-0.0919**	*(0.1555)*	0.0052
Number of Lenders				**-0.0305**	*(0.1783)*	0.0005
Refinanced Loan				**0.0392**	*(0.0493)*	0.0034
LIBOR				**26.133**	*(0.3661)*	2.2318
Crisis				**0.7963**	*(41.9965)*	0.0282
Constant	**2.7346**	*(3.8902)*		**-10.789*** **	*(0.6687)*	
Panel B.2 – Choosing no CRT vs. CDS						
Credit Quality (Long-term)	**-0.1898*** **	*(0.0308)*		**-0.1103** **	*(0.0443)*	
Min. Lender Capitalization (Tier1and2)	**25.613**	*(23.632)*		**33.619**	*(25.5857)*	
Min. Lender Liquidity (Liquid Asset to Deposit)	**-0.0075** **	*(0.0032)*		**-0.0093** **	*(0.0039)*	
Binding Financial and Regulatory Const. (2)				**0.6090**	*(0.5741)*	
Log (loan size)				**0.0749**	*(0.1256)*	
Log (Borrower Market Equity)				**-0.2114***	*(0.1308)*	
Number of Lenders				**-0.0478***	*(0.0283)*	
Refinanced Loan				**-0.0163**	*(0.2279)*	
LIBOR				**-9.9401**	*(25.2132)*	
Crisis				**0.4700**	*(0.3915)*	
Constant	**1.6052**	*(2.5400)*		**0.0522**	*(3.7434)*	
Control for borrower fixed effects	**Yes**			**Yes**		
Control for Time fixed effects	**Yes**			**Yes**		
Number of Observations	994			926		
Wald Chi Square	123.59***			145.16***		
Pseudo R Square	0.1148			0.1354		

*** significant at 1% level ** significant at 5% level * significant at 10% level

Panel C – Robustness Test – Altman Z as a measure of Borrowers' Credit Quality

CRT Instrument	Model		
	Coefficient	**Std. E.**	**Elasticity**
Panel C.1 – Choosing Sale vs. CDS			
Credit Quality (Altman Z Score)	**-0.2557****	*(0.1292)*	-0.0231
Credit Rating Dummy	**-2.4359*****	*(0.5759)*	0.0545
Min. Lender Capitalization (Tier1)	**18.419**	*(19.756)*	-0.2233
Max. Lender Illiquidity (Loan to Asset)	**0.0467**	*(0.0443)*	0.0002
Binding Financial and Regulatory Const. (1)	**2.3576*****	*(0.6774)*	-0.0069
Log (loan size)	**-0.0456**	*(0.1094)*	0.01944
Number of Lenders	**-0.0362**	*(0.0429)*	-0.0039
Refinanced Loan	**-0.0221**	*(0.2671)*	-0.0102
LIBOR	**24.360**	*(29.950)*	2.4770
Crisis	**0.5096**	*(0.3753)*	0.0316
Constant	**8.3607*****	*(2.3668)*	
Panel C.2 – Choosing no CRT vs. CDS			
Credit Quality (Altman Z Score)	**0.1122**	*(0.1005)*	
Credit Rating Dummy	**-3.4222*****	*(0.5262)*	
Min. Lender Capitalization (Tier1)	**22.462**	*(17.511)*	
Max. Lender Illiquidity (Loan to Asset)	**0.0445*****	*(0.0120)*	
Binding Financial and Regulatory Const. (1)	**1.5787****	*(0.6263)*	
Log (loan size)	**-0.3612*****	*(0.0875)*	
Number of Lenders	**0.0245**	*(0.0319)*	
Refinanced Loan	**0.1398**	*(0.2122)*	
LIBOR	**-15.141**	*(23.322)*	
Crisis	**0.0272**	*(0.3771)*	
Constant	**8.3607*****	*(2.3668)*	
Control for borrower fixed effects	**Yes**		
Control for Time fixed effects	**Yes**		
Number of Observations	1,547		
Wald Chi Square	201.93***		
Pseudo R Square	0.2121		

