Can Equity Volatility Explain the Global Loan Pricing Puzzle?*

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March 4, 2012

ABSTRACT

We examine whether equity volatility can explain the difference in syndicated corporate loan spreads paid by U.S. and European borrowers first documented by Carey and Nini (2007). We argue that OLS estimates of the association between equity volatility and loan spreads are biased and inconsistent. We suggest instrumental variables that potentially identify consistent estimates. Our instrumental variable results indicate that there is no statistically significant difference in loan spreads paid by U.S. and European borrowers, and that OLS estimates of the association between idiosyncratic equity volatility and corporate loan spreads are biased downward by about a factor of 5. Our instrumental variable results also indicate that equity volatility can explain the cash holding-credit spread puzzle documented by Acharya, Davydenko, and Strebulaev (2011).

JEL codes: E40, G12, G15, G21

In this paper we examine whether equity volatility can explain the difference in syndicated corporate loan spreads between the U.S. and Europe documented by previous research. Carey

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and Nini (2007) provide evidence that interest rates spreads in Europe are 30 basis points lower than in the United States, and Houston, Itzkowitz, and Naranjo (2007) present evidence that loan spreads are 40 basis points lower in Europe compared to the U.S. These authors' results suggest that there must be a barrier that prohibits U.S. borrowers from accessing the lower cost European loan market. This is puzzling because several large lenders extend credit to both markets, many large borrowers have global operations in both continents, and recent research by Becker and Ivashina (2011) documents that the syndicated corporate loan market is a primary source of debt financing for large corporations. Intuition suggests that many of these firms could access either market to minimize their financing costs. Because the syndicated corporate loan market is an important source of corporate debt financing, it is important to better understand the determinants of loan pricing.

It is well established in the finance and economics literature that firm volatility is a primary determinant of the cost of corporate debt financing and that equity volatility is a proxy for firm volatility. Beginning with Merton (1974), contingent claims models of corporate debt valuation predict that corporate default risk and cost of debt financing are functions of a firm's total debt, asset value, and asset value volatility. These models also predict that equity volatility is a direct function of firm's asset volatility, which motivates the use of equity volatility as a proxy for firm's asset volatility. Empirical evidence confirms the predictions of these models. Campbell and Taksler (2003) present evidence equity volatility has substantial explanatory for corporate bond yields, and Santos (2011) and Santos and Winton (2010) find that equity volatility has significant explanatory power for syndicated loan spreads in the U.S. market.

There are also other reasons we expect equity volatility may be associated with the cost of corporate loan financing beyond those reasons suggested by contingent claims models. Equity

volatility may not only proxy for firms' asset volatility, but may proxy for other sources of uncertainty or other unobservable risk factors that lenders price. Credit risk models based on the assumptions of contingent claims models are often viewed as too unrealistic and unsuitable for practical implementation, and as a result we expect that lenders likely use several models based on alternative risk factors. We expect that an association between loan spreads and equity volatility could also arise if equity volatility is one of these factors or subsumes information in another set of factors. For example, research by Santos (2011), Santos and Winton (2010) document several factors that are associated with loan spreads and another group of studies documents that several of these same factors are also associated with equity volatility (Bartram, Brown, and Stulz (2009) and Bekaert, Hodrick, and Zhang (2012)). Hence, it may be reasonable to expect that other unobservable risk factors that lenders price may also be associated with equity volatility.

While we expect equity volatility to have significant explanatory power for the cost of corporate loan financing, we expect equity volatility may explain the difference in U.S. and European loan spreads because recent research suggests there is significant difference in average equity volatility between U.S. and foreign firms, and that the difference in equity volatility reflects that U.S. firms take greater risks than foreign firms. Bartram, Brown, and Stulz (2009) present evidence that idiosyncratic equity volatility is larger in the U.S. compared to other countries, however they find mixed evidence regarding the relative magnitudes of systematic equity volatility. They suggest that idiosyncratic volatility is greater in countries with greater government stability and quality, and financial development, and that greater idiosyncratic equity volatility reflects good volatility from greater risk taking that promotes economic growth. If greater equity volatility for U.S. firms compared to European firms reflects that U.S. borrowers are riskier than European borrowers, then we expect that

greater equity volatility may be able to explain the difference in U.S. and European loan spreads.

We use a large sample of corporate loans to examine whether equity volatility, decomposed into its idiosyncratic and systematic components, can explain the loan spread differential paid by U.S. and European borrowers. We decompose borrowers' total stock return volatility into its idiosyncratic and systematic components because previous studies that examine the association between equity volatility and the cost of corporate debt financing typically follow a similar approach, or focus solely on idiosyncratic equity volatility (See Campbell and Taksler (2003), Santos (2011), and Santos and Winton (2010)). Moreover, Bartram et al. (2009) suggest that differences between U.S. and foreign firms stock return volatility is largely due to differences in idiosyncratic volatility. However, because equity volatility is measured with error and may be a proxy for borrower risk, we expect that our OLS estimates of the determinants of loan spread will be biased and inconsistent. Consequently, we attempt to obtain consistent estimates using an instrumental variable generalized methods of moments (IV) estimator where we instrument equity volatility with the volatility of quarterly financial statement ratios and quarterly total assets. We also control for a broad set of explanatory variables that are standard in the literature.

In our main OLS results that control for idiosyncratic and systematic volatility, we estimate that loan spreads received by European borrowers are lower than those received by U.S. borrowers. Our OLS estimates indicate that the loan spread differential was roughly 50 basis points over our sample period and roughly 40 basis points when excluding the recent financial crisis. This evidence is consistent with those of Carey and Nini (2007) and Houston et al. (2007). However, our IV results indicate that there is no statistically significant difference in loan spreads received by European and U.S. borrowers. In addition, compared

to our OLS results, our IV results suggest that OLS estimates of the association between idiosyncratic equity volatility and corporate loan spreads are biased downward by about a factor of four to five.

We also find other significant differences in coefficient estimates between our OLS and IV results. Our coefficient estimates for firm size, measured by borrowers' total assets, are significant in our OLS models, but not in our IV models. The coefficient estimates for leverage also about half as large in the instrumental variable estimates as compared to our OLS estimates. The sign of the coefficient on firm's cash holdings switches from positive in OLS specifications to negative in IV models. This result suggests that equity volatility can solve the cash holding-credit spread puzzle documented by Acharya et al. (2011).

Our focus on borrower location differs from previous research by Carey and Nini (2007) and Houston et al. (2007) which mainly focuses on the difference in loan spreads between loans originated in U.S. and European syndicated loan markets.[1] We focus on borrower location because we expect that firm volatility depends on firms' domicile, rather than the market where firms originate their loans. However, we expect that borrower location is highly correlated with market of syndication because borrowers overwhelmingly originate loans in their home region. Table I, which tabulates borrowers region against their loans' market of syndication, provides support for this claim. The tabulations indicate that with few exceptions borrowers originate loans in their home market. Carey and Nini (2007) and Houston et al. (2007) provide additional support for this claim by providing similar evidence that borrowers tend to issue loans in their home market. Therefore, we do not expect our

[1]In the syndicated loan market, there are distinct markets that operate in different regions of the globe. Markets can be thought of as a location where borrowers and lenders meet to arrange loan deals. Typically borrowers and lenders are free to choose and arrange deals in markets located outside their home domicile. In our sample, the markets that the borrowers originate loans include Africa, Asia Pacific, Eastern Europe/Russia, and Latin America/Caribbean. The market of syndication is unknown for a negligible number of loans.

results to depend on whether we use market of syndication instead of borrower location. And for robustness we also present results that show that idiosyncratic equity volatility can explain the difference in loan spreads between European and U.S. loan markets.

We also provide several other sets of robustness checks. In our first set of robustness checks we estimate our main model with a smaller data sample where the borrowers in the U.S. are matched to similar European borrowers. We apply a propensity score matching technique to match loans originated by U.S. borrowers to European borrowers. Using the matched sample for estimations, we find in our OLS estimations that the loan spreads are about 50 to 60 basis points lower in Europe. However, once we estimate our model with instrumental variables we again find no statistically loan spread difference between the U.S. and Europe. This suggests that our results are due to systematic differences in the composition of our U.S. and European samples. For an example of matching for sample selection for regression analysis see Bartram, Brown, and Stulz (2009), Bartram, Brown, and Conrad (2011),Dehejia and Wahba (2002).

Second, we examine whether there are sufficient differences in stock market development and investor protection between the U.S. and European countries that could generate differences in borrower risk and equity volatility between U.S. and European borrowers. We find that greater stock market development and protections of shareholder rights are associated with greater loan spreads and greater equity volatility, and that greater creditor rights are associated with lower loan spreads and lower equity volatility. We interpret these results as consistent with the assertion that greater shareholder (debt holder) influence is associated greater borrower risk and loan spreads because shareholders (debt holders) prefer greater (lesser) risk taking.

Third, we employ different firm default probabilities from the Kamakura Risk Informa-

tion Services (KRIS) as an additional explanatory variables in our estimations. We find that estimates of firm default probabilities have a positive and statistically significant association with loan spreads in our OLS models, but do not always have statistically significant explanatory power for loan spreads in our instrumental variable models.

We also examine whether our results are sensitive to other loan contract features or controlling for other measures of credit risk. In order to ensure comparability with the analysis of Carey and Nini (2007) we closely follow their approach and present evidence that our main results are robust to several variations in specification and sample composition. We show that our main results are invariant to whether or not we include information on non-price loan contract terms (e.g. loan maturity, number of lenders, performance pricing, covenants and whether a loan is secured with collateral) which may be endogenous to loan interest rate spreads. We also estimate specifications where over samples limited only to loans denominated in U.S. dollars and loans that have spreads with a LIBOR base rate. We also estimate models where we do not include fees in our measure of loan spreads. All of our main results are robust to these variations.

[PLACE TABLE I HERE]

Our results have four main implications. First, our results suggest that there is no material loan pricing difference between loans received by U.S. and European borrowers. This result indicates that on average, U.S. borrowers do not stand to gain by obtaining a loan in Europe and vice versa. Our results also suggest that either borrowers have no interest in crossing markets, or there must be other reasons why borrowers do not cross markets. Recent research provides some possible explanation. For example, Sufi (2007) presents evidence that borrowers with greater asymmetric information problems tend to

receive loans from lenders that are located geographically more closely, and that borrower reputation mitigates, but does not eliminate asymmetric information problems. We interpret the evidence of Sufi (2007) as suggesting that borrowers may borrow in their home market to mitigate asymmetric information problems with lenders, and obtain more favorable loan financing terms than if they borrowed outside their home market.

Second, our results provide evidence that accounting for the endogeneity of equity volatility can have important consequences for understanding the determinants of corporate loan contract terms. Recently, Roberts and Whited (2011) review different sources of endogeneity problems in corporate finance and possible methods for addressing endogeneity problems such as instrumental variables and matching. Beyond our main result, that the observed difference in loan spreads paid U.S. and European borrowers vanishes after controlling for the endogeneity of idiosyncratic equity volatility, our analysis indicates that several important results differ between our OLS and IV estimations. As mentioned previously, there are substantial differences in our coefficient estimates for proxies for borrower size, leverage, borrowers' cash holdings, and estimates of borrowers' default probabilities. First, several studies control for firm size under the assumption that size is associated with fewer credit risk and asymmetric information problems. However, our coefficient for firm size is significant in our OLS estimates but no longer significant in our IV models. Second, the coefficient on leverage is much smaller in our IV estimates compared to our OLS estimates, which suggests that OLS results overstate the impact of leverage for loan spreads. Next, the coefficient on proxies for borrowers' cash holdings, a standard measure of balance sheet liquidity, is positive in our OLS estimates but negative in our IV estimates. The positive sign in the OLS models is inconsistent with the notion that firms with greater cash holdings have lower risk because they have more balance sheet liquidity. In contrast, our IV results have the expected sign.

For example Acharya, Davydenko, and Strebulaev (2011) point out that the positive correlation between credit spreads and cash holdings is a puzzling finding because borrowers with more liquid balance sheets are less risky. They suggest that the positive association between credit spreads and cash holdings arises because riskier firms hold more cash for precautionary motives. Perhaps the positive bias in OLS models is why previous research generally has not controlled for balance sheet liquidity although existing research suggests that balance sheet liquidity is an important determinant of credit risk. Our instrumental variable estimates provide a simple method of potentially identifying the impact of cash holdings on the cost of firms' debt financing, and provide a solution to the cash holdings-credit spread puzzle pointed out by Acharya et al. (2011).

Our third implication is that we provide a rationale for why equity volatility, in particular idiosyncratic equity volatility, has substantial explanatory power for the cost of corporate debt financing. Campbell and Taksler (2003) suggest that a challenge for future research to explain why equity volatility explains a substantial fraction of corporate bond yields and debt financing more generally. Our analysis provides a simple explanation, that equity volatility may simply proxy for firm volatility or subsume information contained in other risk factors.

A fourth implication of our results is that they suggest cross country differences in the legal and regulatory environment, stock market development, and differences in shareholder rights can be explained by equity volatility. Recent research by Qian and Strahan (2007) documents that proxies for greater investor protection are associated with borrowers receiving more favorable loan contract terms. Our results suggest that variables that describe the legal environment and stock market development may be associated with the cost of loan financing through through their covariance with firm risk or firm volatility.

The remainder of the paper is as follows. Section I presents the econometric procedure.

Section II describes the data and the creation of the proxy variables. Section III shows the estimation results and robustness checks. Section IV concludes.

I. Empirical Model

In this section we present our empirical model that we use to examine the determinants of loan spreads for U.S. and European borrowers. We motivate our model with the literatures that examine the determinants of syndicated loan spreads and contingent claims models of corporate debt valuation.[2] We model the interest rate charged on corporate loans as a function of the volatility of the market value of the firm's assets, the ratio of the book value of firm's debt to the market value of firm's assets, and a set of additional control variables. We follow the approach of Carey and Nini (2007) and Houston et al. (2007) and allow loan spreads to depend on whether a borrower is located in Europe or the U.S. The model is given by the following equation:

$$r_i - r_f \quad = \quad \beta_0 + \beta_1 \sigma_{Ai} + \beta_2 \frac{D_i}{A_i} + \beta_3 E_i + \beta_4 X_4 + \ldots + \beta_k X_k + \varepsilon_{1i} \tag{1}$$

In Equation (1) $r_i - r_f$, is the interest rate spread on the loan, defined as the interest rate on the loan, r_i, minus the risk free rate, r_f.The risk spread depends of the volatility of the firm's assets, σ_{Ai}, and borrower's leverage, $\frac{D_i}{A_i}$, which is total debt, D, divided by the market value of assets, A. E_i is a dummy variable indicating whether the firm is located in Europe, X_is are additional control variables, and ε_{1i} is a normally distributed residual with mean zero and variance $\sigma^2_{\varepsilon 1}$, i.e. $\varepsilon_1 \sim N[0, \sigma^2_{\varepsilon 1}]$.

[2]See Ivashina (2009) and Qian and Strahan (2007) for syndicated loans, and Merton (1974) and Campbell and Taksler (2003) for contingent claims models among others.

Because firm's asset volatility is unobservable, the parameters of the loan spread equation cannot be identified. One approach is not to account for firm volatility, and leave it as an omitted variable. However, since volatility is likely correlated with other control variables, this might result in biased and inconsistent coefficient estimates. A typical approach used by the literature is to use firm's equity volatility as a proxy for firm's asset volatility. Studies that similarly use equity volatility as a proxy for firm volatility include Gilchrist, Sim, and Zakrajšek (2010), Santos (2011), Santos and Winton (2010), and Shumway (2001). We interpret this approach as implying that equity volatility can be written as a function of firm's asset volatility and market leverage:

$$\sigma_{Ei} \quad = \quad \alpha_0 + \alpha_1 \sigma_{Ai} + \alpha_2 \frac{D_i}{A_i} + \varepsilon_{2i} \tag{2}$$

In equation (2) the error term ε_{2i} is the difference between our estimate of idiosyncratic equity volatility and the lenders' assessment of firm volatility. It is normally distributed with mean zero and variance $\sigma^2_{\varepsilon 2}$, i.e. $\varepsilon_2 \sim N[0, \sigma^2_{\varepsilon 2}]$. We can interpret the error term, ε_{2i}, in multiple ways. First, if lenders directly use estimates of idiosyncratic or systematic equity volatility as a proxy for borrower volatility then the error term could simply reflect the difference between our estimates of equity volatility and lenders' estimates of equity volatility. For instance, lenders could use daily returns, while we use weekly returns in our analysis. Or, if lenders use different asset pricing models to estimate idiosyncratic and systematic equity volatility, the error term could reflect these differences. Second, lenders could implement a variety of non-linear models to estimate borrowers' asset volatility from estimates of equity volatility.[3] In this case the error term could reflect differences between these assessments

[3]These models are usually derived from structural models of corporate debt valuation. For an example of these type of models see McNeil, Frey, and Embrechts (2005), Lando (2004), and Cairns (2004).

and our estimates of equity volatility. We expect that each of these scenarios is partially responsible for the wedge between borrower risk and estimates of equity volatility.

