Takeover Defense Provisions, Firm Volatility, and the Cost of Corporate Loan Finance*

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ABSTRACT

Does the negative correlation between the cost of corporate loans and the G-Index of Gompers, Ishii, and Metrick (2003) uncovered by Chava, Livdan, and Purnanandam (2009) imply that adopting anti-takeover provisions lowers the cost of debt? In this paper, we argue against such a conclusion. We present evidence that an omitted variable, firm asset volatility, can account for the statistically significant relation between the G-Index and corporate loan spreads found by Chava et al. (2009). After controlling for firms' asset volatility using estimates of equity volatility and instrumental-variable methods, we show there is no longer a robust, statistically significant relation between the G-Index and loan spreads.

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I. Introduction

Recent research by Chava, Livdan, and Purnanandam (2009), henceforth CLP, presents evidence that firms that adopt fewer takeover defenses pay significantly higher interest rate spreads on their syndicated corporate loans. CLP measure the number of takeover defense provisions that firms adopt with the well-known G-Index of Gompers, Ishii, and Metrick (2003). Instead of using the G-Index as an explanatory variable in their loan-pricing regressions, however, CLP use their takeover vulnerability index, which is inversely related to the G-Index.[1] According to CLP, takeover defenses affect the cost of corporate loans because banks charge higher loan spreads to firms with higher takeover vulnerability largely due to banks' concern about the potential for an increase in the leverage of these firms after a successful takeover bid.

In this paper, we show that an omitted variable, the asset volatility of a firm, can explain the significant, positive relation between takeover vulnerability and the cost of bank loans in CLP. That asset volatility could be an important determinant of loan spreads can be motivated by John, Litov, and Yeung (2008), who show that the G-Index is negatively related to firms' risk-taking and cash-flow volatility. John et al. (2008) argue that the managers of firms insulated from disciplinary takeovers lower their risk-taking in order to protect their managerial positions. This behavior increases expected future opportunities for managers to make non-value maximizing decisions that benefit themselves at firms' shareholders' expense. We expect that if lower risk-taking and cash-flow volatility reduces firms' asset volatility, then a negative relation between firms' asset volatility and the G-Index could induce a positive relation between takeover vulnerability and corporate loan spreads.

In order to examine the robustness of CLP's findings, we do the following. First, we replicate the base loan-pricing regressions that CLP use in their analysis. In estimating these regressions,

[1]The takeover vulnerability index is defined as 24 minus the G-Index and directly measures a firm's exposure to takeover risk. The G-Index is based on the 24 governance rules used by Gompers, Ishii, and Metrick (2003) to construct a measure of the level of shareholder rights at large firms.

we use the same sample period from 1990 to 2004, the same firm-specific and loan-specific variable definitions, the same regression specifications, and the same estimation procedure, i.e., ordinary least squares (OLS). Based on the OLS estimates from these regressions, we confirm CLP's findings of a statistically significant, positive relation between takeover vulnerability and loan spreads. Then, we control for asset volatility, which is unobservable or at best difficult to accurately measure (see Choi and Richardson (2012)), by adding equity volatility to the specification and re-estimating the regressions using OLS. The inclusion of equity volatility as an explanatory variable to the regression specification decreases the coefficient estimate for takeover vulnerability by half and changes its statistical significance from the 1 percent level to the 10 percent level.

However, because equity volatility is a noisy or error-prone measure of firm asset volatility, controlling for asset volatility with equity volatility in OLS regressions poses an econometric problem. This is because the error in measuring asset volatility with equity volatility will result in biased and inconsistent coefficient estimates for any regressor correlated with asset volatility, such as takeover vulnerability. Therefore, in order to obtain a consistent estimate of the relation between takeover vulnerability and loan spreads, we employ the instrumental-variable (IV) estimation methods suggested by Gaul and Uysal (2013) and instrument for equity volatility to address the measurement error problem. In the IV procedure, we use as instrumental variables for equity volatility an estimate of firms' cash-flow volatility; a measure of peer firms' equity volatility, where peers are defined by year, industry, and size; and estimates of aggregate stock return volatility for several different value-weighted portfolios of stocks. The IV results are robust to the choice of instrumental variable and show that there is no longer a statistically significant relation between takeover vulnerability and loan spreads over the sample period used by CLP.