*** significant at 1% level ** significant at 5% level * significant at 10% level

Table 8 – Hypothesis3- The Effect of Borrower's Credit Quality and Borrower's Monitoring Costs from Lenders' perspective on Lenders' CRT Decision

This Table presents multivariate tests for hypothesis 3. Two Multinomial Logit models have been used to show the impact of different factors on lender banks risk transfer decision. The dependent variable is CRT Instrument which is a categorical variable. It equals 1 if the lenders have chosen no CRT, equals 2 if they have chosen CDS, and 3 if they have chosen loan sales. Facilities that are both sold and hedged through CDs are dropped from the regression. The base for Multinomial Logit regressions is CRT Instrument equal to 1, i.e. no CRT instrument is used. The results for CDS and sale are reported in top and bottom sub-panels. Therefore the coefficients in the top (bottom) sub-panel show what the effect of one additional unit change in the independent variable is on the odds of being hedged through CDS (being sold) rather than using no instrument for laying off credit risk. We are mainly interested to analyse CDS versus none in this part. We also report *"Elasticity"* which is calculated as *d(lnF)/d(lnx)*, where d is the first derivative, *ln(F)* is the natural logarithm of the density function and *ln(x)* is the natural logarithm of the explanatory variable and is evaluated at the sample means of the explanatory variables. The main independent variables to test hypothesis 3 are borrower's credit quality (measured by S&P long term issuer credit ranking), and also proxies for borrowers' monitoring costs. Two different groups of proxies for monitoring costs are examined. In Panel A we use existence of relationship lending as a measure for monitoring; i.e. we use whether or not it is the first time that a good borrower enters into a loan agreement with the lead arranger lenders, and existence of a previous relationship independent of the quality of the borrower (relationship lending). In Panel B we use borrowers' relative bid-ask spread in the stock market and also their tangibility as other measures of monitoring costs. The descriptions for all variables can be found in Appendix A.

Panel A – Monitoring cost is measured as the existence of previous relationship

CRT Instrument	Model		
	Coefficient	**Std. E.**	**Elasticity**
Panel A.1 – Choosing CDS vs. no CRT			
Credit Quality (Long-term)	**0.0742***	*(0.0427)*	0.0121
First relationship with a good borrower	**1.1205****	*(0.4570)*	0.2249
Relationship Lending	**0.7854***	*(0.4065)*	0.1040
Min. Lender Capitalization (Tier1)	**-10.765**	*(15.300)*	-1.5587
Max. Lender Illiquidity (Loan to Asset)	**-0.0235****	*(0.0097)*	-0.0034
Log (loan size)	**-0.0679**	*(0.0929)*	-0.0111
Log (Borrower Market Equity)	**0.2704****	*(0.1106)*	0.0390
Number of Lenders	**-0.0094**	*(0.0282)*	-0.0014
Refinanced Loan	**-0.0003**	*(0.1944)*	-0.0001
LIBOR	**17.030**	*(21.618)*	2.3715
CRISIS	**-0.3520**	*(0.3471)*	-0.0504
Constant	**-2.5429**	*(2.1027)*	
Panel A.2 – Choosing Sale vs. no CRT			
Credit Quality (Long-term)	**-0.3650*****	*(0.0609)*	
First relationship with a good borrower	**-13.729**	*(300.90)*	
Relationship Lending	**-0.3274**	*(0.2538)*	
Min. Lender Capitalization (Tier1)	**-3.0437**	*(19.830)*	
Max. Lender Illiquidity (Loan to Asset)	**-0.0022**	*(0.0126)*	
Log (loan size)	**0.3550**	*(0.0109)*	
Log (Borrower Market Equity)	**0.1086**	*(0.1106)*	
Number of Lenders	**0.0210**	*(0.0282)*	
Refinanced Loan	**0.0179**	*(0.1944)*	
LIBOR	**31.736**	*(21.618)*	
CRISIS	**0.2286**	*(0.4308)*	
Constant	**-6.6668****	*(2.1027)*	
Control for borrower fixed effects	**Yes**		
Control for Time fixed effects	**Yes**		
Number of Observations	926		
Wald Chi Square	140.92***		
Pseudo R Square	0.1429		