In the next step, we solve for asset volatility in equation (2) as:

$$\sigma_{Ai} = \frac{\sigma_{Ei}}{\alpha_1} - \frac{\alpha_0}{\alpha_1} - \frac{\alpha_2}{\alpha_1}\frac{D_i}{A_i} - \frac{\varepsilon_{2i}}{\alpha_1} \tag{3}$$

and insert it into equation (1). We assume that the error terms ε_{1i} in equation (1) and ε_{2i} in equation (2) are independent and are orthogonal to the explanatory variables. This results in the following regression model:

$$\begin{aligned} r_i - r_f &= \left(\beta_0 - \frac{\beta_1\alpha_0}{\alpha_1}\right) + \frac{\beta_1}{\alpha_1}\sigma_{Ei} + \left(\beta_2 - \frac{\beta_1\alpha_2}{\alpha_1}\right)\frac{D_i}{A_i} + \beta_3 E_i + \beta_4 X_4 + \ldots + \beta_k X_k + \left(\varepsilon_{1i} - \frac{\beta_1}{\alpha_1}\varepsilon_{2i}\right) \\ &= \rho_0 + \rho_1\sigma_{Ei} + \rho_2\frac{D_i}{A_i} + \beta_3 E_i + \beta_4 X_4 + \ldots + \beta_k X_k + \eta_i \end{aligned} \tag{4}$$

In contrast to equation (1), equation (4) models interest rate spreads as a function of equity volatility rather than asset volatility. This model is unable to identify the parameters β_0, β_1, and β_2. If our previously mentioned assumption that European dummy variable or the remaining control variables X_4-X_k do not have an independent association with equity volatility in equation (2) is valid, then we are able to identify β_3 through β_k.

One can argue that equity volatility could also be a function of other control variables in equation (2), which could result in different expressions for equation (4). In particular, independent of firm's asset volatility and leverage, equity volatility could be a function of whether a firm is in the U.S. or European sample. For example, research suggests idiosyncratic equity volatility is greater for firms in countries that have stronger investor property rights because these countries attract more informed investment (Morck, Yeung, and Yu,

2000). One could expect that if the U.S. has stronger investor property rights than European countries, then U.S. stocks could have more idiosyncratic volatility because the U.S. financial system attracts more informed investment, not because U.S. firms are riskier. This could potentially bias our results toward not finding a difference in loan spreads between the U.S. and Europe. Hence our key identifying assumption is that the difference in idiosyncratic equity volatility between U.S and European firms is accounted for by differences in firms' asset volatility, risk, and leverage. However, we note that the analysis of (Morck, Yeung, and Yu, 2000) indicates that the difference in firm specific information imputed into stock returns is mainly between developed and developing countries, and that U.S. and European countries, in particular large European countries, have similar amounts of firm specific information imputed into stock returns. We also note that virtually all countries in our sample, perhaps with the exception of Greece and Cyprus, are considered developed countries. And, as we previously mention, one paper that provides support for our identifying assumption is Bartram et al. (2009) which presents evidence that the difference between U.S. and foreign firms' equity volatility is due to risk taking rather than greater informed investment. Additionally, related research by Irvine and Pontiff (2009) suggests that the increase in idiosyncratic equity volatility in recent years in the United States is largely due to greater cash flow volatility, which is also a measure of borrower risk. Also John, Litov, and Yeung (2008) present results that governance structures in the U.S. favor shareholder rights as compared to Europe and are associated with greater risk taking.

In addition, in this paper we present evidence that U.S. firms have more volatile balance sheets than European firms and that more volatile balance sheets are associated with greater idiosyncratic and systematic equity volatility. While idiosyncratic equity volatility may be influenced by greater informed investment in addition to risk, we expect that greater balance

sheet volatility is primarily driven by greater risk taking. Hence, we interpret this evidence as additonal support for our claim that greater idiosyncratic equity volatility in the U.S. than in Europe largely reflects greater risk rather than other potential non-risk sources such as informed investment.

If we estimate the coefficients in equation (4) with OLS, then we would likely get biased and inconsistent coefficient estimates, since equity volatility is correlated with the error term, η_i. This is because

$$COV\left(\sigma_{Ei}, \varepsilon_{2i}\right) = VAR\left(\varepsilon_{2i}\right) = \sigma_{\varepsilon 2}^2 \neq 0 \;\; \Rightarrow \;\; COV\left(\sigma_{Ei}, \eta_i\right) = -\rho_1 \sigma_{\varepsilon 2}^2. \tag{5}$$

The relationship between equity volatility and the error term will lead to a downward biased estimate of ρ_1, even if all other control variables are exogenous. To examine the bias in the coefficients we define: $\text{plim}\frac{X^{*\prime}X^*}{n} = Q^*$ where X^* is the matrix of explanatory variables including the original σ_{Ai}. And using the inverse of this matrix we define q^{*j1} as the $(j,1)$th element in Q^{*-1}. The coefficient estimate for idiosyncratic equity volatility is:[4]

$$\text{plim}\hat{\rho}_1 = \text{plim}\frac{\widehat{\beta_1}}{\alpha_1} \;\; = \;\; \frac{{}^{\beta_1}\!/_{\alpha_1}}{1 + \sigma_{\varepsilon 2}^2 \dfrac{q^{*11}}{\alpha_1^2}} \tag{6}$$

and for leverage, D_i/A_i which is in both Equation (1) and Equation (2) the coefficient estimate is:

$$\text{plim}\hat{\rho}_2 = \text{plim}\widehat{\beta_2 - \beta_1\frac{\alpha_2}{\alpha_1}} \;\; = \;\; \left(\beta_2 - \beta_1\frac{\alpha_2}{\alpha_1}\right) - \text{plim}\left(\hat{\rho}_1\right)\sigma_{\varepsilon 2}^2\frac{q^{*21}}{\alpha_1} + \text{plim}\left(\hat{\rho}_1\right)\frac{\alpha_2 q^{*11}}{\alpha_1^2} \tag{7}$$

[4]Please see Appendix A for the derivations.

For the rest of the explanatory variables we have:

$$\text{plim}\hat{\beta}_j \quad = \quad \beta_j - \text{plim}\,(\hat{\rho}_1)\,\sigma^2_{\varepsilon 2}\frac{q^{*j1}}{\alpha_1} \qquad \text{for } j = 3, 5 \ldots, k \tag{8}$$

It is clear from these three equations that the proxy variable creates a bias not only for its own coefficient estimate, but also for other explanatory variables as well. The difference between Equation (7) and Equation (8) comes from the extra term that depends on α_2 which is the coefficient estimate for the leverage in the idiosyncratic equity volatility equation. The results in Equation (7) and Equation (8) depend on several unknowns and we cannot determine the direction of the bias.

Consistent estimates could be obtained by finding an instrumental variable correlated with equity volatility, but orthogonal to η_i. One solution is to use another variable that could be a proxy for for σ_{Ai}, but is uncorrelated with η_i.

We use proxies for the volatility of quarterly financial statement ratios and balance sheet variables as instruments for equity volatility. Our instruments include the standard deviation of total assets, the standard deviation of the ratio of total equity to total assets, and the standard deviation of cash and short term investments to assets. Our reasoning is simple. We suggest that if there is greater variation in these three variables derived from borrowers' quarterly financial statements, then investors' valuation of firms' assets should change more frequently. Hence, firms with more volatile financial statements should have more volatile asset values, and as a result, more volatile stock returns. We use these variables as instruments for both idiosyncratic and systematic equity volatility. We relate our instrumental variables to firms' asset volatility and leverage with the following equation.

$$\sigma_{\mathbf{Bi}} = \delta_0 + \delta_1 \sigma_{Ai} + \delta_2 \frac{D_i}{A_i} + \varepsilon_{3i} \tag{9}$$

In order for our instruments to identify the consistent estimates of the coefficients in equation (4), the instruments should not be correlated with the error terms ε_{2i} and ε_{1i}. As previously mentioned, we interpret ε_{2i} as the difference between our estimate of equity volatility and lenders' assessment of firm volatility. We do not suspect that there are convincing reasons why our instruments would be correlated with ε_{2i}. If our instruments are orthogonal to ε_{1i}, this would implies that our instruments are not omitted variables in the loan spread equation. However, we recognize one could argue that lenders, like equity investors, could base their assessment of firm volatility directly on estimates of the volatility of balance sheet variables. And, this would imply that measures of the volatility of balance sheet variables should be included in the regressions as explanatory variables for loan spreads, rather than as instruments of equity volatility. To the extent that stock prices reflect publicly available information we expect estimates of equity volatility should subsume the information in our instrumental variables.

II. Data Sample and Summary Statistics

We gather data from several sources. We obtain information on corporate loan contracts from the Loan Pricing Corporation's Dealscan database, data on U.S. firms' financial statements from Compustat, data from European and non-U.S. firms' financial statements from Compustat Global, data on U.S. firms' stock prices from CRSP, and data on European firms' stock prices from the Compustat Global Security Daily database. We also acquire data on interest and exchange rates from the Federal Reserve Bank of St. Louis web site.

We begin with with the Dealscan database and gather data on individual corporate loans. We have two main samples, one where we examine loans by *borrower country* and another one where we examine loans by *borrower market*. For borrower country we define the U.S. and the European samples using the location of the borrower. For borrower market we define the U.S. and the European samples using the market of syndication for the loan. Each observation is an individual corporate loan facility and consists primarily of syndicated loans.

The data in Dealscan are organized by deal and facility. A loan deal is the contract between borrower and a lender (or lenders) at a particular date, and may be composed of multiple loan facilities. In our sample about 75 percent of the deals contain one facility, and 20 percent of the loans contain two facilities. It is very likely that pricing and the loan contract terms differ across facilities within a deal, therefore we use each loan facility as one observation. Strahan (1999), Carey and Nini (2007), and Houston et al. (2007) also conduct their analysis at the loan facility level. For an overview of the syndicated loan market and the Dealscan database, see Strahan (1999).

Our data loan sample spans the years 1998 through 2010. The Dealscan database has information on a small number of loans in the late 1980's and the number of loans in the database begins to increase in the mid 1990's. There is substantial coverage of the U.S. market throughout the entire time frame while coverage of the European market is largely concentrated in late 1990's and afterwards; therefore, we begin our estimation sample in 1998. We merge Dealscan with Compustat, Compustat Global, CRSP, and Compustat Global Security Daily data for firms' fiscal years that end one year prior to the calendar year in which a loan is originated. Our resulting sample contains 16,340 loan facilities for the borrower country specification and 16,327 loan facilities for the borrower market specification.

We begin by describing the primary variables used in our analysis. The dependent variable in our estimations are corporate loan interest rate spreads. Our measure of corporate loan spreads is Dealscan's All-In-Drawn spread which is the interest rate on a corporate loan minus the LIBOR or the Euribor rate. In our robustness checks we use a sample that only uses loans that have LIBOR as a base rate. Dealscan states that the All-In-Drawn spread is a measure of the "overall cost of the loan" that "takes into account, one time and recurring fees," and is measured in basis points. As robustness check, we also acquire data on loan spreads that do not include fees.

Our first main control variables are a set of *European dummy* variables which are defined using two different classifications as previously mentioned: the borrower's country and loans' market of syndication. The first one, *European C.*, takes on a value 1 if the borrower is located in a European country, and 0 if the borrower is located in the U.S. The second one, *European M.*, takes on a value 1 if the the loan is originated in the European market, and 0 if the market of syndication is the U.S.

The coefficient on the European dummy variable is an estimate of difference in loan spreads paid by U.S. and European borrowers. To see whether these results change over time, we also experiment with separate European dummies for different time periods. Specifically, we include European dummies for the time periods: 1998-2000, 2001-2003, 20004-2006, and 2007-2010. We also do analysis using only the data from 1998 to 2007, to exclude the effects of the latest crisis period.

Panel A of Table II provides counts of the number of loans originated by borrowers located in Europe or the U.S. in our data sample, and indicates that the majority of loans are originated by borrowers located in the U.S. Although our European sample is smaller than our U.S. sample, it is relatively large compared to those used by Carey and Nini

(2007) and Houston et al. (2007).[5] Panel B tabulates the number of loans originated by borrowers located in each European country in our data sample, and indicates that the majority of European loans are originated by borrowers located in the United Kingdom, France, Germany, Spain, Netherlands, and Italy. As a robustness check, to ensure our main results do not depend on a small number of countries with a few number of observations, we also provide estimates using these six countries to define our European sample.

[PLACE TABLE II HERE]

Our next main control variables are estimates of borrowers' idiosyncratic and systematic stock return volatility. We construct our estimates of stock return volatility using data on borrowers' weekly stock returns. For U.S. firms we gather stock price data for CRSP for the final trading day of each week during a borrowers' fiscal year and construct weekly returns using the formula used by CRSP to construct daily and monthly stock returns.[6] For European firms, we gather stock price data from the Compustat Global Security Daily database for the final trading day of each week. The Compustat Global Security Daily database does not directly provide return data, so we construct weekly returns using the formula provided by Wharton Research Data Services (WRDS).[7]

[5] In addition our sample is also limited by the availability of firm level control variables.

[6] The formula used to construct weekly stock returns for U.S. borrowers is $r^s_{i,t} = \frac{p_{i,t}f_{it} - p_{i,t-1}f_{i,t-1}}{p_{i,t-1}f_{i,t-1}}$. In this formula, r^s, represents the stock return, the inverse of the cumulative split factor is denoted as f, and the price of firms shares are, p. The subscripts, i, and, t, refer to borrower and fiscal year respectively.

[7] The formula used to construct weekly stock returns for non-U.S. borrowers is is calculated in three steps. First, we convert all foreign stock prices into U.S. dollars. Second, we adjust prices by multiplying observed week-end prices by the daily total return factor and then divide this by the cumulative adjustment factor. We then calculate the weekly return as $r^s_{i,t} = \frac{p_{i,t} - p_{i,t}}{p_{i,t-1}}$. In the preceding formula, r^s, represents the stock return, the cumulative split factor is denoted as f, and the price of firms shares are, p. The subscripts, i, and, t , refer to borrower and fiscal year respectively.

We then use the constructed weekly returns to estimate the following CAPM regression model for each borrower's fiscal year:

$$r^s_{i,t,j} - r^f_{t,j} = \beta_{i,t}\left(r^m_{t,j} - r^f_{t,j}\right) + \xi_{i,t,j}. \tag{10}$$

In equation (10), $r^s_{i,t,y}$, is the weekly stock return for firm, i, during week, t, in year, j. The risk free weight, $r^f_{t,j}$, is either the weekly 1 year treasury rate for U.S. firms or the weekly 1 year LIBOR rate for foreign firms. Also, $r^m_{t,j}$, is the return on market index m, during week, t, in year, j. Each firm's yearly CAPM beta is given by $\beta_{i,t}$, and $\xi_{i,t,y}$, is the idiosyncratic component of firm's weekly stock returns. An issue arises in deciding what proxy to use for firm's market index. For U.S. firms we follow convention and calculate a value weighted index for each week using all available returns in CRSP. For European firms, we use an estimate of the value weighted return on the stock exchange that each firm trades as a proxy for the relevant market portfolio. We estimate the value weighted return using all available weekly returns for all firms in the Compustat Global Security Daily database for each week for each exchange. We drop all returns for exchanges with less than 100 available individual firm returns. Our estimate of systematic stock return volatility is, $\left(\widehat{\beta}_{i,t}\right) Std\left(r^m_{tj} - r^f_{t,j}\right)$ which is the standard deviation of the excess return on the relevant market portfolio, multiplied by $\widehat{\beta}_{i,t}$, our estimate of each firm's CAPM beta. Our estimate of firm's idiosyncratic stock return volatility is $Std\left(\xi_{i,t,j}\right)$ which is the yearly standard deviation of our estimate of each firm's weekly idiosyncratic stock returns. We annualize our measures of systematic and idiosyncratic stock return volatility by multiplying by $100 \times \sqrt{52}$.

Our next variables we discuss are our instrumental variables. We construct three instruments for equity volatility using quarterly financial statement data from Compustat and Compustat Global. The first instrument is the yearly standard deviation of the ratio of

borrowers' quarterly book equity to assets ratio. The second instrument is the yearly standard deviation of the ratio of borrowers' quarterly cash and short term investment to assets. The third instrument is the yearly standard deviation borrowers' quarterly total assets. We calculate the standard deviations using the four available quarterly observations during each firms fiscal year.

We now discus our remaining control variables. For similar discussions and examples of control variables used in the literature, see work by Santos (2011), Santos and Winton (2010), and Strahan (1999). For brevity, we do not discuss predictions regarding these variables' coefficient estimates, as these controls are standard in the literature and have been widely used in analysis similar to ours.

We construct multiple variables describing other non-price loan contract terms common in the literature. We construct a measure of loan size, which is the log of the loan facility amount in dollars. For term loans this would include the entire loan balance received by the borrower at origination, and for revolving lines of credit, this would include the amount of the line of credit that the borrower has available for future use. We create an estimate of a loan's maturity length which is the log of the difference between a loan facility's stated maturity date and start date in days. We measure the size of the loan syndicate as the number of lenders. We include dummy variables that indicate whether a loan is secured, contains performance pricing provisions, or has general and financial covenants. Since information regarding whether a loan is secured is often missing, we set missing values of the secured indicator equal to zero and include an indicator for missing values. We also include dummy variables indicating loan type and purpose.