In other estimations, we follow the steps described above and estimate the same regressions over a longer sample period from 1990 to 2006. This allows us to update CLP's results and also to assess whether there may have been a change over time in the relation between takeover vulnerability and loan spreads. Based on the IV regression estimates for the longer sample period, we again show

that takeover vulnerability is not a statistically significant determinant of loan spreads when asset volatility is controlled for with equity volatility.

Next, as is done in CLP, we also consider in our empirical analysis two corner portfolios of firms sorted on the G-Index, or alternatively CLP's takeover vulnerability index, which is calculated as 24 minus the G-Index: a Democracy portfolio (where G $\leqslant$ 5 or takeover vulnerability index $\geqslant$ 19) and a Dictatorship portfolio (where G $\geqslant$ 14 or takeover vulnerability index $\leqslant$ 10). CLP claim that democratic firms are more likely to be taken over and therefore pay higher spreads due to the greater threat of a leverage-increasing takeover.

In the corner portfolio regressions, we replace the takeover vulnerability measure with the Democracy and Dictatorship portfolio dummy variables and re-estimate the loan-pricing regressions for both sample periods. We are unable to fully replicate the OLS results of CLP for regressions that omit equity volatility for the 1990-2004 sample period. CLP find a statistically significant, positive relation between the Democracy variable and loan spreads, and a statistically significant, negative relation between the Dictatorship variable and loan spreads. While we are able to replicate their results for the relation between the Dictatorship variable and loan spreads, we do not find a statistically significant relation between the Democracy variable and loan spreads. Then, in OLS and IV regressions where we control for asset volatility with equity volatility, we show that there is no reliable and consistent relation between the Democracy and Dictatorship variables and loan spreads in either the 1990-2004 or 1990-2006 sample periods. In order to assess the sensitivity of the results to the choice of thresholds for the Democracy and Dictatorship portfolios, we also estimate IV regressions for varying cutoffs for the two corner portfolios using firms' cash-flow volatility as an instrument for equity volatility. Based on these regressions, we find no reliable and consistent relation between the Democracy and Dictatorship variables and loan spreads.

Finally, we conclude our analysis with a re-examination of the empirical support for the leverage-increasing takeover hypothesis put forth by CLP. In their paper, CLP hypothesize that banks charge a higher loan spread to firms with higher takeover vulnerability because of banks' concern about an

increase in firms' leverage following a takeover. CLP argue that firms with low-leverage at the time of loan origination are more likely to be the targets of leverage-increasing takeovers, and banks may charge a higher loan spread as compensation for this risk. CLP estimate leverage-channel loan-pricing regressions that they argue show that the effect of a leverage-increasing takeover on loan spreads is greatest for lower-leverage firms with more debt capacity. We are unable to fully replicate CLP's results for the 1990-2004 sample period and find no empirical support for their leverage-increasing hypothesis in either the 1990-2004 or 1990-2006 sample periods.

The remainder of the paper is organized as follows. Section II presents the empirical loan-pricing model and describes our instrumental-variable estimation approach. Section III discusses the sample data and the dependent and explanatory variables. Section IV presents descriptive statistics for the variables. In Section V, we present our OLS and IV regression results. Section VI offers a re-examination of the empirical support for CLP's leverage-increasing takeover hypothesis. Finally, Section VII concludes.

II. Empirical Model

Our empirical model is based on Gaul and Uysal (2013), and we refer the reader to their paper for a detailed discussion of modeling and estimation issues.

Following Gaul and Uysal (2013), we model the interest rate spreads on corporate loans as an approximately linear function of firm-specific and loan-specific risk factors. If we denote the G-Index from Gompers et al. (2003) as G, then the takeover vulnerability index, T, would be equal to $24 - G$ as specified in CLP. We can specify the underlying model in which we substitute the expression for G in terms of T as follows:

$$r_i - r_f = \beta_0 + \beta_1 \sigma_{Ai} + \beta_2 \frac{D_i}{A_i} + \beta_3 \underbrace{(24 - T_i)}_{G_i} + \beta_4 Z_{4i} + \ldots + \beta_k Z_{ki} + \varepsilon_{1i}. \quad (1)$$

In equation (1), the subscript i refers to firm i, and $r_i - r_f$ is the interest rate spread on the loan

which is the all-in-drawn spread on the loan, r_i, minus the risk free rate, r_f. Loan spreads are a function of the takeover vulnerability index, T, firms' expected future asset volatility, σ_{Ai}, borrower leverage, $\frac{D_i}{A_i}$, which is total debt, D, divided by the market value of assets, A, and additional control variables $Z_4 - Z_k$. The term ε_{1i} is the regression error, which includes the remaining determinants of loan spreads that are orthogonal to the control variables.