*** significant at 1% level ** significant at 5% level * significant at 10% level

Panel B – Monitoring cost is measured as Relative Bid-Ask Spread and Tangibility

CRT Instrument	Model		
	Coefficient	**Std. E.**	**Elasticity**
Panel B.1 – Choosing CDS vs. no CRT			
Credit Quality (Long-term)	**0.1233*** **	*(0.0471)*	0.0219
Min. Lender Capitalization (Tier1)	**-3.3376**	*(15.563)*	-0.6095
Max. Lender Illiquidity (Loan to Asset)	**-0.0286** **	*(0.0134)*	-0.0039
Bid-Ask Spread	**0.5312*** **	*(0.2013)*	0.0827
Tangibility	**0.3918**	*(0.3967)*	0.0579
Log (loan size)	**0.0254**	*(0.1082)*	-0.0011
Log (Borrower Market Equity)	**0.1870**	*(0.1244)*	0.0261
Number of Lenders	**-0.0024**	*(0.0302)*	-0.0008
Refinanced Loan	**0.0029**	*(0.2305)*	-0.0001
LIBOR	**10.458**	*(26.257)*	1.0199
CRISIS	**-0.1075**	*(0.4256)*	-0.0181
Constant	**-4.3619** **	*(2.5337)*	
Panel B.2 – Choosing Sale vs. no CRT			
Credit Quality (Long-term)	**-0.3769*** **	*(0.0740)*	
Min. Lender Capitalization (Tier1)	**11.483**	*(23.422)*	
Max. Lender Illiquidity (Loan to Asset)	**0.0004**	*(0.0126)*	
Bid-Ask Spread	**-0.7246**	*(1.1163)*	
Tangibility	**-0.3006**	*(0.5397)*	
Log (loan size)	**0.3514*** **	*(0.1094)*	
Log (Borrower Market Equity)	**-0.0218**	*(0.1623)*	
Number of Lenders	**0.0348**	*(0.0443)*	
Refinanced Loan	**0.0418**	*(0.3074)*	
LIBOR	**32.586**	*(38.330)*	
CRISIS	**0.2630**	*(0.6059)*	
Constant	**-6.8710** **	*(3.1382)*	
Control for borrower fixed effects	**Yes**		
Control for Time fixed effects	**Yes**		
Number of Observations	847		
Wald Chi Square	130.28***		
Pseudo R Square	0.1332		

*** significant at 1% level ** significant at 5% level * significant at 10% level

Table 9– Hypothesis4- the Effect of Borrower's Credit Quality and Lenders' Reputation on Lenders' CRT Decision

This Table presents multivariate tests for hypothesis 4. Two Logit models have been used to show the impact of different factors on lender banks risk transfer decision. The dependent variable is binary variable that receives a value of 1 if the lenders have chosen at least one CRT instrument (CDS or loan sale) and equals 0 otherwise. Each coefficient shows what the effect of one additional unit change in the independent variable is on the odds of being hedged through CDS or sale. We also report "*Elasticity*" which is calculated as *d(lnF)/d(lnx)*, where d is the first derivative, *ln(F)* is the natural logarithm of the density function and *ln(x)* is the natural logarithm of the explanatory variable and is evaluated at the sample means of the explanatory variables. The main independent variables to test hypothesis 4 are borrower's credit quality (measured by S&P long term issuer credit ranking), and Lender's reputation, and whether or not the loan is related to a reputable lender dealing with a good quality borrower. Reputation is measured by lender's market share in the primary market. Lenders' with top 5% market shares in the primary market over 2000-2005 are counted as reputable banks. Model 1 represents the result when market share is measured as the total value of loans, and Model 2 shows the result when market share is computed as total number of loans. The descriptions for all other variables can be found in Appendix A.