We construct multiple control variables for borrower's risk characteristics. We include Tobin's average Q which is interpreted as the market value of firm's assets divided by the

replacement value of firm's capital stock. Tobin's Average Q is calculated as the sum of the market value of equity plus the book value of debt, all divided by total assets. We include a borrowers' market to book ratio, which we calculate as the market value of equity divided by total assets minus total liabilities plus book equity minus the book value of preferred stock. We include which we calculated as long term debt plus debt in current liabilities, all divided by total assets. We calculate a proxy for firm's cash stocks as the sum of cash and short term investments divided by total assets. We measure borrower size with the log of firm's total assets in millions. We estimate firms' age as the length of time the borrower has been in the COMPUSTAT or COMPUSTAT Global database. As is common in the literature, we use the firms' first year in Compustat to calculate firms' age because we lack sufficient information regarding firms' formation or IPO dates. We include infoermation Moody's senior unsecured debt rating at time of loan origination. We include 23 separate dummy variables for each individual rating and an indicator for borrowers without debt rating information. We also include a dummy variable that is equal to 1 for firms with a debt rating and equal to 0 for firms without a debt rating or have missing rating information. Debt ratings are directly by Dealscan and reflect the existing rating at origination. Finally, we also create dummy variables for each year and 2-digit SIC codes.

We now briefly discuss basic summary statistics for our full data samples which are located in Table III and in Table IV for borrower country and market of syndication respectively.[8] We present statistics separately for the U.S. and European subsamples and the total data sample. For each variable we report the mean, standard deviation, 25th and 75th percentiles. We briefly highlight the differences between the U.S. and European subsamples. First, examining the descriptive statistics for borrower country, we see that for borrowers located in the U.S.

[8]To limit the influence of outliers, we winsorize firm level variables at the top and the bottom one percentile.

that spreads are roughly 33 basis points higher than the spreads paid by borrowers located in Europe. The statistics indicate that U.S. borrowers' idiosyncratic equity volatility is almost 60% higher on average compared to European firms, while systematic equity volatility is about the same for both U.S. and European firms. Looking at the summary statistics for our instrumental variables, U.S. firms have greater book equity volatility and greater cash and short term investment volatility. However borrowers located in Europe have greater total asset volatility than borrowers in the U.S., which we suspect is due to the fact that European firms are slightly larger than U.S. firms on average. Next, examining the borrower market specification we get similar summary statistics as the borrower country: firms who borrow in the U.S. market pay about 39 basis points higher loan spreads that those who borrow in the European market, idiosyncratic equity volatility is almost 60% higher for the firms who borrow in the U.S. market whereas there is not much difference for the systematic equity volatility.

[PLACE TABLE III HERE]

[PLACE TABLE IV HERE]

Further examination of Table III and Table IV reveals a few other differences between European and U.S. subsamples. U.S. firms have lower debt ratings but a greater portion of U.S. firms have debt ratings. Loan syndicates have more lenders in Europe than in the U.S. Finally a larger portion of loans are collateralized, contain covenants, and have performance pricing provisions in the U.S sample. In addition, U.S. borrowers have larger values of Tobin's Q and market to book ratios and are slightly older than European borrowers. The remaining

statistics indicate that U.S. and European subsamples have similar average values for cash , leverage, loan maturity, and loan size.

III. Results

A. Main Results

We begin by describing our main results for our full data sample. We present our OLS estimates in Table V for borrower country and in Table VI for market of syndication. The results for instrumental variable estimations are in Table VII for borrower country and Table VIII for market of syndication.

In the first three columns of Table V and Table VI, we include the full set of control variables but exclude idiosyncratic or systematic stock return volatility. The results indicate that the coefficients on European dummy variables are negative and statistically significant at conventional levels. In addition, when we include European dummies for different time periods, the coefficient estimates indicate a substantially larger difference in loan spreads for the period 2001 to 2003 and a smaller gap in loan spreads from 2004 to 2006. In the fourth through sixth columns of Tables V and VI, we include the full set of control variables including idiosyncratic and systematic stock return volatility, and the results imply that the coefficients on the European dummy variables are still negative and statistically different from zero. However, these coefficient estimates are smaller in magnitude compared to those in the first through third columns.

The results in the fourth through sixth columns of also indicate that there is a positive association between idiosyncratic equity volatility and loan spreads. However, the association between systematic equity volatility and loan spreads is not statistically different from zero.

Our estimates indicate that a one standard deviation increase in idiosyncratic equity volatility is associated with roughly a 29 basis point increase in loan spreads. Overall our OLS results suggest that controlling for idiosyncratic equity volatility influences the estimates of the loan spread difference paid by European and U.S. borrowers. However the results show that equity volatility cannot fully account for the loan spread difference.

[PLACE TABLE V HERE]

[PLACE TABLE VI HERE]

We now discuss our main instrumental variable results presented in Table VII and Table VIII. The first stage estimation results for these tables are respectively in Table B.I and Table B.II in Appendix B. In the first three columns, we present estimation results with a full set of control variables, and we instrument both idiosyncratic and systematic equity volatility with our measures for quarterly balance sheet volatility: book equity volatility, cash and short term investment volatility, and total asset volatility. In the fourth through sixth columns we provide results for specifications that include idiosyncratic volatility and omit systematic volatility. We have an over-identified model and we exclude total asset volatility as an instrument, because it results in less precise coefficient estimates. Overall, the results indicate that there is no longer any statistically significant difference in loan spreads paid by U.S. and European borrowers once we control for the endogeneity of the equity volatility.

[PLACE TABLE VII HERE]

[PLACE TABLE VIII HERE]

These estimation results also show that the association between idiosyncratic equity volatility and loan spreads is about 4 to 5 times larger when compared to our OLS results. In addition, consistent with our OLS results we find that there is no statistically significant association between loan spreads and systematic volatility. Across each of the two tables, the results indicate that after accounting for the endogeneity of idiosyncratic equity volatility, the European dummies have no significant explanatory power for the loan spread differential between the U.S. and Europe.

We also present test results regarding the quality of our instrumental variables. As a general rule instrumental variables should be correlated with the endogenous variables, which are idiosyncratic equity volatility and systematic equity volatility, and at the same time orthogonal to the errors in the estimated equation. We use the under identification test to check whether the estimated equation is under identified. In Table VII and Table VIII we fail to reject the under identification tests, which implies that the excluded instruments, our measures of balance sheet volatilities, are relevant, meaning correlated with the measures of equity volatility.

Next, we would like to test whether our instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation. Since we have an over identified system, we can use Hansen-J test. Our Hansen-J test statistics show that we fail to reject that our instruments are uncorrelated with the error term.

One last check we do for our instrumental variable estimations is testing for the endogeneity of the regressors. The endogeneity test gives information regarding whether we

actually have an endogeneity problem. Our test statistics imply the rejection of the null hypothesis that measures of equity volatility can actually be treated as exogenous, and hence instrumental variable estimation is appropriately performed.

A.1. Inspecting the Instruments

In this section we present multiple robustness checks for our main results to further assess the validity of our instrumental variable estimation results. First, we use each of our measures of balance sheet volatility to estimate exactly identified instrumental variable models. The second stage results are presented in the first three columns of Table X and Table XI for borrower country and market of syndication respectively, and the first stage results are presented in the first three columns of Table B.III and Table B.IV in Appendix B.

The results indicate that when we instrument idiosyncratic equity volatility with book equity volatility or cash and short term investment volatility we obtain quantitatively similar estimates to out main IV results. However when we use total asset volatility as an instrument, even though the coefficient estimates are qualitatively similar, they have larger standard errors.

[PLACE TABLE X HERE]

[PLACE TABLE XI HERE]

Inspection of the instrumental variable estimations in the first three columns of Table X and Table XI show that both the European dummy variable and borrower size are not

statistically significant in the second stage estimates. And the first stage results in Table B.III and Table B.IV indicate that these variables are statistically significant in the first stage estimates. If these variables are uncorrelated with the residuals in our empirical model, then we expect that these variables may be suitable instrumental variables for equity volatility. Therefore, if this is the case, then using the European dummy variable and borrower size as instrumental variables should provide estimates that are similar to our previous instrumental variable results.

We present these results in the forth and fifth columns of Table X and Table XI. In the forth column we include only total assets as an instrument, and in the fifth column we include the European dummy as the only instrument. In both of these specifications, we also include our measures of balance sheet volatility as independent variables. The results in the forth and fifth columns are again similar to our previous IV results. Overall, these results provide additional confirmation that the observed difference in loan spreads paid by the U.S. and European borrowers in our OLS model and previous research can be accounted for by U.S. borrowers' greater idiosyncratic equity volatility.

It is also important to note that the coefficient estimates for the balance sheet volatility measures are not significant in our second stage estimates, and they do not have explanatory power for the loan spread differential between the U.S. and European borrowers beyond their correlation with idiosyncratic equity volatility.

Taken together, these robustness checks indicate that multiple sets of instrumental variables generate similar coefficient estimates of the empirical association between equity volatility and corporate loan spreads. We suggest that these results imply that our primary results presented in Table VII and Table VIII are not due to luck, data mining, or any particular bias generated by a particular instrumental variable. In addition, our results suggest that

multiple instrumental variables can be used to identify an association between idiosyncratic equity volatility and corporate loan spreads that accounts for the difference in average loan spreads between loans originated by U.S. and European borrowers.

A.2. Results for Additional Control Variables

In this subsection we describe how our instrumental variable estimates differ from OLS estimates for our remaining control variables. We emphasize that if our OLS estimates of the association between equity volatility and syndicated loan spreads are biased and inconsistent, then all of the remaining estimates could be biased and inconsistent.

Our OLS results in Table V and Table VI are generally consistent with those found by previous research examining the determinants of syndicated loan spreads. We find that larger firm size, higher Tobin's Q, older firms, and lower leverage are associated with lower loan spreads. Market-to-book ratio does not have explanatory power in explaining the loan spreads, and does not have a significant coefficient estimate in most of our specifications. Our results also indicate that larger loans are associated with lower loan spreads.

For multiple control variables our instrumental variable estimates differ markedly from our OLS estimates. Our instrumental variable estimates in Table VII and Table VIII indicate that there is no longer any statistically significant association between borrower size and loan spreads. This contrasts with much of the corporate finance literature which assumes that larger size is associated with lower risk and asymmetric information problems. Contrary to our OLS results, our instrumental variable results also show that age does not have a statistically significant association with loan spreads after controlling for volatility.

Likewise compared to OLS results the coefficient on leverage is also smaller in the IV results. The parameter estimates on the remaining control variables are largely unchanged:

market-to-book ratio does not have a statistically significant relation with loan spread; firms higher Tobin's Q and larger loans have lower loan spreads.

An interesting results is that the coefficient for borrowers' cash-to-assets is positive and statistically significant in the OLS estimates. This coefficient estimate appears to be at odds with intuition, as we would expect that borrowers with more cash and liquid assets should be able to more easily service debt payments. However studies by McLean (2011) and Riddick and Whited (2009) suggest that riskier firms hold more cash. In addition Acharya, Davydenko, and Strebulaev (2011) also argue that firms with higher cash holdings should be safer and have lower credit spreads. However they observe a positive association between cash holdings and credit spreads, and they argue that this is because riskier firms hold more cash for precautionary motives. Consequently, the positive coefficient estimate could imply that we do not adequately control for volatility or risk in our OLS models.

The coefficient on borrowers' cash and short term investment is negative and statistically significant in our instrumental variable estimations. This contrasts with the positive and statistically significant coefficient found in our OLS specification. Our results provide a solution to the puzzle that credit spreads and cash holdings are positively correlated as suggested by Acharya, Davydenko, and Strebulaev (2011). The OLS coefficient estimates are likely biased upward due to the positive correlation between idiosyncratic equity volatility and cash holdings. The first stage results in Table B.I and Table B.II support this claim because they show that cash holdings have a strong positive association with idiosyncratic equity volatility.

B. Robustness Analysis

B.1. U.S. and European Subsamples

U.S. borrowers compose the majority of our main data sample, and as we note in the data section, there appear to be systematic differences between U.S. and European borrowers. To examine whether either the U.S. our European subsamples overly influence our main results, we re-estimate our main specifications separately for the U.S. and European sub-samples. The second stage results are presented in Table IX, and the first stage results are presented in Table B.V in Appendix B. We use borrower country in the first two columns and market of syndication in the last two columns to determine the European and U.S. sub-samples. These results suggest that idiosyncratic equity volatility has a large and meaninful association with loan spreads for both our U.S. and European sub-samples. However, because of the samller European sample size as compared to the U.S. sample, the European coefficient estimates are less precise than the U.S. estimates.

[PLACE TABLE IX HERE]

B.2. Matching Regressions

Next, to further examine whether systematic differences between our U.S. and European sub-samples influence our main results, we re-estimate our main specifications using a sample of U.S. borrowers matched to European borrowers using propensity score matching techniques.[9] This method allows us to obtain a sample of U.S. and European borrowers that are similar on average in multiple dimensions. We match the U.S. borrowers to european borrowers

[9]See Bartram, Brown, and Stulz (2009), Bartram, Brown, and Conrad (2011),Dehejia and Wahba (2002).

using all firm risk characteristics except for idiosyncratic and systematic equity volatility. These include our measures of borrower cash holdings, age, Tobin's Q, leverage, size, and market-to-book ratio. We also include our individual debt rating dummies and 2-digit industry dummies. We match U.S. borrowers to European borrowers because of the larger U.S. sample size. In our propensity score matching methodology we first estimate logit models where the dependent variables are our European dummys. We obtain matched samples for both borrower country and market of syndication subsamples. We use the logit results to estimate the propensity scores, and match firms without replacement using a caliper of 0.005. We use matdching without replacement because the U.S. sample is large relative to the European sample, which likely allows us to find a close U.S. matched observation for each European observation. Also, in comparison to matching with replacement, matching without replacement should result in more precise estimation results Dehejia and Wahba (2002). However, we note that all of our results are robust to using alternative matching methodologies.

In Table XII, for borrower country, and Table XIII, for market of syndication, we provide summary statistics regarding the means and standard deviations for the variables we use to match our U.S. and European samples in addition to our propensity score estimates, our esitmates of idiosyncratic and systemtic equity volatility, our measures of balance sheet volatility, and corporate loan spreads. The p-values are for the t-tests regarding the differences in means across the U.S. and Europe subsamples. We provide statistics for both our full estimation samples and our matched subsamples.

The statistics in Table XII and Table XIII indicate that we closely match the U.S. and the European borrowers given the borrower characteristics. There are no statistically significant differences on average in the matched samples for the variables we use to match U.S. and

European borrowers. Similarly, the average propensity score estimates for the probability of being in the European samples do not differ between U.S. and European borrowers. However, the statistics indicate that for both of our matched samples, that U.S. borrowers have greater idiosyncratic equity volatility, balance sheet volatility, and also pay greater loan spreads on average. These statistics support the claim that the difference in idiosyncratic equity volatility, balance sheet volatility, and loan spreads between our full U.S. and European samples is not due to differences in the sample composition.

In Table XIV and Table XV we present OLS and instrumental variable estimation results for using our matched smaples based on borrower location and market of syndication respectively. For brevity and to obtain more precise estimates, we only present results for specifications with our full set of control variables where we omit systematic equity volatility. In the first three columns we present OLS estimation results and in the forth through sixth columns we present instrumental variable etimation results. Both the OLS and IV results are qualitatively identical to our main estimation results. The OLS results indicate that the coefficient on each of our European dummy variables are negative and statistically different from zero, and IV results indicate that coefficient on each of our European dummy variables is not statistically different from zero. In addition, the coefficients on idiosyncratic equity volatility are again qualitatively similar to our main results.

[PLACE TABLE XIV HERE]

[PLACE TABLE XV HERE]

The main difference between the matched sample and the full sample results is that the standard errors of several coefficients are larger in the matched samples which is likely due

to lower statistical power in our smaller matched samples. The cash coefficient is no longer statistically significant and the average Q coefficient is only statistically different from zero at the 5 percent level compared to the 1 percent level in the main instrumental variable results.

B.3. Cross Country Characteristics

In this section we investigate whether cross country differences in investor protection and stock market development, that have been shown to be related to idiosyncratic equity volatility, are associated with syndicated loan spreads and idiosyncratic equity volatility in our data sample. Our set of legal variables include a measure of creditor rights taken from Djankov, Hart, McLiesh, and Shleifer (2008). This variable is motivated by Qian and Strahan (2007) and Bartram et al. (2009). We also use variables for investors' legal protection that are taken from Porta, de Silanes, and Shleifer (2008). These variables include measures of stock market investor protection, disclosure requirements, liability standards, and common law. We motivate these variables with the analysis of Bartram et al. (2009). We also use three measures of stock market development which include stock market capitalization to GDP ratio, total stock trading volume over GDP, and stock turnover. The inclusion of these variables is motivated by Bartram et al. (2009) and Bekaert et al. (2012). We obtain these variables from the World Bank's World Development Indicators (WDI) dataset.

We present summary statistics for the legal and stock market development variables in Table XVI. As can be seen from the summary statistics there are differences between the U.S. and the European countries. Creditor protection is higher in the U.S. whereas investor protection is higher in Europe. Also, the statistics indicate that U.S. stock markets are more developed in the U.S. than in Europe.

We present the estimation results in Table XVII, where we use the full sample in the top panel, and the matched sample of U.S. and European borrowers' in the bottom panel. For both samples, OLS results show that greater protections of stock market investor rights and stock market development are associated with greater loan spreads. In our full sample we find that greater creditor rights are associated with lower loan spreads, which is consistent with the findings of Qian and Strahan (2007), however in the matched sample, we do not find a significant association between creditor rights and loan spreads.