If we focus on the term $\beta_3 \underbrace{(24 - T_i)}_{G_i}$, we see that β_3 would be the coefficient on the G-Index in a model where we include G in the regression rather than T. And, according to the logic from CLP, we would expect $\beta_3 < 0$. If we then multiply out the term $\beta_3 \underbrace{(24 - T_i)}_{G_i}$, we also see that $-\beta_3$ would be the coefficient on takeover vulnerability. We expect takeover vulnerability to be positively related to loan spreads because $-\beta_3 > 0$.

As Gaul and Uysal (2013) point out, an econometric problem with estimating equation (1) is that asset volatility is unobservable. One estimation approach is to leave asset volatility as an omitted variable and allow it to be absorbed by the regression error term and estimate the model with OLS. We interpret the results that CLP present in their paper as OLS estimates of regression models identical to equation (1) that omit asset volatility and assume that $\beta_1 = 0$.

The problem with omitting any control variables for firm asset volatility, is that if $\beta_1 \neq 0$, then omitting asset volatility will create an omitted variable bias (OVB) in the coefficient estimate of any explanatory variable that is correlated with asset volatility, such as the takeover vulnerability index, T. If we estimate equation (1) with OLS, we expect the coefficient estimate for T, which we denote as $-\widehat{\beta_3^{OVB}}$, to be equal to

$$\text{plim } -\widehat{\beta_3^{OVB}} = -\beta_3 + \beta_1 \phi_{\sigma_A, T_i}. \tag{2}$$

Equation (2) states that the coefficient estimate for T would be equal to the true value of $-\beta_3$ plus a second term. This second term is the product of the coefficient on firm asset volatility multiplied by ϕ_{σ_A, T_i}, which is the coefficient on T in a regression of firm asset volatility on all of the control

variables in equation (1). Since we expect firm asset volatility to be positively related to loan spreads and takeover vulnerability, we predict $-\widehat{\beta_3^{OVB}}$ to be an upward-biased estimator of $-\beta_3$. We expect that the positive relation between takeover vulnerability and loan spreads found by CLP could be due to $-\beta_3 = 0$ and $\phi_{\sigma_A,T_i} > 0$.

To remove the omitted-variable bias in the estimate of $-\beta_3$, we follow Gaul and Uysal (2013) and include equity volatility in regressions that explain loan spreads as an indicator variable for firm asset volatility.[2] To operationalize this approach, Gaul and Uysal (2013) suggest that firms' equity volatility, denoted as σ_{Ei}, can be approximated as a linear function of expected future asset volatility and leverage as

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

where ε_{2i} is orthogonal to the control variables in equation (1).

Gaul and Uysal (2013) show that if we solve for σ_{Ai} in equation (3) and substitute the expression into equation (1) that the following regression model can be derived:

$$r_i - r_f = \rho_0 + \rho_1 \sigma_{Ei} + \rho_2 \frac{D_i}{A_i} - \beta_3 T_i + \beta_4 Z_{4i} + \ldots + \beta_k Z_{ki} + \eta_i \tag{4}$$

where $\rho_0 = \beta_0 + 24\beta_3 - \frac{\beta_1 \alpha_0}{\alpha_1}$, $\rho_1 = \frac{\beta_1}{\alpha_1}$, and $\rho_2 = \beta_2 - \frac{\beta_1 \alpha_2}{\alpha_1}$. Because $COV\left[\sigma_{Ei}, \eta_i\right] \neq 0$, Gaul and Uysal (2013) show that, if we estimate equation (4) with OLS, the estimate for $-\beta_3$, which we denote as $-\hat{\beta}_3$, will be equal to

$$\text{plim} - \hat{\beta}_3 = -\beta_3 + \beta_1 \phi_{\sigma_A,T_i}(1 - \pi_1) \tag{5}$$

[2]While the terms indicator variable and proxy variable are often used interchangeably, it is technically incorrect to do so. We consider equity volatility to be an indicator variable for asset volatility because we expect the regression error term in equation (3) to be correlated with equity volatility and to potentially contain variation that is irrelevant to loan pricing. If we expected, instead, the regression error to be correlated with asset volatility rather than equity volatility, then we would refer to equity volatility as a proxy variable and our instrumental-variable methods would not be applicable, since the regression error in equation (3) would be an omitted variable in our loan-pricing regressions. For a thorough discussion of using indicator variables and instrumental-variable methods to control for unobserved variables, see Greene (2011) and Wooldridge (2010).

where π_1 represents the signal-to-noise ratio for equity volatility, which measures the fraction of the variability in equity volatility that reflects asset volatility, after orthogonalizing equity volatility with respect to all the control variables in equation (4).