CRT Instrument	Model 1 (Reputation based on total value of loans)			Model 2 (Reputation based on total number of loans)		
	Coefficient	**Std. E.**	**Elasticity**	**Coefficient**	**Std. E.**	**Elasticity**
Choosing CRT (Logistic Model)						
Credit Quality (Long-term)	**-0.0244**	*(0.0533)*	-0.0054	**-0.0197**	*(0.0532)*	-0.0044
Lender Reputation (Market Share)	**2.6654*** **	*(1.0068)*	0.3070	**1.7038** **	*(0.7587)*	0.2529
Reputation * Good Borrower	**-0.6371** **	*(0.3183)*	-0.1396	**-0.6934** **	*(0.3188)*	-0.1532
Min. Lender Capitalization (Tier1)	**-8.6143**	*(14.633)*	-1.8881	**-10.694**	*(14.607)*	-2.3658
Max. Lender Illiquidity (Loan to Asset)	**-0.0122**	*(0.0083)*	-0.0027	**-0.0143**	*(0.0083)*	-0.0032
Binding Financial and Regulatory Const. (1)	**-0.3580**	*(0.3387)*	-0.0741	**-0.3708**	*(0.3402)*	-0.0774
Log (loan size)	**0.1345**	*(0.0971)*	0.0295	**0.1352**	*(0.0969)*	0.0299
Log (Borrower Market Equity)	**0.1895***	*(0.1056)*	0.0415	**0.1988***	*(0.1051)*	0.0440
Number of Lenders	**-0.0168**	*(0.0253)*	-0.0037	**-0.0177**	*(0.0253)*	-0.0039
Refinanced Loan	**0.1087**	*(0.1863)*	0.0237	**0.0904**	*(0.1865)*	0.0199
LIBOR	**21.583**	*(19.524)*	4.7308	**19.909**	*(19.487)*	4.4042
CRISIS	**-0.1660**	*(0.3368)*	-0.0361	**-0.1885**	*(0.3370)*	-0.0413
Constant	**-6.3143** **	*(2.6093)*		**-5.1849** **	*(2.5066)*	
Control for borrower fixed effects	**Yes**			**Yes**		
Control for Time fixed effects	**Yes**			**Yes**		
Number of Observations	951			951		
Wald Chi Square	31.52***			30.95***		
Pseudo R Square	0.0440			0.0390		

*** significant at 1% level ** significant at 5% level * significant at 10% level

Table 10– Hypothesis 1 and 2 - The Effect of Borrower's Credit Quality and Lender's Capital/Liquidity on Lenders' CRT Decision (Sale vs. CDS) – Robustness Test: Sample restricted to loans with collateral/financial covenants

This Table presents multivariate tests for hypothesis 1 and 2. As a robustness check model specifics are selected as similar to Table 5 panel A, however the sample is restricted to loans with collateral or financial covenants, as a robustness check. Two Groups of Multinomial Logit models have been used to show the impact of different factors on lender banks risk transfer decision. The dependent variable is CRT Instrument which is a categorical variable. It equals 1 if the lenders have chosen no CRT, equals 2 if they have chosen CDS, and 3 if they have chosen loan sales. Facilities that are both sold and hedged through CDs are dropped from the regression (less than 5% of total facilities). The base for Multinomial Logit regressions is CRT Instrument equal to 2, i.e. using CDS. The results for sale and none are reported in top and bottom sub-panels, respectively. Therefore the coefficients in top (bottom) sub-panel shows what the effect of one additional unit change in the independent variable is on the odds of being sold (using no CRT instrument) rather than using CDS as a CRT instrument. We also report *"Elasticity"* which is calculated as d(lnF)/d(lnx), where d is the first derivative, ln(F) is the natural logarithm of the density function and ln(x) is the natural logarithm of the explanatory variable and is evaluated at the sample means of the explanatory variables. The main focus of this analysis is the decision to sale versus using CDS. The main independent variable to test hypothesis 1 and 2 are borrower's credit quality and Lender's Capital and Liquidity and their binding financial and regulatory constraints. Borrower's credit quality is measured by S&P long term issuer credit ranking. Lenders' capitalization is measured by the lowest Tier1 that belongs to lenders (syndicate participants) and Loans to assets ratio is used as the measure of illiquidity. Binding financial and regulatory constraints are binary variables that equals one if the syndicate includes at least one lender with relatively weak capital and liquidity. Those are Lenders in the bottom quintile of all bank-lenders in the sample when they are sorted based on their liquidity and capital within each year. The dummy for binding financial and liquidity constraints is the interaction of having at least one weak lender with low quality borrowers. We have used different lender, borrower, market and contract characteristics for controls. Also all models control for borrower and time fixed effects. The descriptions for all variables can be found in Appendix A.