In addition, consistent with our previous results, equity volatility has a positive and statistically significant association with loan spreads. In contrast, in the the instrumental variable results, none of the legal or stock market development variables have a statistically significant association with loan spreads, and the coefficients on equity volatility are similar to our previous results. Taken together, these results suggest that there are economically meaningful differences between U.S. and European countries that may partially explain why U.S. firms are, on average, more volatile and have a greater cost of debt financing.

[PLACE TABLE XVI HERE]

[PLACE TABLE XVII HERE]

B.4. Default

In this section we examine whether our main results are robust to including estimates of firm default probabilities from the Kamakura Risk Information service as additional explanatory

variables. In Table XVIII we present results for both a full sample that includes all available U.S. and European observations and another that includes a matched sample of U.S. and European observations. In the OLS results, the default probability estimates have a positive and statistically significant association with loan spreads for the full sample. However, in the matched sample, the Merton model estimates have weak or no statistically significant association with loan spreads. Our main coefficient estimates of interest still have the expected signs, the coefficient estimates on the European dummy variables are negative and statistically significant, and the coefficients on idiosyncratic equity volatility are positive and statistically significant.

In the instrumental variable results, the coefficient estimates for the Kamakura default probability estimates are not statistically significant from zero and the Merton model coefficient estimates are negative and statistically different from zero. It is not intuitive that there is a negative association between the Merton model estimates and loan spreads. We expect that since the Merton model estimates are not directly calibrated to historical defaults, that the Merton model probabilities are likely correlated with a portion of equity volatility that is unrelated to borrower risk. This likely results in the negative coefficients we observe in our instrumental variable estimates. This would arise if the Merton default probability estimates appeared in equation (5) after controlling for asset volatility and leverage. The Kamakura default estimates are derived by projecting historical defaults onto estimates of equity volatility and other observable risk characteristics; therefore, we expect that the Kamakura default estimates would likely not appear in (5) after controlling for asset volatility and leverage.

[PLACE TABLE XVIII HERE]

B.5. Small European Sample

In Table XIX we present results for a subsample of our six largest European countries in order assess whether our results are driven by less representative countries. Following the distribution of borrower countries in Table II, we limit our European sample to include only the borrowers that are located in United Kingdom, France, Germany, Spain, Netherlands, and Italy. The results indicate that OLS estimates for our European country dummies are negative and statistically different from zero. In the IV estimates, the European dummies have coefficients that are not statistically different from zero, and the coefficients for idiosyncratic equity volatility are statistically significant and similar to our previous results. These results indicate that our main results are not driven by a subset of loans to less representative European borrowers.

[PLACE TABLE XIX HERE]

B.6. Currency, Base Rate, and Fees

In this section we present results for three sets of robustness checks. In our first set we estimate our main model for a subset of loans denominated in U.S. dollars. The currency in which a loan is denominated might have an influence on the loan spread for two reasons. First, if arbitrage is not sufficient, the covered interest parity condition may not hold, which could create a difference in loan spreads. However, Carey and Nini (2007) indicate that it is likely that the covered interest parity condition is satisfied in the syndicated corporate loan market. A second reason is that there could be an expected future depreciation of the currency the loan is denominated in, which could also create a difference in loan spreads,

even if the covered interest parity condition holds.[10] To mitigate these concerns, we re-estimate our main specifications only with the loans that are denominated in U.S. dollars, and the results are in Table XX. Again, the results are the same as our main results. Interest rate spreads are larger in the U.S. compared to Europe in our OLS estimates, and our instrumental variable results indicate no difference in interest rate spreads.

As a second robustness check, we redo our main estimations by using a sample of loans where the loan spreads are a markup over LIBOR, because some of the loan spreads in our sample are defined over Euribor as opposed to LIBOR. Our results are in Table XXI. Again, in our OLS results we find that loan spreads are greater in the U.S. and in our instrumental variable results we do not find a statistically significant difference in loan spreads between the U.S. and Europe.

As a third robustness check we replicate our main results using the interest rate spreads without fees. The results are presented in Table XXII and are also consistent with our previous findings. Our OLS results indicate that European borrowers pay significantly lower spreads on average than U.S. borrowers, and in our instrumental variable results we do not find we find a significant difference in loan spreads between the U.S. and Europe.

[PLACE TABLE XX HERE]

[PLACE TABLE XXI HERE]

[PLACE TABLE XXII HERE]

[10] We also examine, but do not report, the ratio of month end Euro/Dollar and Pound/Dollar forward and spot exchange rates to examine whether there were any signifcant expected future depreciations over our sample period which could materially affect our results. This analysis did not reveal any substantial expected future depreciations during our sample period, which we take as support for the claim that loan currency likely does not have a meaningful impact on our main results.

B.7. Loan Contract Terms

As we mention earlier, our main specifications exclude loan contract terms as explanatory variables, because they might be endogenous and result in biased and inconsistent coeffcient estimates. In this section we include non-price loan contract terms in our estimations to examine whether they influence our main results. Specifically we include the number of lenders in a loan syndicate, the maturity of the loan, a dummy for whether a loan is secured, a dummy for whether a loan has performance pricing, and dummies for loans with general and financial covenants. The results are presented in Table XXIII. Our OLS results show that loan spreads are significantly lower in Europe, and our IV results indicate no significant loan spread differential between U.S. and European borrowers. In addition, the coeffcient estimates for idiosyncratic equity volatility are positive and statistically significant, but slightly smaller than those in our previous results.

[PLACE TABLE XXIII HERE]

IV. Conclusion

This paper examines whether idiosyncratic equity volatility can account for the average difference in corporate loan spreads paid by U.S. and European borrowers observed by previous research. We present evidence that OLS estimates of the association between loan spreads and systematic and idiosyncratic equity volatility are likely biased and inconsistent. We use an instrumental variable estimator that can potentially identify consistent estimates of the association between loan spreads and equity volatility. Our main IV results indicate that

there is no statistically significant difference in corporate loan spreads paid by U.S. and European borrowers, and that OLS estimates of the association between idiosyncratic equity volatility and loan spreads is downward biased by a factor of about 5.

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Table I: **Borrower Region and Market of Syndication**

This table tabulates borrowers' location against loans' market of syndication. "Other" market of syndication includes Africa, Asia Pacific, Eastern Europe/Russia, Latin America/Caribbean, and Unknown.

	Market of Syndication			
Borrower Region	United States	Western Europe	Other	Total
United States	14,698	49	11	14,758
Western Europe	42	1,529	11	1582
Total	14,740	1,578	22	16,340

Table II: **Distribution of Borrower Location**

This table tabulates the number of loans by borrower location. Panel A provides counts of the number of loans originated by borrowers located in Europe or the U.S. Panel B tabulates the number of loans originated by borrowers located in each European country in our data sample.

Panel A: Number of Loans by Borrower Location

	Frequency	Percentage
United States	14,758	90.32
Europe	1,582	9.68

Panel B: Number of Loans by Borrower Country for Firms Located in Europe

	Frequency	Percentage
United Kingdom	615	38.87
France	215	13.59
Germany	188	11.88
Spain	146	9.23
Netherlands	110	6.95
Italy	108	6.83
Sweden	53	3.35
Ireland	46	2.91
Norway	30	1.90
Finland	18	1.14
Belgium	16	1.01
Denmark	12	0.76
Greece	10	0.63
Luxembourg	5	0.32
Portugal	4	0.25
Switzerland	3	0.19
Austria	2	0.13
Cyprus	1	0.06

Table III: **Descriptive Statistics - Borrower Country**

The sample consists of 16,340 loan facilities over the period 1998-2010. European sample is defined using the borrower country. Information on loan contract terms are from the Loan Pricing Corporation's Dealscan database, data on U.S. firms' financial statements from Compustat, data for non-U.S. firms' financial statements from Compustat Global, data on U.S. firms stock prices from CRSP, and data on non-U.S. firms stock price from the Compustat Global Security Daily database. P(25) is the 25th percentile and P(75) is the 75th percentile.

	US				Europe				Total			
	Mean	Std. Dev.	P(25)	P(75)	Mean	Std. Dev.	P(25)	P(75)	Mean	Std. Dev.	P(25)	P(75)
All-in-Drawn Spread	200.68	149.39	87.5	275	167.73	176.33	50	225	197.49	152.51	75	275
Idio. Vol.	45.56	23.04	28.14	58.51	28.77	11.85	20.15	34.26	43.94	22.75	26.78	56.36
Syst. Vol.	17.44	13.63	8.09	22.59	16.69	11.39	9.12	21.42	17.36	13.43	8.21	22.52
Book Equity Vol.	7.49	9.6	2.32	8.35	6.15	9.35	1.43	6.91	7.36	9.59	2.24	8.17
Cash & STI Vol.	4.93	6.52	1.01	6	4.37	6.78	0.94	4.87	4.87	6.55	1	5.87
Asset Vol.	62282.45	294574.28	2465.97	33588.15	248351.48	1250000	3878.48	89260.63	80297.21	482372.06	2583.87	37347.55
Cash	0.07	0.09	0.01	0.09	0.06	0.07	0.02	0.08	0.07	0.09	0.01	0.09
Age	2.39	0.48	2.08	2.77	2.31	0.56	1.95	2.77	2.38	0.49	2.08	2.77
MB	1.47	1.64	0.61	1.68	1.43	1.83	0.53	1.49	1.47E+00	1.66	0.6	1.67
Average Q	1.48	1.07	0.82	1.73	1.29	1.15	0.69	1.36	1.46	1.08	0.81	1.69
Leverage	0.3	0.21	0.14	0.42	0.3	0.18	0.16	0.41	0.3	0.21	0.15	0.42
Size	6.84	1.92	5.48	8.16	7.83	2.04	6.4	9.14	6.94	1.95	5.57	8.26
Maturity	6.99	0.72	6.59	7.51	7.29	0.68	7	7.71	7.02	0.72	6.59	7.51
Amount	18.58	1.66	17.62	19.77	19.52	1.52	18.55	20.67	18.67	1.67	17.73	19.81
No. Lenders	1.86	0.84	1.1	2.48	2.27	0.82	1.61	2.94	1.9	0.85	1.1	2.56
Secured	0.53	0.5	0	1	0.21	0.41	0	0	0.5	0.5	0	1
Performance	0.51	0.5	0	1	0.15	0.36	0	0	0.48	0.5	0	1
General Cov.	0.64	0.48	0	1	0.05	0.23	0	0	0.59	0.49	0	1
Financial Cov.	0.69	0.46	0	1	0.05	0.23	0	0	0.63	0.48	0	1
N	14,758				1,582				16,340			

Table IV: **Descriptive Statistics - Borrower Market**

The sample consists of 16,327 loan facilities over the period 1998-2010. European sample is defined using market of syndication. Information on loan contract terms are from the Loan Pricing Corporation's Dealscan database, data on U.S. firms' financial statements from Compustat, data for non-U.S. firms' financial statements from Compustat Global, data on U.S. firms stock prices from CRSP, and data on non-U.S. firms stock price from the Compustat Global Security Daily database. P(25) is the 25th percentile and P(75) is the 75th percentile.

	US				Europe				Total			
	Mean	Std. Dev.	P(25)	P(75)	Mean	Std. Dev.	P(25)	P(75)	Mean	Std. Dev.	P(25)	P(75)
All-in-Drawn Spread	201.15	149.67	87.5	275	162.3	172.97	50	225	197.39	152.51	75	275
Idio. Vol.	45.57	23.01	28.17	58.47	28.67	12.04	20.01	34.26	43.93	22.74	26.8	56.32
Syst. Vol.	17.45	13.62	8.1	22.62	16.45	11.22	9.07	21.06	17.35	13.41	8.21	22.52
Book Equity Vol.	7.49	9.61	2.32	8.35	6.14	9.24	1.47	6.91	7.36	9.59	2.24	8.18
Cash & STI Vol.	4.92	6.52	1.01	5.99	4.43	6.9	0.94	4.9	4.88	6.56	1	5.87
Asset Vol.	62205.54	294629.27	2465.55	33566.06	249135.96	1250000	3987.61	89260.63	80283.76	482555.12	2584.35	37248.93
Cash	0.07	0.09	0.01	0.09	0.06	0.07	0.02	0.08	0.07	0.09	0.01	0.09
Age	2.39	0.48	2.08	2.77	2.31	0.57	1.95	2.77	2.38	0.49	2.08	2.77
MB	1.47	1.65	0.61	1.68	1.41	1.75	0.54	1.5	1.47	1.66	0.6	1.67
Average Q	1.48	1.07	0.82	1.73	1.29	1.13	0.7	1.38	1.46	1.08	0.81	1.69
Leverage	0.3	0.21	0.14	0.42	0.3	0.18	0.17	0.41	0.3	0.21	0.15	0.42
Size	6.84	1.92	5.48	8.16	7.84	2.03	6.4	9.18	6.94	1.95	5.57	8.26
Maturity	6.99	0.72	6.59	7.51	7.29	0.68	7	7.77	7.02	0.72	6.59	7.51
Amount	18.58	1.66	17.62	19.78	19.52	1.52	18.52	20.66	18.67	1.67	17.73	19.81
No. Lenders	1.86	0.84	1.1	2.48	2.29	0.82	1.61	2.94	1.9	0.84	1.1	2.56
Secured	0.53	0.5	0	1	0.21	0.41	0	0	0.5	0.5	0	1
Performance	0.51	0.5	0	1	0.16	0.37	0	0	0.48	0.5	0	1
General Cov.	0.64	0.48	0	1	0.07	0.25	0	0	0.59	0.49	0	1
Financial Cov.	0.69	0.46	0	1	0.07	0.25	0	0	0.63	0.48	0	1
N	14,748				1,549				16,327			

Table V: **OLS Results for Borrower Country**

The dependent variable in OLS regressions is the all-in-drawn spread on the loan. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	Without Volatility			With Volatility		
	(1)	(2)	(3)	(4)	(5)	(6)
European C.	-59.69***			-47.13***		
	5.03			4.83		
EC 98-00		-55.10***			-37.47***	
		11.31			11.26	
EC 01-03		-90.26***			-71.86***	
		7.87			7.51	
EC 04-06		-43.48***			-34.48***	
		7.97			7.65	
EC 07-10		-58.57***			-47.73***	
		8.92			8.75	
EC 98-07			-53.63***			-40.80***
			5.35			5.12
Idio. Vol.				1.29***	1.28***	1.28***
				0.08	0.08	0.08
Syst. Vol.				-0.04	-0.04	-0.02
				0.12	0.12	0.12
Cash	78.29***	78.64***	84.45***	50.78***	51.29***	54.39***
	16.50	16.49	16.44	16.06	16.05	16.16
Age	-22.45***	-22.40***	-20.53***	-17.21***	-17.26***	-15.03***
	3.57	3.58	3.69	3.48	3.49	3.55
MB	1.37	1.35	2.27*	1.56	1.55	2.39*
	1.26	1.25	1.32	1.19	1.19	1.26
Average Q	-17.38***	-17.34***	-17.47***	-17.71***	-17.70***	-17.97***
	1.82	1.82	1.88	1.75	1.75	1.83
Leverage	102.14***	101.68***	97.59***	89.30***	89.09***	87.14***
	8.43	8.39	8.87	8.06	8.03	8.48
Size	-8.93***	-8.75***	-8.79***	-6.57***	-6.48***	-6.68***
	1.38	1.40	1.45	1.36	1.37	1.42
Amount	-20.48***	-20.52***	-21.63***	-17.96***	-18.00***	-19.00***
	1.25	1.26	1.30	1.24	1.25	1.30
R^2	0.234	0.236	0.266	0.265	0.266	0.297
N	16340	16340	14206	16340	16340	14206

* p<.10, ** p<.05, *** p<.01

Table VI: **OLS Results for Market of Syndication**

The dependent variable in OLS regressions is the all-in-drawn spread on the loan. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	Without Volatility			With Volatility		
	(1)	(2)	(3)	(4)	(5)	(6)
European M.	-62.85***			-50.61***		
	4.90			4.69		
EM 98-00		-55.22***			-37.73***	
		11.21			11.17	
EM 01-03		-90.10***			-71.94***	
		7.80			7.43	
EM 04-06		-48.71***			-39.98***	
		7.59			7.27	
EM 07-10		-61.88***			-51.62***	
		8.87			8.66	
EM 98-07			-56.27***			-43.73***
			5.16			4.92
Idio. Vol.				1.29***	1.28***	1.27***
				0.08	0.08	0.08
Syst. Vol.				-0.05	-0.05	-0.02
				0.12	0.12	0.12
Cash	79.28***	79.20***	86.42***	51.72***	51.85***	55.94***
	16.52	16.50	16.48	16.06	16.05	16.19
Age	-22.67***	-22.66***	-20.83***	-17.44***	-17.53***	-15.38***
	3.57	3.59	3.69	3.49	3.51	3.56
MB	1.29	1.29	2.17*	1.51	1.50	2.30*
	1.25	1.25	1.31	1.19	1.18	1.25
Average Q	-17.40***	-17.39***	-17.47***	-17.73***	-17.76***	-17.98***
	1.82	1.82	1.88	1.75	1.75	1.82
Leverage	102.94***	102.45***	98.70***	90.11***	89.89***	88.17***
	8.41	8.39	8.84	8.04	8.03	8.46
Size	-8.82***	-8.70***	-8.62***	-6.46***	-6.42***	-6.52***
	1.39	1.40	1.45	1.36	1.37	1.42
Amount	-20.44***	-20.46***	-21.65***	-17.92***	-17.94***	-19.00***
	1.25	1.27	1.31	1.24	1.25	1.30
R^2	0.236	0.237	0.267	0.266	0.267	0.298
N	16327	16327	14204	16327	16327	14204

* p<.10, ** p<.05, *** p<.01

Table VII: **Main IV Results for Borrower Country**

The dependent variable in IV regressions is the all-in-drawn spread on the loan. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates. The instruments used for each column are specified in the *Instruments Used* panel. *Under-Id* test has the null hypothesis that the equation is under identified, so rejection of this test implies that the excluded instruments are relevant, meaning correlated with the endogenous regressors. Null Hypothesis for *Hansen J* test is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.