Because equity volatility measures asset volatility with error, in order to obtain a consistent estimate of $-\beta_3$ we instrument equity volatility with variables that are correlated with asset volatility but uncorrelated with ε_{1i} and ε_{2i}. Gaul and Uysal (2013) suggest the use of estimates of the standard deviation of firms' financial statement ratios as instrumental variables. They argue that financial-statement volatility is a determinant of firms' asset volatility because firms with more volatile financial statements have more volatile asset values. These variables are valid instruments (1) if they are only correlated with the component of equity volatility related to asset volatility, which would imply that they are orthogonal to ε_{2i}; and (2) if they are exogenous to loan spreads conditional on asset volatility, which would imply the instruments are orthogonal to ε_{1i}.

As a robustness check on the choice of instrumental variable, we use additional instrumental variables for firm-specific equity volatility based on alternative stock return volatility measures.[3] First, we use instruments based on aggregate stock return volatilities for several different value-weighted stock portfolios, which include estimates of total aggregate stock market volatility, industry volatility, and size-decile volatility. Second, we calculate and use an estimate of firms' peer stock return volatility as an instrumental variable, where peers are matched exactly by year and industry and then with the firm with the closest asset size. We argue that if, conditional on a firm's leverage, these instrumental variables, which are calculated from stock return volatilities, are not too highly correlated with the borrower-level error in measuring a firm's asset volatility with equity volatility, and are uncorrelated with omitted borrower-level risk factors, then these instrumental variables can be used to identify consistent estimates of the relation between takeover vulnerability and loan spreads.[4]

[3] As noted by Roberts and Whited (2011), truly exogenous instruments are extremely difficult to find. This is particularly true in empirical corporate finance research.

[4] We thank the editor Ivo Welch for suggesting the use of these additional instrumental variables.

In concluding this section, we should point out that our estimation method is widely known but not often used in empirical corporate research. For an example of our instrumental variable methodology in another context, see Blackburn and Neumark (1992). In their analysis, they attempt to control for unobservable ability in an empirical analysis of interindustry wage differentials. They use IQ and other test scores as measures of unobservable ability and instrument these scores with family background variables that they argue are determinants of ability. In our analysis, estimates of equity volatility are our counterpart to IQ and other test scores, and our estimates of financial-statement ratio volatility and the four alternative stock return volatility measures are our counterparts to family background variables.

III. Data Description and Variables

A. CLP Data

To construct our dataset, we first replicate the firm-specific balance sheet variables, loan-specific variables, and measures of takeover vulnerability that CLP use in their analysis. We obtain data on corporate loans from the Dealscan database distributed by the Loan Pricing Corporation. The sources of firm-specific characteristics are the Standard and Poor's COMPUSTAT and CRSP databases. We obtain data on the G-Index from the Institutional Shareholder Service on WRDS. Then, to complete our dataset, we add variables that are necessary to test the hypothesis that asset volatility can explain the relation between takeover vulnerability and loan spreads. We refer the reader to CLP for a detailed discussion on constructing the dataset with the exception of the modifications to the dataset that we describe in the remainder of this section.[5][6]

We have two separate estimation samples. Our first sample replicates the time period that CLP use in their analysis which spans 1990-2004. This sample includes 7089 facilities for 1319

[5]Based on correspondence with CLP, we follow what they did in their analysis and drop all Dual-class firms from our samples and winsorize all continuous control variables at the 1 percent and 99 percent levels.

[6]We also include details of the construction of the variables that we include in the analysis in the Internet Appendix.

non-financial U.S. public corporations. Our second sample spans a longer time period 1990-2006 and includes 8293 facilities for 1405 non-financial U.S. corporations. We extend the sample to 2006 from 2004 using the G-Index observations available in 2006. We end the sample in 2006 to ensure that the recent 2007-2009 financial crisis does not confound our estimations and inferences.

B. Volatility Measures

We calculate several additional variables for our analysis besides those used by CLP.

First, we calculate estimates of firms' equity volatility with data on their weekly stock returns. To calculate weekly returns, we use stock price data from CRSP for the last trading day of each week after adjusting stock prices for stock splits. We estimate equity volatility as the standard deviation of firms' weekly stock returns for each calendar year, which we annualize by multiplying by $100 \times \sqrt{52}$. We calculate equity volatility with data on stock prices from the calendar year prior to the calendar year in which a loan was originated.