CRT Instrument	Model 1			Model 2		
	Coefficient	**Std. E.**	**Elasticity**	**Coefficient**	**Std. E.**	**Elasticity**
Panel A.1 – Choosing Sale vs. CDS						
Credit Quality (Long-term)	**-0.5512*** **	*(0.0741)*	-0.0362	**-0.6025*** **	*(0.0946)*	-0.0402
Min. Lender Capitalization (Tier1)	**18.6326**	*(25.133)*	4.0031	**44.529**	*(35.730)*	4.6380
Max. Lender Illiquidity (Loan to Asset)	**0.0050**	*(0.0180)*	-0.0037	**0.0245**	*(0.0203)*	-0.0011
Binding Financial and Regulatory Const. (1)				**1.3605***	*(0.8658)*	0.0732
Log (loan size)				**0.6005*** **	*(0.2146)*	0.0668
Log (Borrower Market Equity)				**-0.1108**	*(0.2550)*	0.0070
Number of Lenders				**0.0360**	*(0.0600)*	0.0005
Refinanced Loan				**0.0872**	*(0.5171)*	0.0063
LIBOR				**-78.494**	*(56.483)*	-1.6163
Crisis				**0.0907**	*(0.9066)*	-0.0274
Constant	**4.4253****	*(2.2351)*		**-6.5972**	*(5.6243)*	
Panel A.2 – Choosing no CRT vs. CDS						
Credit Quality (Long-term)	**-0.3041*** **	*(0.0632)*		**-0.2671*** **	*(0.0764)*	
Min. Lender Capitalization (Tier1)	**-14.487**	*(19.595)*		**2.7667**	*(23.8017)*	
Max. Lender Illiquidity (Loan to Asset)	**0.0390****	*(0.0163)*		**0.0385****	*(0.0179)*	
Binding Financial and Regulatory Const. (1)				**0.8656**	*(0.7850)*	
Log (loan size)				**-0.0060**	*(0.1826)*	
Log (Borrower Market Equity)				**-0.1962**	*(0.2122)*	
Number of Lenders				**0.0352**	*(0.0378)*	
Refinanced Loan				**0.0334**	*(0.4270)*	
LIBOR				**-71.830***	*(38.7011)*	
Crisis				**0.3881**	*(0.6507)*	
Constant	**5.0710*** **	*(1.6626)*		**6.5580**	*(4.4221)*	
Control for borrower fixed effects	**Yes**			**Yes**		
Control for Time fixed effects	**Yes**			**Yes**		
Number of Observations	516			477		
Wald Chi Square	77.44***			106.53***		
Pseudo R Square	0.1388			0.1795		

*** significant at 1% level ** significant at 5% level * significant at 10% level

Table 11–The Effect of Borrower's Credit Quality and Lender's Capital/Liquidity on Lenders' Decision to sell a loan (Robustness)

This Table presents the results of logistic regressions testing the impact of borrowers' credit quality, and lenders' financial constraints on the likelihood of selling a loan. The dependent variable equals 1 if a loan has been sold and 0 otherwise. The variables are similar to the ones in tables 5 and 8. Panel A presents the results for the total sample. Panel B presents the results for loans that have covenants or collaterals. The main independent variables are the binding financial and regulatory constraints for lenders and also borrower's credit quality. The descriptions for all variables can be found in Appendix A.