	Both Volatilities			Only Idio. Volatility		
	(1)	(2)	(3)	(4)	(5)	(6)
Europ European C.	-7.36			-0.20		
	13.23			10.12		
EC 98-00		20.81			29.22	
		19.82			18.83	
EC 01-03		-11.30			-2.32	
		18.79			15.08	
EC 04-06		-4.90			-0.53	
		11.06			10.23	
EC 07-10		-15.02			-7.16	
		16.12			12.20	
EC 98-07			9.12			5.99
			15.14			11.19
Idio. Vol.	5.02***	5.05***	6.35***	6.10***	6.09***	5.92***
	1.64	1.61	1.72	0.90	0.90	0.95
Syst. Vol.	1.93	1.87	-0.73			
	3.03	3.01	3.04			
Cash	-59.46*	-58.93*	-55.33*	-54.10*	-53.77*	-56.75*
	30.87	30.88	32.82	28.47	28.45	30.37
Age	1.67	1.48	5.71	2.69	2.41	5.29
	5.17	5.13	6.09	5.50	5.48	6.16
MB	2.10	2.08	2.90*	2.30*	2.28	2.84*
	1.41	1.42	1.51	1.39	1.39	1.48
Average Q	-20.31***	-20.37***	-19.41***	-19.09***	-19.21***	-19.90***
	2.96	2.93	3.23	2.28	2.28	2.38
Leverage	52.28***	52.23***	44.79**	41.66***	42.01***	49.40***
	19.14	18.86	21.33	13.38	13.28	12.64
Size	-3.14	-3.14	2.72	1.85	1.67	0.79
	7.78	7.69	7.96	2.33	2.30	2.40
Amount	-9.38***	-9.31***	-8.93***	-8.46***	-8.42***	-9.32***
	2.30	2.28	2.58	2.36	2.37	2.55
Instruments Used						
Cash and Short Term Inv. Vol.	YES	YES	YES	YES	YES	YES
Book Equity Vol.	YES	YES	YES	YES	YES	YES
Total Asset Vol.	YES	YES	YES			
N	16340	16340	14206	16340	16340	14206
Under-Id	0.000	0.000	0.000	0.000	0.000	0.000
Hansen J	0.985	0.998	0.803	0.864	0.855	0.869
Endog	0.000	0.000	0.000	0.000	0.000	0.000

* p<.10, ** p<.05, *** p<.01

Table VIII: **Main IV Results for Market of Syndication**

The dependent variable in IV regressions is the all-in-drawn spread on the loan. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates. The instruments used for each column are specified in the *Instruments Used* panel. *Under-Id* test has the null hypothesis that the equation is under identified, so rejection of this test implies that the excluded instruments are relevant, meaning correlated with the endogenous regressors. Null Hypothesis for *Hansen J* test is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.

	Both Volatilities			Only Idio. Volatility		
	(1)	(2)	(3)	(4)	(5)	(6)
Europ European M.	-10.46			-4.05		
	12.59			9.98		
EM 98-00		20.78			29.49	
		19.89			18.87	
EM 01-03		-10.78			-2.15	
		18.15			15.06	
EM 04-06		-10.07			-6.52	
		10.26			9.96	
EM 07-10		-20.14			-12.72	
		15.32			11.88	
EM 98-07			5.75			2.88
			14.50			11.05
Idio. Vol.	5.11***	5.10***	6.41***	6.17***	6.16***	5.98***
	1.65	1.61	1.73	0.91	0.91	0.97
Syst. Vol.	1.90	1.92	-0.73			
	3.06	3.02	3.07			
Cash	-60.75*	-60.55*	-57.45*	-55.56*	-55.22*	-58.74*
	31.11	31.18	33.31	28.82	28.76	30.92
Age	1.83	1.58	5.51	2.77	2.46	5.12
	5.23	5.19	6.14	5.57	5.55	6.20
MB	2.11	2.08	2.87*	2.31*	2.29	2.81*
	1.42	1.42	1.52	1.40	1.40	1.49
Average Q	-20.38***	-20.52***	-19.49***	-19.18***	-19.33***	-19.98***
	2.98	2.94	3.25	2.30	2.31	2.40
Leverage	52.21***	52.73***	44.77**	41.79***	42.26***	49.39***
	19.35	18.89	21.57	13.49	13.38	12.78
Size	-2.82	-3.09	2.92	2.07	1.83	1.00
	7.83	7.67	8.03	2.35	2.33	2.42
Amount	-9.19***	-9.14***	-8.70***	-8.25***	-8.19***	-9.10***
	2.35	2.32	2.62	2.39	2.40	2.59
Instruments Used						
Cash and Short Term Inv. Vol.	YES	YES	YES	YES	YES	YES
Book Equity Vol.	YES	YES	YES	YES	YES	YES
Total Asset Vol.	YES	YES	YES			
N	16327	16327	14204	16327	16327	14204
Under-Id	0.000	0.000	0.000	0.000	0.000	0.000
Hansen J	0.993	0.984	0.797	0.839	0.826	0.866
Endog	0.000	0.000	0.000	0.000	0.000	0.000

* p<.10, ** p<.05, *** p<.01

Table IX: **IV Results for the U.S. and Europe**

The dependent variable in IV regressions is the all-in-drawn spread on the loan. First and third columns are the sample for U.S., and second and forth columns are for the European sample. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates. The instruments used for each column are specified in the *Instruments Used* panel. *Under-Id* test has the null hypothesis that the equation is under identified, so rejection of this test implies that the excluded instruments are relevant, meaning correlated with the endogenous regressors. Null Hypothesis for *Hansen J* test is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.

	Borrower Country		Borrower Market	
	U.S.	Europe	U.S.	Europe
Idio. Vol.	5.15***	8.25***	5.27***	5.75*
	0.84	2.99	0.85	3.02
Cash	-32.28	-49.37	-35.72	-55.33
	27.39	65.89	27.78	59.69
Age	-0.53	4.21	-0.83	5.50
	5.86	10.55	5.96	9.54
MB	2.56*	2.18	2.66*	0.88
	1.40	2.37	1.41	2.09
Average Q	-20.97***	-5.25	-21.37***	-6.18
	2.21	4.69	2.25	4.18
Leverage	44.19***	62.18**	41.92***	73.43***
	13.61	29.21	13.77	25.99
Size	0.46	2.37	0.76	-1.92
	2.26	5.62	2.31	5.11
Amount	-10.69***	-1.76	-10.32***	-3.60
	2.39	3.55	2.44	3.24
Instruments Used				
Cash and Short Term Inv. Vol.	YES	YES	YES	YES
Book Equity Vol.	YES	YES	YES	YES
N	14758	1582	14748	1579
Under-Id	0.000	0.001	0.000	0.001
Hansen J	0.568	0.019	0.537	0.010
Endog	0.000	0.042	0.000	0.193

* p<.10, ** p<.05, *** p<.01

Table X: **Robustness of Instruments using Borrower Country**

The dependent variable in IV regressions is the all-in-drawn spread on the loan. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates. The instruments used for each column are specified in the *Instruments Used* panel. *Under-Id* test has the null hypothesis that the equation is under identified, so rejection of this test implies that the excluded instruments are relevant, meaning correlated with the endogenous regressors. Null Hypothesis for *Hansen J* test is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.

	(1)	(2)	(3)	(4)	(5)
European C.	-0.63	1.55	-12.29	-11.63	
	10.40	14.53	19.95	10.23	
Idio. Vol.	6.06***	6.28***	4.86**	4.90***	6.09***
	0.94	1.38	1.92	0.84	0.55
Book Equity Vol.				0.20	-0.01
				0.26	0.23
Cash & STI Vol.				0.20	0.07
				0.33	0.34
Asset Vol.				-0.00	-0.00
				0.00	0.00
Size	1.79	2.19	-0.32		2.17
	2.35	3.09	3.90		2.08
Cash	-53.10*	-57.95	-27.16	-37.07	-55.95**
	28.96	36.74	46.62	24.92	24.66
Age	2.42	3.34	-2.49	-1.15	2.54
	5.71	6.76	8.43	4.68	4.34
MB	2.29*	2.33	2.11	2.19*	2.30*
	1.39	1.42	1.31	1.28	1.39
Average Q	-19.07***	-19.13***	-18.74***	-19.15***	-19.11***
	2.27	2.33	2.11	2.03	2.28
Leverage	42.09***	39.87**	53.94**	52.58***	41.87***
	13.55	17.21	21.42	11.77	11.67
Amount	-8.57***	-8.13***	-10.92***	-10.89***	-8.64***
	2.43	3.08	3.84	2.76	1.90
Instruments Used					
Cash and Short Term Inv. Vol.	YES				
Book Equity Vol.		YES			
Total Asset Vol.			YES		
Total Assets				YES	
European Dummy					YES
N	16340	16340	16340	16340	16340
Under-Id	0.000	0.000	0.000	0.000	0.000
Endog	0.000	0.000	0.052	0.000	0.000

* p<.10, ** p<.05, *** p<.01

Table XI: **Robustness of Instruments using Market of Syndication**

The dependent variable in IV regressions is the all-in-drawn spread on the loan. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates. The instruments used for each column are specified in the *Instruments Used* panel. *Under-Id* test has the null hypothesis that the equation is under identified, so rejection of this test implies that the excluded instruments are relevant, meaning correlated with the endogenous regressors. Null Hypothesis for *Hansen J* test is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.

	(1)	(2)	(3)	(4)	(5)
European M.	-4.56	-1.99	-15.46	-16.31	
	10.23	14.42	19.94	10.06	
Idio. Vol.	6.11***	6.38***	4.97**	4.86***	6.56***
	0.95	1.40	1.96	0.84	0.57
Book Equity Vol.				0.21	-0.09
				0.25	0.24
Cash & STI Vol.				0.23	0.03
				0.33	0.36
Asset Vol.				-0.00	-0.00
				0.00	0.00
Size	2.00	2.47	-0.03		3.11
	2.37	3.13	3.97		2.18
Cash	-54.37*	-60.24	-29.37	-36.79	-64.17**
	29.27	37.44	47.79	24.98	25.61
Age	2.44	3.54	-2.26	-1.44	3.85
	5.77	6.86	8.59	4.69	4.52
MB	2.30*	2.34	2.11	2.17*	2.35
	1.40	1.43	1.32	1.27	1.45
Average Q	-19.16***	-19.24***	-18.83***	-19.23***	-19.20***
	2.29	2.36	2.14	2.03	2.39
Leverage	42.30***	39.64**	53.64**	53.78***	38.41***
	13.64	17.45	21.83	11.76	12.25
Amount	-8.38***	-7.85**	-10.64***	-10.89***	-7.65***
	2.46	3.14	3.93	2.76	1.97
Instruments Used					
Cash and Short Term Inv. Vol.	YES				
Book Equity Vol.		YES			
Total Asset Vol.			YES		
Total Assets				YES	
European Dummy					YES
N	16327	16327	16327	16327	16327
Under-Id	0.000	0.000	0.000	0.000	0.000
Endog	0.000	0.000	0.050	0.000	0.000

* p<.10, ** p<.05, *** p<.01

Table XII: **Matching Statistics for Borrower Country**

The variables that are used in the propensity score matching are reported in the top panel. The second column specifies whether data belongs to before or after the match sample. The third and the forth columns show the mean values of the variables for Europe and the U.S samples. The fifth column reports the p-value for the difference between means of the Europe and the U.S. samples.

		Mean		
	Sample	Europe	U.S.	p-value
Cash	Unmatched	0.06	0.07	0.000***
	Matched	0.06	0.06	0.634
Age	Unmatched	2.31	2.39	0.000***
	Matched	2.33	2.33	0.792
Average Q	Unmatched	1.29	1.47	0.000***
	Matched	1.34	1.37	0.424
Leverage	Unmatched	0.30	0.30	0.990
	Matched	0.30	0.29	0.114
Size	Unmatched	7.83	6.82	0.000***
	Matched	7.59	7.61	0.736
MB	Unmatched	1.43	1.46	0.408
	Matched	1.46	1.47	0.779
Firm Rating	Unmatched	2.37	4.06	0.000***
	Matched	2.51	2.70	0.351
PSCORE	Unmatched	0.24	0.08	0.000***
	Matched	0.20	0.20	0.942
Spread	Unmatched	167.77	201.15	0.000***
	Matched	171.36	182.92	0.065*
Idiosync. Vol.	Unmatched	28.76	45.67	0.000***
	Matched	28.72	42.44	0.000***
Book Equity Vol.	Unmatched	6.15	7.51	0.000***
	Matched	6.27	7.54	0.000***
Cash & STI Vol.	Unmatched	4.36	4.96	0.001***
	Matched	4.34	4.84	0.046**
Asset Vol.	Unmatched	250000	60699	0.000***
	Matched	150000	120000	0.144

* p<.10, ** p<.05, *** p<.01

Table XIII: **Matching Statistics for Market of Syndication**

The variables that are used in the propensity score matching are reported in the top panel. The second column specifies whether data belongs to before or after the match sample. The third and the forth columns show the mean values of the variables for Europe and the U.S samples. The fifth column reports the p-value for the difference between means of the Europe and the U.S. samples.

		Mean		
	Sample	Europe	U.S.	p-value
Cash	Unmatched	0.06	0.07	0.000***
	Matched	0.06	0.06	0.704
Age	Unmatched	2.31	2.39	0.000***
	Matched	2.34	2.34	0.985
Average Q	Unmatched	1.29	1.47	0.000***
	Matched	1.34	1.35	0.902
Leverage	Unmatched	0.30	0.30	0.713
	Matched	0.30	0.30	0.758
Size	Unmatched	7.84	6.81	0.000***
	Matched	7.60	7.62	0.718
MB	Unmatched	1.41	1.46	0.234
	Matched	1.44	1.47	0.616
Firm Rating	Unmatched	2.41	4.04	0.000***
	Matched	2.60	2.40	0.336
PSCORE	Unmatched	0.24	0.08	0.000***
	Matched	0.20	0.20	0.939
Spread	Unmatched	162.34	200.80	0.000***
	Matched	165.61	190.03	0.000***
Idiosync. Vol.	Unmatched	28.66	45.62	0.000***
	Matched	28.59	42.84	0.000***
Book Equity Vol.	Unmatched	6.14	7.50	0.000***
	Matched	6.22	7.49	0.000***
Cash & STI Vol.	Unmatched	4.42	4.95	0.002***
	Matched	4.41	4.83	0.098*
Asset Vol.	Unmatched	250000.	60104	0.000***
	Matched	150000	100000	0.034**

* p<.10, ** p<.05, *** p<.01

Table XIV: **Main Matched Estimation Results for Borrower Country**

The dependent variable in OLS and IV regressions is the all-in-drawn spread on the loan. The first three columns are the results for OLS estimations and the last three columns are for the IV estimations. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates. The instruments used for each column are specified in the *Instruments Used* panel. *Under-Id* test has the null hypothesis that the equation is under identified, so rejection of this test implies that the excluded instruments are relevant, meaning correlated with the endogenous regressors. Null Hypothesis for *Hansen J* test is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.

	OLS			IV		
	(1)	(2)	(3)	(4)	(5)	(6)
European C.	-48.89***			1.02		
	6.87			16.39		
EC 98-00		-46.28***			23.07	
		14.67			27.11	
EC 01-03		-70.12***			2.60	
		11.16			24.16	
EC 04-06		-44.30***			-13.39	
		11.95			15.88	
EC 07-10		-40.91***			2.82	
		10.07			17.48	
EC 98-07			-45.64***			9.48
			7.51			19.81
Idio. Vol.	1.43***	1.40***	1.37***	6.44***	6.42***	6.71***
	0.20	0.20	0.22	1.42	1.44	1.70
Cash	33.57	33.86	36.80	-74.33	-75.33	-86.94
	39.04	39.29	41.56	55.16	55.54	64.32
Age	-8.43	-8.22	-12.00*	10.54	9.86	10.55
	6.11	6.12	6.52	9.25	9.20	10.73
MB	0.78	0.75	3.15	1.77	1.73	4.64
	2.72	2.74	3.16	2.69	2.67	2.98
Average Q	-13.61***	-13.62***	-13.24***	-7.69**	-8.47**	-8.33**
	3.42	3.47	3.73	3.87	3.83	4.04
Leverage	115.53***	115.71***	108.87***	91.26***	92.18***	90.82***
	17.71	17.66	19.44	20.35	20.32	21.10
Size	-5.60*	-5.39*	-3.93	0.56	0.29	1.92
	2.93	2.91	3.28	3.90	3.82	4.35
Amount	-13.98***	-13.78***	-16.74***	-8.15**	-8.20**	-10.90***
	3.01	3.02	3.39	3.70	3.65	4.19
Instruments Used						
Cash & STI. Vol.				YES	YES	YES
Book Equity Vol.				YES	YES	YES
R^2	0.174	0.175	0.198			
N	2878	2878	2316	2878	2878	2316
Under-Id				0.000	0.000	0.000
Hansen J				0.527	0.502	0.809
Endog				0.000	0.000	0.000

* p<.10, ** p<.05, *** p<.01

Table XV: **Main Matched Estimation Results for Market of Syndication**

The dependent variable in OLS and IV regressions is the all-in-drawn spread on the loan. The first three columns are the results for OLS estimations and the last three columns are for the IV estimations. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates. The instruments used for each column are specified in the *Instruments Used* panel. *Under-Id* test has the null hypothesis that the equation is under identified, so rejection of this test implies that the excluded instruments are relevant, meaning correlated with the endogenous regressors. Null Hypothesis for *Hansen J* test is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.

	OLS			IV		
	(1)	(2)	(3)	(4)	(5)	(6)
European M.	-60.63***			5.02		
	6.86			30.83		
EM 98-00		-53.18***			33.76	
		13.54			41.63	
EM 01-03		-81.37***			12.77	
		11.06			39.42	
EM 04-06		-48.97***			-19.19	
		12.50			15.62	
EM 07-10		-61.88***			-17.75	
		10.20			21.24	
EM 98-07			-55.22***			46.15
			7.94			50.36
Idio. Vol.	1.32***	1.27***	1.18***	7.83***	7.14**	10.35**
	0.17	0.17	0.18	2.96	3.01	4.47
Cash	55.19	57.14	83.84**	-102.78	-89.92	-151.22
	38.72	38.66	40.23	90.64	81.91	139.33
Age	-5.94	-5.80	-12.97*	9.59	7.72	11.83
	6.32	6.26	7.19	10.70	9.99	15.65
MB	-2.50	-2.51	-0.50	0.39	-0.23	3.17
	1.76	1.73	1.84	3.14	2.80	4.77
Average Q	-11.80***	-11.78***	-11.85***	-7.42*	-7.47*	-7.23
	2.69	2.65	2.54	4.42	3.89	5.81
Leverage	125.42***	124.88***	112.03***	91.33***	90.54***	72.80**
	17.84	17.72	18.40	28.02	24.19	36.73
Size	-10.83***	-10.73***	-9.05***	2.44	0.50	8.98
	2.75	2.73	2.97	7.32	6.12	10.36
Amount	-8.07***	-8.19***	-9.43***	-2.27	-4.24	-1.00
	2.49	2.50	2.52	4.02	3.36	5.85
Instruments Used						
Cash & STI. Vol.				YES	YES	YES
Book Equity Vol.				YES	YES	YES
R^2	0.176	0.177	0.185			
N	2850	2850	2244	2850	2850	2244
Under-Id				0.002	0.003	0.022
Hansen J				0.247	0.178	0.445
Endog				0.010	0.027	0.006

* p<.10, ** p<.05, *** p<.01

Table XVI: **Descriptive Statistics for Cross Country Characteristics**

The second column specifies whether data belongs to before or after the match sample. The third and the forth columns show the mean values of the variables for Europe and the U.S samples. The fifth column reports the p-value for the difference between means of the Europe and the U.S. samples.

		Mean		
	Sample	Europe	U.S.	p-value
Creditor Rights	Unmatched	2.62	1.00	0.000***
	Matched	2.64	1.00	0.000***
Investor Protection	Unmatched	5.39	10.00	0.000***
	Matched	5.41	10.00	0.000***
Disclosure	Unmatched	0.67	1.00	0.000***
	Matched	0.67	1.00	0.000***
Liability	Unmatched	0.49	1.00	0.000***
	Matched	0.49	1.00	0.000***
Market Cap.	Unmatched	101.09	140.04	0.000***
	Matched	102.25	138.96	0.000***
Stocks over GDP	Unmatched	125.78	214.03	0.000***
	Matched	124.41	218.89	0.000***
Stock Turnover	Unmatched	130.90	156.82	0.000***
	Matched	129.23	161.07	0.000***
Common Law	Unmatched	0.42	1.00	0.000***
	Matched	0.42	1.00	0.000***

* p<.10, ** p<.05, *** p<.01

Table XVII: **Results for Estimations that use Cross Country Characteristics**

The dependent variable used in the regressions is the all-in-drawn spread on the loan. The variable name under the column number refer to the legal variable used in the regression. The top panel, *Panel A*, uses the full sample for estimations, and the bottom panel, *Panel B*, uses the matched sample. In both panels, the top sub-panel is for the OLS results and the bottom sub-panel is for the IV results. In the IV estimations we use cash and short term investment volatility and book equity volatility as instruments. Cash, age, market-to-book, average q, leverage, size, loan amount variables, and loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Creditor Rights	Investor Protection	Disclosure	Liability	Market Cap.	Stocks over GDP	Stock Turnover	Common Law
***Panel A:* FULL SAMPLE**								
OLS								
Idio. Vol.	1.35***	1.33***	1.32***	1.32***	1.36***	1.30***	1.33***	1.34***
	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.07
Legal Var.	-9.57***	6.97***	101.84***	74.37***	0.50***	0.32***	0.45***	43.81***
	2.14	0.91	13.49	8.49	0.09	0.03	0.06	6.49
R^2	0.258	0.262	0.261	0.264	0.261	0.266	0.263	0.261
N	16334	16334	16334	16334	15736	15736	15723	16334
IV								
Idio. Vol.	6.11***	6.10***	6.09***	6.10***	6.36***	6.36***	6.36***	6.10***
	0.90	0.88	0.88	0.88	0.93	0.93	0.93	0.88
Legal Var.	3.15	1.52	7.99	19.32	0.11	0.01	-0.05	8.52
	3.14	1.36	22.47	13.40	0.12	0.07	0.11	9.72
N	16334	16334	16334	16334	15736	15736	15723	16334
Under-Id	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen J	0.868	0.862	0.885	0.847	0.725	0.737	0.781	0.863
Endog	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
***Panel B:* MATCHED SAMPLE**								
OLS								
Idio. Vol.	1.76***	1.64***	1.64***	1.57***	1.81***	1.61***	1.68***	1.67***
	0.20	0.20	0.20	0.20	0.21	0.21	0.22	0.20
Legal Var.	-3.80	5.84***	77.39***	71.05***	0.38***	0.25***	0.34***	31.78***
	2.35	1.06	17.03	10.26	0.10	0.04	0.07	7.45
R^2	0.152	0.164	0.161	0.173	0.160	0.169	0.164	0.160
N	2872	2872	2872	2872	2756	2756	2743	2872
IV								
Idio. Vol.	6.31***	6.40***	6.32***	6.43***	6.30***	6.30***	6.21***	6.37***
	1.38	1.31	1.33	1.33	1.40	1.40	1.44	1.30
Legal Var.	3.77	1.46	0.99	25.64	0.16	0.01	-0.03	3.93
	3.55	1.73	29.99	16.69	0.13	0.09	0.15	11.61
N	2872	2872	2872	2872	2756	2756	2743	2872
Under-Id	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen J	0.552	0.556	0.597	0.497	0.464	0.504	0.624	0.577
Endog	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

* p<.10, ** p<.05, *** p<.01

Table XVIII: **Results for Estimations that use Default Variables**

The dependent variable is the all-in-drawn spread on the loan. The default variable used in the regression is specified on top of each column. The top panel, *Panel A*, uses the full sample for estimations, and the bottom panel, *Panel B*, uses the matched sample. In both panels, the top sub-panel is for the OLS results and the bottom sub-panel is for the IV results. The first two columns use the borrower country specification and the last two columns use the market of syndication to define the European sample. In the IV estimations we use cash and short term investment volatility and book equity volatility as instruments. Cash, age, market-to-book, average q, leverage, size, loan amount variables, and loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

***Panel A:* FULL SAMPLE**

OLS	Borrower Country		Borrower Market	
	Merton	Kamakura	Merton	Kamakura
Idio. Vol.	1.14***	1.19***	1.13***	1.18***
	0.13	0.12	0.13	0.12
Default Var.	10.05***	6.40***	10.07***	6.38***
	2.19	2.26	2.19	2.28
Europe	-53.50***	-56.24***	-57.52***	-59.58***
	6.59	6.62	6.24	6.22
R^2	0.242	0.247	0.244	0.249
N	9665	9665	9657	9657

IV	Borrower Country		Borrower Market	
	Merton	Kamakura	Merton	Kamakura
Idio. Vol.	6.51***	6.31***	6.63***	6.43***
	1.21	1.25	1.23	1.26
Default Var.	-27.28***	-4.01	-28.15***	-4.33
	8.94	2.95	9.05	2.99
European C.	-11.04	-8.71	-15.59	-13.46
	11.54	13.47	11.12	12.85
N	9665	9665	9657	9657
Under-Id	0.000	0.000	0.000	0.000
Hansen J	0.998	0.876	0.931	0.814
Endog	0.000	0.000	0.000	0.000

***Panel B:* MATCHED SAMPLE**

OLS	Borrower Country		Borrower Market	
	Merton	Kamakura	Merton	Kamakura
Idio. Vol.	1.28***	1.22***	1.63***	1.36***
	0.28	0.28	0.32	0.30
Default Var.	10.49*	6.08***	4.22	8.10***
	5.93	1.77	5.05	1.54
Europe	-47.38***	-51.03***	-58.79***	-62.14***
	8.63	8.78	9.68	9.76
R^2	0.140	0.148	0.142	0.160
N	1678	1678	1674	1674

IV	Borrower Country		Borrower Market	
	Merton	Kamakura	Merton	Kamakura
Idio. Vol.	5.79***	5.66**	7.56***	6.71**
	2.11	2.26	2.65	2.89
Default Var.	-15.77	-0.34	-33.45*	0.44
	14.14	3.71	17.71	4.49
Europe	-3.28	-2.96	-5.88	-8.97
	22.20	25.83	24.89	28.89
N	1678	1678	1674	1674
Under-Id	0.000	0.001	0.000	0.001
Hansen J	0.421	0.408	0.088	0.038
Endog	0.022	0.039	0.035	0.098

* p<.10, ** p<.05, *** p<.01

Table XIX: **Estimation Results for Small European Sample**

The dependent variable is the all-in-drawn spread on the loan. The European sample is defined using the borrower countries United Kingdom, France, Germany, Spain, the Netherlands, and Italy. The first two columns use the full sample and the last two columns use the matched sample for estimation. In the IV estimations we use cash and short term investment volatility and book equity volatility as instruments. Cash, age, market-to-book, average q, leverage, size, loan amount variables, and loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	FULL SAMPLE		MATCHED SAMPLE	
	OLS	IV	OLS	IV
Europe 6	-49.03***	-4.40	-52.09***	-7.05
	5.13	10.08	6.93	20.81
Idio. Vol.	1.28***	5.91***	1.42***	5.55***
	0.07	0.89	0.19	1.66
R^2	0.267		0.198	
N	16140	16140	2554	2554
Under-Id		0.000		0.000
Hansen J		0.862		0.122
Endog		0.000		0.007

* p<.10, ** p<.05, *** p<.01

Table XX: **Results for Estimations that use Dollar Sample**

The dependent variable is the all-in-drawn spread on the loan. The estimation sample includes the loans that are denominated in U.S. dollars. The first two columns use borrower country, and the last two columns use the market of syndication to define the European sample. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	Borrower Country		Borrower Market	
	OLS	IV	OLS	IV
Europe	-28.29***	9.72	-38.23***	-2.54
	10.18	12.46	9.55	11.76
Idio. Vol.	1.24***	5.31***	1.24***	5.37***
	0.07	0.83	0.07	0.84
Cash	52.16***	-38.78	52.84***	-39.46
	17.18	28.34	17.19	28.54
Age	-18.70***	1.02	-18.89***	1.18
	3.72	5.77	3.73	5.84
MB	2.45*	2.78**	2.38*	2.74*
	1.26	1.41	1.26	1.41
Average Q	-19.47***	-20.75***	-19.43***	-20.76***
	1.82	2.23	1.82	2.25
Leverage	85.95***	43.08***	86.72***	43.07***
	8.36	13.45	8.36	13.58
Size	-7.13***	0.19	-7.10***	0.45
	1.42	2.25	1.42	2.29
Amount	-18.95***	-10.53***	-18.83***	-10.32***
	1.31	2.38	1.31	2.40
R^2	0.266		0.267	
N	14205	14205	14197	14197
Under-Id		0.000		0.000
Hansen J		0.608		0.595
Endog		0.000		0.000

* p<.10, ** p<.05, *** p<.01

Table XXI: **Results for Estimations that use Libor Sample**

The dependent variable is the all-in-drawn spread on the loan where the spread is defined over LIBOR. The first two columns use borrower country, and the last two columns use the market of syndication to define the European sample. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	Borrower Country		Borrower Market	
	OLS	IV	OLS	IV
European C.	-38.49***	7.04	-43.39***	1.97
	5.80	11.05	5.58	10.89
Idio. Vol.	1.26***	5.81***	1.25***	5.89***
	0.07	0.92	0.07	0.94
Cash	53.71***	-44.97	54.39***	-46.70
	16.24	28.64	16.26	29.04
Age	-18.38***	1.66	-18.63***	1.86
	3.59	5.80	3.60	5.89
MB	1.52	2.17	1.48	2.18
	1.22	1.39	1.21	1.40
Average Q	-17.89***	-19.30***	-17.90***	-19.39***
	1.82	2.28	1.82	2.30
Leverage	91.66***	44.53***	92.45***	44.46***
	8.30	13.65	8.30	13.79
Size	-7.34***	1.00	-7.28***	1.19
	1.32	2.35	1.33	2.37
Amount	-18.26***	-9.05***	-18.21***	-8.79***
	1.23	2.45	1.23	2.49
R^2	0.265		0.266	
N	15618	15618	15606	15606
Under-Id		0.000		0.000
Hansen J		0.803		0.825
Endog		0.000		0.000

* p<.10, ** p<.05, *** p<.01

Table XXII: **OLS and IV Estimation Results for Spread Margin**

The dependent variable is the all-in-drawn spread excluding the fees on the loan. The first two columns use borrower country, and the last two columns use the market of syndication to define the European sample. In the IV estimations we use cash and short term investment volatility and book equity volatility as instruments. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	Borrower Country		Borrower Market	
	OLS	IV	OLS	IV
European C.	-43.37***	-5.35		
	4.95	8.61		
European M.			-46.86***	-9.62
			4.80	8.39
Idio. Vol.	1.30***	5.15***	1.30***	5.20***
	0.07	0.71	0.07	0.71
Cash	50.65***	-32.62	51.76***	-33.14
	15.88	24.85	15.87	25.05
Age	-16.13***	-0.20	-16.32***	-0.24
	3.23	4.66	3.23	4.70
MB	1.60	2.38**	1.54	2.37**
	1.01	1.15	1.00	1.15
Average Q	-18.29***	-19.88***	-18.30***	-19.96***
	1.57	1.97	1.57	1.99
Leverage	84.08***	48.33***	85.01***	48.56***
	7.71	11.00	7.70	11.08
Size	-7.11***	-0.24	-7.09***	-0.08
	1.31	1.97	1.31	1.99
Amount	-18.53***	-11.18***	-18.40***	-10.94***
	1.24	2.02	1.24	2.04
R^2	0.304		0.305	
N	15936	15936	15927	15927
Under-Id		0.000		0.000
Hansen J		0.905		0.898
Endog		0.000		0.000

* p<.10, ** p<.05, *** p<.01

Table XXIII: **Estimation Results with Loan Contract Terms**

The dependent variable is the all-in-drawn spread on the loan, and loan contract terms are used as control variables in the estimations. The first two columns use borrower country, and the last two columns use the market of syndication to define the European sample. In the IV estimations we use cash and short term investment volatility and book equity volatility as instruments. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	Borrower Country		Borrower Market	
	OLS	IV	OLS	IV
Europe	-36.25***	0.68	-40.22***	-4.08
	5.10	9.55	4.94	9.29
Idio. Vol.	1.07***	5.57***	1.07***	5.65***
	0.07	0.96	0.07	0.98
Cash	30.63**	-52.39**	31.30**	-53.89**
	15.30	26.53	15.29	26.87
Age	-13.48***	3.28	-13.70***	3.38
	3.31	5.28	3.33	5.35
MB	1.23	2.04	1.18	2.06
	1.13	1.33	1.12	1.34
Average Q	-15.17***	-17.60***	-15.21***	-17.72***
	1.65	2.17	1.65	2.20
Leverage	74.58***	35.90***	75.30***	35.96***
	7.74	12.57	7.74	12.68
Size	-5.03***	0.97	-5.01***	1.11
	1.36	2.11	1.36	2.13
Amount	-14.67***	-9.90***	-14.72***	-9.79***
	1.27	1.88	1.27	1.90
No. of Lenders	-4.13**	2.91	-3.67*	3.35
	1.97	2.76	1.98	2.78
Maturity	-3.08	5.65	-2.74	6.29
	3.37	4.37	3.37	4.43
Secured	52.04***	23.41***	51.89***	22.79***
	3.11	7.39	3.11	7.49
Performance	-39.42***	-29.52***	-39.56***	-29.42***
	3.24	4.19	3.24	4.23
General Cov.	30.88***	34.72***	30.50***	34.07***
	4.42	5.39	4.40	5.40
Financial Cov.	-10.82**	-18.78***	-10.83**	-19.29***
	4.40	5.60	4.41	5.67
R^2	0.306		0.307	
N	16340	16340	16327	16327
Under-Id		0.000		0.000
Hansen J		0.879		0.846
Endog		0.000		0.000

* p<.10, ** p<.05, *** p<.01

A. Appendix A

In this section we have a more general case of our econometric model. We show how using a proxy variable creates bias. Our derivations follow closely in Greene (2011), and we omit the constant term for simplicity. We define the two equations as follows:

$$r_i - r_f = \beta_1 \sigma_{Ai} + \beta_2 \frac{D_i}{A_i} + \beta_3 E_i + \beta_4 X_4 + \ldots + \beta_k X_k + \varepsilon_1 \quad (11)$$

$$\sigma_{Ei} = \alpha_1 \sigma_{Ai} + \alpha_2 \frac{D_i}{A_i} + \varepsilon_2 \quad (12)$$

and in a more compact matrix notation:

$$\mathbf{y} = \mathbf{X}^* \beta + \varepsilon_1 \qquad \varepsilon_1 \sim N[0, \sigma^2_{\varepsilon 1}]$$

$$\mathbf{X} = \mathbf{X}^* \alpha + \varepsilon_2 \qquad \varepsilon_2 \sim N[0, \sigma^2_{\varepsilon 2}]$$

where $\mathbf{y}$ is the loan spread, $\mathbf{X}^*$ is a $k \times k$ matrix of explanatory variables with $x_1^* = \sigma_{Ai}$ which is the unobserved variable. For expositional purposes we order the variables such that the first variable in the $\mathbf{X}$ matrix is σ_{Ai}, and the second variable is $x_2 = D_i/A_i$. Since we observe the proxy variable σ_{Ei}, we define $\mathbf{X}$ as a $k \times k$ matrix of explanatory variables with $x_1 = \sigma_{Ei}$.