Panel A – The decision to sell a loan versus otherwise – Total Sample

Sale	**Model 1**			**Model 2**		
	Coefficient	**Std. E.**	**Elasticity**	**Coefficient**	**Std. E.**	**Elasticity**
Credit Quality (Long-term)	**-0.3534*** **	*(0.0562)*	-0.0238	**-0.3601** **	*(0.0561)*	-0.0241
Min. Lender Capitalization (Tier1)	**17.512**	*(22.464)*	1.1817			
Min. Lender Capitalization (Tier1and2)				**2.6007**	*(2.8881)*	0.1739
Lender Liquidity (Liquid Asset to Deposit)				**-0.0001**	*(0.0037)*	0.0000
Lender Illiquidity (Loan to Asset)	**0.0011**	*(0.0108)*	0.0001			
Binding Financial and Regulatory Const. (1)	**0.6229***	*(0.3736)*	0.0525			
Binding Financial and Regulatory Const. (2)				**0.7426** **	*(0.3276)*	0.0647
Log (loan size)	**0.2989*** **	*(0.1116)*	0.0202	**0.3079*** **	*(0.1134)*	0.0206
Log (Borrower Market Equity)	**0.0198**	*(0.1231)*	0.0013	**0.0375**	*(0.1228)*	0.0025
Number of Lenders	**0.0220**	*(0.0388)*	0.0015	**-0.0031**	*(0.0366)*	-0.0002
Refinanced Loan	**-0.0348**	*(0.2423)*	-0.0024	**-0.0522**	*(0.2401)*	-0.0035
LIBOR	**38.594**	*(26.955)*	2.6042	**45.618**	*(26.930)*	3.0503
Crisis	**0.5541**	*(0.4204)*	0.0405	**0.5182***	*(0.4157)*	0.0373
Constant	**-7.7351*** **	*(3.0049)*		**-6.9390*** **	*(2.2922)*	
Control for borrower fixed effects	**Yes**			**Yes**		
Control for Time fixed effects	**Yes**			**Yes**		
Number of Observations	951			951		
Wald Chi Square	112.14***			115.19***		
Pseudo R Square	0.1636			0.1681		

*** significant at 1% level ** significant at 5% level * significant at 10% level

Panel B – The decision to sell a loan versus otherwise – Loans with covenants/collaterals

Sale	Model 1			Model 2		
	Coefficient	**Std. E.**	**Elasticity**	**Coefficient**	**Std. E.**	**Elasticity**
Credit Quality (Long-term)	**-0.2716*** **	*(0.0669)*	-0.0298	**-0.2928*** **	*(0.0653)*	-0.0322
Min. Lender Capitalization (Tier1)	**41.941**	*(25.341)*	4.6086			
Min. Lender Capitalization (Tier1and2)				**3.6912**	*(3.8701)*	0.4064
Lender Liquidity (Liquid Asset to Deposit)				**0.0003**	*(0.0046)*	2.9E-4
Lender Illiquidity (Loan to Asset)	**-0.0081**	*(0.0123)*	-0.0009			
Binding Financial and Regulatory Const. (1)	**0.7363***	*(0.4409)*	0.0993			
Binding Financial and Regulatory Const. (2)				**0.7189***	*(0.3812)*	0.0965
Log (loan size)	**0.4942*** **	*(0.1436)*	0.0543	**0.5145*** **	*(0.1474)*	0.0566
Log (Borrower Market Equity)	**-0.0121**	*(0.1449)*	-0.0013	**0.0463**	*(0.1439)*	0.0051
Number of Lenders	**0.0044**	*(0.0430)*	0.0005	**-0.0354**	*(0.0417)*	-0.0039
Refinanced Loan	**-0.0526**	*(0.3178)*	-0.0058	**-0.0982**	*(0.3108)*	-0.0110
LIBOR	**-0.9470**	*(32.019)*	-0.1041	**8.1111**	*(32.435)*	0.8930
Crisis	**0.1106**	*(0.5591)*	0.0123	**-0.0340**	*(0.5589)*	-0.0037
Constant	**-11.795*** **	*(3.7962)*		**-9.8772*** **	*(3.0024)*	
Control for borrower fixed effects	**Yes**			**Yes**		
Control for Time fixed effects	**Yes**			**Yes**		
Number of Observations	499			499		
Wald Chi Square	61.05***			61.21***		
Pseudo R Square	0.1350			0.1353		

*** significant at 1% level ** significant at 5% level * significant at 10% level