We allow x_1 to be a function of leverage, D_i/A_i. It could also be a function of other explanatory variables, but just for mathematical convenience we are going to allow σ_{Ei} to be function of leverage only. If it was a function of other variables, then our results will hold under that scenario. The variance of ε_1 and ε_2 are $\sigma^2_{\varepsilon 1}$ and $\sigma^2_{\varepsilon 2}$ respectively.

Define: $X^* = \begin{bmatrix} x_{11}^* & x_{21} & x_{31} & \dots & x_{k1} \\ x_{12}^* & x_{22} & x_{32} & \dots & x_{k2} \\ . & . & . & & . \\ . & . & . & & . \\ x_{1n}^* & x_{2n} & x_{3n} & \dots & x_{kn} \end{bmatrix}_{n \times k}$,

$\varepsilon_2 = \begin{bmatrix} \varepsilon_{21} & 0 & 0 & \dots & 0 \\ \varepsilon_{22} & 0 & 0 & & 0 \\ . & . & . & & . \\ . & . & . & & . \\ \varepsilon_{2n} & . & . & \dots & . \end{bmatrix}_{n \times k}$, $\alpha = \begin{bmatrix} \alpha_1 & 0 & 0 & \dots & 0 \\ \alpha_2 & 1 & 0 & & 0 \\ 0 & 0 & 1 & & 0 \\ . & . & . & \ddots & . \\ 0 & . & . & \dots & 1 \end{bmatrix}_{k \times k}$

and $\Sigma_{\varepsilon 2} = \begin{bmatrix} \sigma_{\varepsilon 2}^2 & 0 & 0 & \dots & 0 \\ 0 & 0 & 0 & & 0 \\ . & . & . & & . \\ . & . & . & & . \\ . & . & . & \dots & . \end{bmatrix}_{k \times k}$

Given the set up we can write:

$$X = X^*\alpha + \varepsilon_2 = \begin{bmatrix} x_{11}^* & x_{21} & x_{31} & \dots & x_{k1} \\ x_{12}^* & x_{22} & x_{32} & \dots & x_{k2} \\ . & . & . & & . \\ . & . & . & & . \\ x_{1n}^* & x_{2n} & x_{3n} & \dots & x_{kn} \end{bmatrix}_{n\times k} \begin{bmatrix} \alpha_1 & 0 & 0 & \dots & 0 \\ \alpha_2 & 1 & 0 & & 0 \\ 0 & 0 & 1 & & 0 \\ . & . & . & & . \\ . & . & . & \dots & 1 \end{bmatrix}_{k\times k} + \begin{bmatrix} \varepsilon_{21} & 0 & 0 & \dots & 0 \\ \varepsilon_{21} & 0 & 0 & & 0 \\ . & . & . & & . \\ . & . & . & & . \\ \varepsilon_{21} & . & . & \dots & . \end{bmatrix}_{n\times k}$$

$$= \begin{bmatrix} \alpha_1 x_{11}^* + \alpha_2 x_{21}^* + \varepsilon_{21} & x_{21} & x_{31} & \dots & x_{k1} \\ \alpha_1 x_{12}^* + \alpha_2 x_{22}^* + \varepsilon_{22} & x_{22} & x_{32} & \dots & x_{k2} \\ . & . & . & & . \\ . & . & . & & . \\ \alpha_1 x_{1n}^* + \alpha_2 x_{2n}^* + \varepsilon_{2n} & x_{2n} & x_{3n} & \dots & x_{kn} \end{bmatrix}_{n\times k} .$$

$$\beta = (X'X)^{-1}X'Y \tag{13}$$

$$= [(X^*\alpha + \varepsilon_2)'(X^*\alpha + \varepsilon_2)]^{-1}(X^*\alpha + \varepsilon_2)'(X^*\beta + \varepsilon_1)$$

$$\beta = [\alpha' X^{*\prime} X^* \alpha + \alpha' X^{*\prime}\varepsilon_2 + \varepsilon_2' X^{*\prime}\alpha' + \varepsilon_2'\varepsilon_2]^{-1}(\alpha' X^{*\prime} X^*\beta + \alpha' X^{*\prime}\varepsilon_1 + \varepsilon_2' X^*\beta + \varepsilon_2'\varepsilon_1)$$

$$\text{plim}\hat{\beta} = [\alpha' Q^*\alpha + \Sigma_{\varepsilon 2}]^{-1}\alpha' Q^{*\prime}\beta \tag{14}$$

where $\text{plim}\frac{X^{*\prime}X^*}{n} = Q^*$. Examining the inverse matrix:

$$[\alpha' Q^*\alpha + \Sigma_{\varepsilon 2}]^{-1} = [\alpha' Q^*\alpha + (\sigma_{\varepsilon 2} e_1)(\sigma_{\varepsilon 2} e_1)']^{-1}$$

$$= (\alpha' Q^*\alpha)^{-1} - \frac{(\alpha' Q^*\alpha)^{-1}\Sigma_{\varepsilon 2}(\alpha' Q^*\alpha)^{-1}}{1 + (\sigma_{\varepsilon 2} e_1)'(\alpha' Q^*\alpha)^{-1}(\sigma_{\varepsilon 2} e_1)}$$

where e_1 is the first column of a $k \times k$ identity matrix. Then Equation (14) can be expanded as:

$$\begin{aligned} \text{plim}\hat{\beta} &= (\alpha' Q^* \alpha)^{-1} \alpha' Q^{*\prime} \beta - \frac{(\alpha' Q^* \alpha)^{-1} \Sigma_{\varepsilon 2} (\alpha' Q^* \alpha)^{-1}}{1 + (\sigma_{\varepsilon 2} e_1)' (\alpha' Q^* \alpha)^{-1} (\sigma_{\varepsilon 2} e_1)} \alpha' Q^{*\prime} \beta \qquad (15) \\ &= \alpha^{-1} Q^{*-1} \alpha'^{-1} \alpha' Q^{*\prime} \beta - \frac{\alpha^{-1} Q^{*-1} \alpha'^{-1} \Sigma_{\varepsilon 2} \alpha^{-1} Q^{*-1} \alpha'^{-1} \alpha' Q^{*\prime} \beta}{1 + (\sigma_{\varepsilon 2} e_1)' \alpha^{-1} Q^{*-1} \alpha'^{-1} (\sigma_{\varepsilon 2} e_1)} \qquad (16) \\ &= \alpha^{-1} \beta - \frac{\alpha^{-1} Q^{*-1} \alpha'^{-1} \Sigma_{\varepsilon 2} \alpha^{-1} \beta}{1 + (\sigma_{\varepsilon 2} e_1)' \alpha^{-1} Q^{*-1} \alpha'^{-1} (\sigma_{\varepsilon 2} e_1)} \qquad (17) \end{aligned}$$

Define:

$$Q^{*-1} = \begin{bmatrix} q^{*11} & q^{*12} & q^{*13} & \dots & q^{*1k} \\ q^{*21} & q^{*22} & q^{*23} & \dots & q^{*2k} \\ . & . & . & & . \\ . & . & . & & . \\ q^{*k1} & q^{*k2} & q^{*k3} & \dots & q^{*kk} \end{bmatrix}$$

Also we can calculate the following expressions:

$$\alpha^{-1} = \begin{bmatrix} {}^{1}/_{\alpha_1} & 0 & 0 & \dots & 0 \\ {}^{-\alpha_2}/_{\alpha_1} & 1 & 0 & & 0 \\ 0 & 0 & 1 & & 0 \\ . & . & . & \ddots & . \\ . & . & . & \dots & 1 \end{bmatrix}$$

$$\alpha^{-1}\beta = \begin{bmatrix} {}^{1}/_{\alpha_1} & 0 & 0 & \dots & 0 \\ {}^{-\alpha_2}/_{\alpha_1} & 1 & 0 & & 0 \\ 0 & 0 & 1 & & 0 \\ . & . & . & \ddots & . \\ . & . & . & \dots & 1 \end{bmatrix} \begin{bmatrix} \beta_1 \\ \beta_2 \\ \beta_3 \\ . \\ \beta_k \end{bmatrix} = \begin{bmatrix} \frac{\beta_1}{\alpha_1} \\ \beta_2 - \beta_1 \frac{\alpha_2}{\alpha_1} \\ \beta_3 \\ . \\ \beta_k \end{bmatrix}$$

$$\alpha^{-1}Q^{*-1}\alpha'^{-1} = \begin{bmatrix} {}^{1}/_{\alpha_1} & 0 & 0 & \dots & 0 \\ {}^{-\alpha_2}/_{\alpha_1} & 1 & 0 & & 0 \\ 0 & 0 & 1 & & 0 \\ . & . & . & \ddots & . \\ . & . & . & \dots & 1 \end{bmatrix} \begin{bmatrix} q^{*11} & q^{*12} & q^{*13} & \dots & q^{*1k} \\ q^{*21} & q^{*22} & q^{*23} & \dots & q^{*2k} \\ . & . & . & & . \\ . & . & . & & . \\ q^{*k1} & q^{*k2} & q^{*k3} & \dots & q^{*kk} \end{bmatrix} \begin{bmatrix} {}^{1}/_{\alpha_1} & {}^{-\alpha_2}/_{\alpha_1} & 0 & \dots & 0 \\ 0 & 1 & 0 & & 0 \\ 0 & 0 & 1 & & 0 \\ . & . & . & \ddots & . \\ . & . & . & \dots & 1 \end{bmatrix}$$

$$= \begin{bmatrix} \frac{q^{*11}}{\alpha_1^2} & -\frac{\alpha_2 q^{*11}}{\alpha_1^2} + \frac{q^{*12}}{\alpha_1} & q^{*13} & . & q^{*1k} \\ -\frac{\alpha_2 q^{*11}}{\alpha_1^2} + \frac{q^{*21}}{\alpha_1} & -\frac{\alpha_2^2 q^{*11}}{\alpha_1^2} - \frac{\alpha_2(q^{*12}+q^{*21})}{\alpha_1} + q^{*22} & -\frac{\alpha_2 q^{*13}}{\alpha_1^2} + q^{*23} & . & -\frac{\alpha_2 q^{*1k}}{\alpha_1^2} + q^{*2k} \\ \frac{q^{*31}}{\alpha_1} & -\frac{\alpha_2 q^{*31}}{\alpha_1^2} + q^{*32} & . & & . \\ . & . & . & & . \\ \frac{q^{*k1}}{\alpha_1} & -\frac{\alpha_2 q^{*k1}}{\alpha_1^2} + q^{*k2} & q^{*k3} & . & q^{*kk} \end{bmatrix}$$

$$\alpha^{-1} Q^{*-1} \alpha'^{-1} \Sigma_{\varepsilon 2} \alpha^{-1} \beta = \begin{bmatrix} \frac{\beta_1}{\alpha_1} \sigma_{\varepsilon 2}^2 \frac{q^{*11}}{\alpha_1^2} \\ \frac{\beta_1}{\alpha_1} \sigma_{\varepsilon 2}^2 \left(\frac{q^{*21}}{\alpha_1} - \frac{\alpha_2 q^{*11}}{\alpha_1^2} \right) \\ \frac{\beta_1}{\alpha_1} \sigma_{\varepsilon 2}^2 \frac{q^{*31}}{\alpha_1} \\ . \\ . \\ . \\ \frac{\beta_1}{\alpha_1} \sigma_{\varepsilon 2}^2 \frac{q^{*k1}}{\alpha_1} \end{bmatrix}$$

$$(\sigma_{\varepsilon 2}e_1)'\alpha^{-1}Q^{*-1}\alpha'^{-1}(\sigma_{\varepsilon 2}e_1) = \begin{bmatrix} \sigma_{\varepsilon 2} & 0 & 0 & \dots & 0 \end{bmatrix} \alpha^{-1}Q^{*-1}\alpha'^{-1} \begin{bmatrix} \sigma_{\varepsilon 2} \\ 0 \\ 0 \\ . \\ 0 \end{bmatrix}$$

$$= \sigma_{\varepsilon 2}\frac{q^{*11}}{\alpha_1^2}$$

Then Equation (17) can be written as:

$$\text{plim} \begin{bmatrix} \widehat{\frac{\beta_1}{\alpha_1}} \\ \widehat{\beta_2 - \beta_1\frac{\alpha_2}{\alpha_1}} \\ \hat{\beta}_3 \\ . \\ . \\ . \\ \hat{\beta}_k \end{bmatrix} = \begin{bmatrix} \frac{\beta_1}{\alpha_1} \\ \beta_2 - \beta_1\frac{\alpha_2}{\alpha_1} \\ \beta_3 \\ . \\ . \\ . \\ \beta_k \end{bmatrix} - \begin{bmatrix} \frac{\beta_1}{\alpha_1}\sigma_{\varepsilon 2}^2\frac{q^{*11}}{\alpha_1^2}/\left(1+\sigma_{\varepsilon 2}\frac{q^{*11}}{\alpha_1^2}\right) \\ \frac{\beta_1}{\alpha_1}\sigma_{\varepsilon 2}^2(\frac{q^{*21}}{\alpha_1} - \frac{\alpha_2 q^{*11}}{\alpha_1^2})/\left(1+\sigma_{\varepsilon 2}\frac{q^{*11}}{\alpha_1^2}\right) \\ \frac{\beta_1}{\alpha_1}\sigma_{\varepsilon 2}^2\frac{q^{*31}}{\alpha_1}/\left(1+\sigma_{\varepsilon 2}\frac{q^{*11}}{\alpha_1^2}\right) \\ . \\ . \\ \frac{\beta_1}{\alpha_1}\sigma_{\varepsilon 2}^2\frac{q^{*k1}}{\alpha_1}/\left(1+\sigma_{\varepsilon 2}\frac{q^{*11}}{\alpha_1^2}\right) \end{bmatrix}$$

The expression for the variable that we use proxy for:

$$\text{plim}\widehat{\frac{\beta_1}{\alpha_1}} = \frac{{}^{\beta_1}\!/_{\alpha_1}}{1+\sigma_{\varepsilon 2}^2\frac{q^{*11}}{\alpha_1^2}} \tag{18}$$

and for the explanatory variable that is in both equations (leverage, D_i/A_i) the coefficient

estimate becomes:

$$\widehat{\text{plim}\beta_2 - \beta_1 \frac{\alpha_2}{\alpha_1}} = \left(\beta_2 - \beta_1 \frac{\alpha_2}{\alpha_1}\right) - \frac{\frac{\beta_1}{\alpha_1}\left[\sigma^2_{\varepsilon 2}\frac{q^{*21}}{\alpha_1} - \frac{\alpha_2 q^{*11}}{\alpha_1^2}\right]}{1 + \sigma^2_{\varepsilon 2}\frac{q^{*11}}{\alpha_1^2}} \tag{19}$$

$$= \left(\beta_2 - \beta_1 \frac{\alpha_2}{\alpha_1}\right) - \text{plim}\left(\widehat{\frac{\beta_1}{\alpha_1}}\right)\left[\sigma^2_{\varepsilon 2}\frac{q^{*21}}{\alpha_1} - \frac{\alpha_2 q^{*11}}{\alpha_1^2}\right] \tag{20}$$

$$= \left(\beta_2 - \beta_1 \frac{\alpha_2}{\alpha_1}\right) - \text{plim}\left(\widehat{\frac{\beta_1}{\alpha_1}}\right)\sigma^2_{\varepsilon 2}\frac{q^{*21}}{\alpha_1} + \text{plim}\left(\widehat{\frac{\beta_1}{\alpha_1}}\right)\frac{\alpha_2 q^{*11}}{\alpha_1^2} \tag{21}$$

For the rest of the explanatory variables we have:

$$\text{plim}\hat{\beta}_j = \beta_j - \text{plim}\left(\widehat{\frac{\beta_1}{\alpha_1}}\right)\sigma^2_{\varepsilon 2}\frac{q^{*j1}}{\alpha_1} \tag{22}$$

B. Appendix B

Table B.I: First Stage Results for Main IV Estimations for Borrower Country

The dependent variable in the first stage regressions is either the idiosyncratic stock return volatility or the systematic stock return volatility, and is specified on top of the columns. The column numbers refer to the column numbers in the second stage regressions in Table VII. The instruments used for each column are specified in the *Instruments Used* panel. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	(1)		(2)		(3)		(4)	(5)	(6)
	Idio. Vol.	Syst. Vol.	Idio. Vol.	Syst. Vol.	Idio. Vol.	Syst. Vol.	Idio. Vol.	Idio. Vol.	Idio. Vol.
Instruments Used									
Book Equity Vol.	0.18***	0.09***	0.18***	0.09***	0.17***	0.08***	0.18***	0.19***	0.17***
	0.03	0.02	0.03	0.02	0.03	0.02	0.03	0.03	0.03
Cash & STI Vol.	0.11***	0.10***	0.11**	0.10***	0.12**	0.11***	0.12***	0.12***	0.12***
	0.04	0.03	0.04	0.03	0.05	0.03	0.04	0.04	0.05
Asset Vol.	0.00***	-0.00*	0.00***	-0.00	0.00**	-0.00***			
	0.00	0.00	0.00	0.00	0.00	0.00			
European C.	-9.78***	-1.60***					-9.62***		
	0.68	0.46					0.68		
EC 98-00			-13.99***	-3.26**				-13.90***	
			1.76	1.28				1.76	
EC 01-03			-14.73***	-3.03***				-14.24***	
			1.17	0.90				1.17	
EC 04-06			-6.99***	-1.44**				-6.87***	
			0.86	0.58				0.87	
EC 07-10			-8.41***	-0.38				-8.35***	
			1.04	0.89				1.05	
EC 98-07					-10.18***	-1.44***			-10.05***
					0.76	0.49			0.76
Cash	15.87***	10.55***	15.96***	10.54***	17.87***	11.10***	15.55***	15.61***	17.59***
	3.09	2.02	3.08	2.02	3.33	2.09	3.08	3.07	3.32
Age	-3.10***	-1.28***	-3.05***	-1.27***	-3.42***	-1.58***	-3.14***	-3.09***	-3.45***
	0.60	0.38	0.60	0.38	0.64	0.39	0.60	0.60	0.64
MB	-0.09	0.05	-0.09	0.05	-0.03	0.06	-0.09	-0.09	-0.03
	0.20	0.11	0.20	0.11	0.21	0.11	0.20	0.20	0.21
Average Q	-0.03	0.61***	-0.00	0.61***	0.11	0.72***	-0.04	-0.01	0.10
	0.34	0.19	0.34	0.20	0.35	0.19	0.34	0.34	0.35
Leverage	9.00***	-0.39	8.88***	-0.44	7.22***	-2.06**	8.92***	8.80***	7.15***
	1.56	0.91	1.56	0.91	1.67	0.93	1.56	1.56	1.67
Size	-1.82***	1.74***	-1.78***	1.76***	-1.64***	1.86***	-1.63***	-1.58***	-1.50***
	0.23	0.14	0.23	0.14	0.25	0.14	0.22	0.22	0.24
Amount	-1.89***	-0.66***	-1.90***	-0.67***	-2.02***	-0.76***	-1.98***	-2.00***	-2.09***
	0.20	0.12	0.20	0.12	0.22	0.13	0.20	0.20	0.22
R^2	0.200	0.052	0.203	0.053	0.207	0.069	0.199	0.201	0.206
N	16340	16340	16340	16340	14206	14206	16340	16340	14206

* p<.10, ** p<.05, *** p<.01

Table B.II: First Stage Results for Main IV Estimations for Market of Syndication

The dependent variable in the first stage regressions is either the idiosyncratic stock return volatility or the systematic stock return volatility, and is specified on top of the columns. The column numbers refer to the column numbers in the second stage regressions in Table VIII. The instruments used for each column are specified in the *Instruments Used* panel. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	(1)		(2)		(3)		(4)	(5)	(6)
	Idio. Vol.	Syst. Vol.	Idio. Vol.	Syst. Vol.	Idio. Vol.	Syst. Vol.	Idio. Vol.	Idio. Vol.	Idio. Vol.
Instruments Used									
Book Equity Vol.	0.18***	0.09***	0.18***	0.09***	0.16***	0.08***	0.18***	0.18***	0.17***
	0.03	0.02	0.03	0.02	0.03	0.02	0.03	0.03	0.03
Cash & STI Vol.	0.11***	0.10***	0.11**	0.10***	0.12**	0.11***	0.12***	0.12***	0.12***
	0.04	0.03	0.04	0.03	0.05	0.03	0.04	0.04	0.05
Asset Vol.	0.00***	-0.00*	0.00***	-0.00	0.00**	-0.00***			
	0.00	0.00	0.00	0.00	0.00	0.00			
European M.	-9.57***	-1.80***					-9.41***		
	0.68	0.45					0.68		
EM 98-00			-13.88***	-3.13**				-13.80***	
			1.75	1.27				1.75	
EM 01-03			-14.55***	-3.22***				-14.08***	
			1.16	0.89				1.16	
EM 04-06			-6.78***	-1.78***				-6.66***	
			0.88	0.56				0.88	
EM 07-10			-8.00***	-0.48				-7.95***	
			1.06	0.87				1.06	
EM 98-07					-10.00***	-1.68***			-9.87***
					0.76	0.48			0.76
Cash	16.07***	10.49***	16.09***	10.48***	18.27***	11.16***	15.75***	15.74***	17.98***
	3.10	2.02	3.08	2.02	3.34	2.09	3.09	3.08	3.34
Age	-3.11***	-1.30***	-3.06***	-1.30***	-3.40***	-1.61***	-3.15***	-3.10***	-3.43***
	0.60	0.38	0.60	0.38	0.64	0.39	0.60	0.60	0.64
MB	-0.10	0.05	-0.10	0.05	-0.04	0.06	-0.11	-0.10	-0.04
	0.20	0.11	0.20	0.11	0.21	0.11	0.20	0.20	0.21
Average Q	-0.02	0.61***	0.00	0.61***	0.12	0.72***	-0.03	-0.00	0.11
	0.34	0.19	0.34	0.20	0.35	0.19	0.34	0.34	0.35
Leverage	9.02***	-0.40	8.87***	-0.44	7.34***	-2.02**	8.94***	8.79***	7.26***
	1.56	0.90	1.56	0.91	1.67	0.92	1.56	1.56	1.67
Size	-1.82***	1.73***	-1.78***	1.75***	-1.63***	1.86***	-1.63***	-1.58***	-1.49***
	0.23	0.14	0.23	0.14	0.25	0.14	0.22	0.22	0.24
Amount	-1.90***	-0.64***	-1.90***	-0.65***	-2.04***	-0.75***	-1.99***	-2.00***	-2.11***
	0.20	0.12	0.20	0.12	0.22	0.13	0.20	0.20	0.22
R^2	0.199	0.052	0.202	0.053	0.206	0.069	0.199	0.201	0.206
N	16327	16327	16327	16327	14204	14204	16327	16327	14204

* p<.10, ** p<.05, *** p<.01

Table B.III: First Stage Results for the Robustness of Instruments for Borrower Country

The dependent variable in the first stage regressions is the idiosyncratic stock return volatility. The instruments used for each column are specified in the *Instruments Used* panel. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	(1)	(2)	(3)	(4)	(5)
European C.	-9.60***	-9.74***	-9.97***	-9.78***	-9.78***
	0.68	0.69	0.69	0.68	0.68
Book Equity Vol.	0.21***			0.18***	0.18***
	0.03			0.03	0.03
Cash & STI Vol.		0.23***		0.11***	0.11***
		0.04		0.04	0.04
Asset Vol.			0.00***	0.00***	0.00***
			0.00	0.00	0.00
Size	-1.61***	-1.78***	-2.03***	-1.82***	-1.82***
	0.22	0.22	0.23	0.23	0.23
Cash	19.00***	14.41***	21.72***	15.87***	15.87***
	2.84	3.06	2.86	3.09	3.09
Age	-3.28***	-3.63***	-4.01***	-3.10***	-3.10***
	0.60	0.59	0.59	0.60	0.60
MB	-0.11	-0.11	-0.14	-0.09	-0.09
	0.20	0.20	0.20	0.20	0.20
Average Q	0.01	0.12	0.28	-0.03	-0.03
	0.33	0.33	0.32	0.34	0.34
Leverage	8.42***	10.50***	10.01***	9.00***	9.00***
	1.54	1.56	1.53	1.56	1.56
Amount	-2.01***	-1.92***	-1.84***	-1.89***	-1.89***
	0.20	0.20	0.20	0.20	0.20
Instruments Used					
Cash and Short Term Inv. Vol.	YES				
Book Equity Vol.		YES			
Total Asset Vol.			YES		
Total Assets				YES	
European Dummy					YES
R^2	0.198	0.193	0.190	0.200	0.200
N	16340	16340	16340	16340	16340

* p<.10, ** p<.05, *** p<.01

Table B.IV: First Stage Results for the Robustness of Instruments for Borrower Market

The dependent variable in the first stage regressions is the idiosyncratic stock return volatility. The instruments used for each column are specified in the *Instruments Used* panel. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	(1)	(2)	(3)	(4)	(5)
European M.	-9.39***	-9.54***	-9.75***	-9.57***	-9.57***
	0.68	0.69	0.69	0.68	0.68
Book Equity Vol.	0.21***			0.18***	0.18***
	0.03			0.03	0.03
Cash & STI Vol.		0.23***		0.11***	0.11***
		0.04		0.04	0.04
Asset Vol.			0.00***	0.00***	0.00***
			0.00	0.00	0.00
Size	-1.61***	-1.78***	-2.02***	-1.82***	-1.82***
	0.22	0.22	0.23	0.23	0.23
Cash	19.18***	14.62***	21.90***	16.07***	16.07***
	2.84	3.07	2.86	3.10	3.10
Age	-3.29***	-3.64***	-4.00***	-3.11***	-3.11***
	0.60	0.59	0.59	0.60	0.60
MB	-0.12	-0.12	-0.16	-0.10	-0.10
	0.20	0.20	0.20	0.20	0.20
Average Q	0.02	0.13	0.29	-0.02	-0.02
	0.33	0.33	0.32	0.34	0.34
Leverage	8.44***	10.50***	10.01***	9.02***	9.02***
	1.54	1.56	1.53	1.56	1.56
Amount	-2.02***	-1.93***	-1.85***	-1.90***	-1.90***
	0.20	0.20	0.20	0.20	0.20
Instruments Used					
Cash and Short Term Inv. Vol.	YES				
Book Equity Vol.		YES			
Total Asset Vol.			YES		
Total Assets				YES	
European Dummy					YES
R^2	0.198	0.192	0.189	0.199	0.199
N	16327	16327	16327	16327	16327

* p<.10, ** p<.05, *** p<.01

Table B.V: First Stage Results for the U.S and Europe

The dependent variable in the first stage regressions is the idiosyncratic stock return volatility. First and third columns are the sample for U.S., and second and forth columns are for the European sample. The instruments used for each column are specified in the *Instruments Used* panel. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	Borrower Country		Borrower Market	
	U.S.	Europe	U.S.	Europe
Instruments Used				
Book Equity Vol.	0.18***	0.18***	0.18***	0.18***
	0.03	0.04	0.03	0.05
Cash & STI Vol.	0.14***	-0.07	0.14***	-0.08
	0.05	0.06	0.05	0.06
Cash	15.00***	8.62	14.92***	12.16**
	3.29	5.79	3.29	6.13
Age	-3.75***	-1.12	-3.74***	-0.98
	0.70	0.78	0.70	0.76
MB	-0.11	0.06	-0.11	-0.00
	0.22	0.23	0.22	0.24
Average Q	0.19	-1.07**	0.22	-0.98**
	0.37	0.48	0.36	0.48
Leverage	10.18***	-1.26	10.16***	-0.74
	1.69	2.83	1.68	2.87
Size	-1.62***	-1.22***	-1.64***	-1.07***
	0.27	0.25	0.27	0.26
Amount	-2.16***	-0.59**	-2.17***	-0.55**
	0.23	0.27	0.23	0.27
R^2	0.176	0.162	0.176	0.148
N	14758	1582	14748	1579

* p<.10, ** p<.05, *** p<.01

Table B.VI: First Stage Results for Main Matched Estimations

The dependent variable in the first stage regressions is the idiosyncratic stock return volatility. The instruments used for each column are specified in the *Instruments Used* panel. Loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	Borrower Country			Borrower Market		
	(1)	(2)	(3)	(4)	(5)	(6)
Instruments Used Book Equity Vol.	0.22***	0.21***	0.16***	0.15***	0.15***	0.11*
	0.06	0.06	0.06	0.05	0.05	0.05
Cash & STI Vol.	0.13	0.12	0.20**	0.03	-0.03	0.06
	0.08	0.08	0.09	0.08	0.07	0.09
European C.	-9.83***			-9.96***		
	0.89			0.96		
Europe 98-00		-13.88***			-11.40***	
		2.00			2.21	
Europe 01-03		-13.82***			-11.72***	
		1.67			1.87	
Europe 04-06		-6.01***			-1.92	
		1.22			1.32	
Europe 07-10		-8.78***			-5.63***	
		1.45			1.30	
Europe 98-07			-10.33***			-11.04***
			0.96			1.14
Cash	16.81***	17.24***	17.19***	20.86***	20.24***	21.76***
	6.33	6.20	6.61	6.70	6.08	7.48
Age	-2.73***	-2.55***	-3.23***	-1.66*	-1.27	-2.07**
	0.91	0.90	0.99	0.87	0.82	0.96
MB	-0.03	-0.03	-0.05	-0.34	-0.29	-0.30
	0.28	0.27	0.27	0.43	0.40	0.49
Average Q	-1.79***	-1.61***	-1.64***	-1.04*	-0.64	-0.90
	0.50	0.51	0.49	0.59	0.56	0.63
Leverage	3.83	3.69	2.52	4.53	2.97	3.60
	2.65	2.64	2.73	2.79	2.54	3.02
Size	-1.14***	-1.05***	-1.04***	-1.97***	-1.49***	-1.91***
	0.35	0.34	0.37	0.36	0.35	0.40
Amount	-1.19***	-1.14***	-1.08***	-0.93***	-0.30	-0.93**
	0.31	0.30	0.34	0.34	0.36	0.41
R^2	0.168	0.177	0.177	0.181	0.239	0.198
N	2878	2878	2316	2850	2850	2244

* p<.10, ** p<.05, *** p<.01

Table B.VII: First Stage Results for Estimations that use Cross Country Characteristics

The dependent variable in the first stage regressions is the idiosyncratic stock return volatility. The variable name under the column number refer to the legal variable used in the regression. The top panel, *Panel A*, uses the full sample for estimations, and the bottom panel, *Panel B*, uses the matched sample. Cash, age, market-to-book, average Q, leverage, size, loan amount, loan type, loan purpose, 2-digit SIC, and year dummies are included in the regressions but are omitted from the table. All standard errors are clustered at the firm level and are reported below the coefficient estimates.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Creditor Rights	Investor Protection	Disclosure	Liability	Market Cap.	Stocks over GDP	Stock Turnover	Common Law
***Panel A:* FULL SAMPLE**								
Legal Var.	-2.59***	1.16***	19.64***	11.61***	0.08***	0.06***	0.10***	7.56***
	0.28	0.14	2.06	1.32	0.01	0.00	0.01	0.85
Book Equity Vol.	0.19***	0.19***	0.19***	0.19***	0.19***	0.19***	0.19***	0.19***
	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Cash & STI Vol.	0.11**	0.13***	0.13***	0.13***	0.12***	0.12***	0.11**	0.13***
	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04
R^2	0.189	0.190	0.192	0.191	0.189	0.198	0.196	0.189
***Panel B:* MATCHED SAMPLE**								
Legal Var.	-1.61***	0.95***	16.39***	9.47***	0.05***	0.05***	0.08***	6.13***
	0.30	0.15	2.20	1.39	0.01	0.01	0.01	0.90
Book Equity Vol.	0.23***	0.23***	0.23***	0.22***	0.22***	0.21***	0.21***	0.23***
	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Cash & STI Vol.	0.10	0.15*	0.14*	0.16**	0.12	0.14*	0.12	0.16*
	0.08	0.08	0.08	0.08	0.09	0.08	0.08	0.08
R^2	0.116	0.125	0.132	0.129	0.105	0.148	0.138	0.124

* p<.10, ** p<.05, *** p<.01