Second, we construct an instrumental variable for firm-specific equity volatility using firms' quarterly financial statement data from COMPUSTAT. The instrumental variable we use is a measure of firms' quarterly cash-flow volatility, which is the standard deviation of a borrower's quarterly return on assets (ROA). We calculate ROA as earnings before interest, taxes, and depreciation (EBITDA) divided by total assets. We calculate the volatility of firms' ROA as the standard deviation of firms' EBITDA-to-assets ratio using four quarters beginning with data from the fourth quarter of the calendar year, prior to loan origination, back through the first quarter of the same calendar year.

Third, we also calculate four additional instrumental variables for firm-specific equity volatility based on alternative stock return volatility measures. We calculate stock return volatilities separately for the total CRSP value-weighted portfolios at the market level; for value-weighted portfolios for each of the Fama-French 48 industry classifications; and for yearly value-weighted portfolios for the CRSP market capitalization deciles. To measure the level of value-wighted stock portfolios,

we use stock price data from CRSP for the last trading day of each week after adjusting stock prices for stock splits and calculate the weekly-value-weighted portfolio returns. We calculate estimates of portfolio volatilities as the standard deviation of weekly value-weighted portfolio returns for each calendar year, which we annualize by multiplying by 100 $\times\sqrt{52}$. We merge yearly total CRSP value-weighted portfolio volatility to all borrowers in a given year. We merge the yearly Fama-French 48 industry value-weighted portfolio volatility and corresponding yearly size-decile portfolio volatility to each borrower by matching portfolio volatilities to each borrowers matching yearly industry and size-decile classification.

Finally, we calculate an instrumental variable based on a measure of peer-firm volatility by matching a borrower to the firm with the closest total asset value. We measure closeness using a Euclidean distance measure based on total asset value in each firm's industry for each year.[7] We use weekly stock returns from CRSP to calculate peer-firms' stock return volatilities and use all firms in both COMPUSTAT and CRSP as potential peer matches.

IV. Descriptive Statistics

Table I presents frequency distributions for the G-Index and the number of bank loans for the two sample periods. To provide a comparison, this table also presents the G-Index frequency distribution from CLP.[8] We note that our G-Index frequency distributions have many more loan observations in the tails of the distributions for both the 1990-2004 and 1990-2006 sample periods than the G-Index distribution that CLP use in their empirical analysis.

[PLACE TABLE I HERE]

Panel A of Table II presents means, medians, and standard deviations of the loan characteristics, firm characteristics, and macroeconomic variables used in our regressions for both sample periods.

[7] We use the command vmatch in Stata to calculate the Euclidean measure of closeness used in deriving peer-firm volatility.

[8] CLP do not provide detail on the loans for firms with G-Index values of 5 provisions or fewer and for 14 provisions or more.

Overall, the descriptive statistics for the variables are comparable to those for the sample of firms that CLP use for both sample periods with the exception that in our sample, loans have somewhat higher spreads and firms are slightly larger. Panel B of Table II presents correlations for our main firm-specific and loan-specific control variables with loan spreads, equity volatility, and takeover vulnerability for both sample periods. Among these correlations, both loan spreads and equity volatility have a higher correlation with takeover vulnerability than any other control variable in our dataset.

[PLACE TABLE II HERE]

V. Regression Results

A. Takeover Vulnerability Explaining Loan Spreads

Table III presents the OLS and IV results for several regression specifications where the log of loan spreads is explained by firm-specific, loan-specific, and macroeconomic risk factors. The results in columns (1) and (2) replicate the base loan-pricing regressions from CLP and show that takeover vulnerability has a positive and statistically significant relation with loan spreads in both sample periods. However, the OLS results reported in columns (3) and (4) show that the coefficient estimates for the takeover vulnerability variables are no longer statistically significant once we add firm-specific equity volatility as a control variable for firm-specific asset volatility to the regression specification. These results are consistent with the prediction from equation (2) in Section II that there could be a positive relation between takeover vulnerability and loan spreads due to omitted control variables for firms' asset volatility, and the prediction from equation (5) in Section II that controlling for firms' asset volatility with equity volatility in OLS regressions could reduce, or even eliminate, the significant positive relation between takeover vulnerability and loan spreads.

[PLACE TABLE III HERE]

In columns (5) through (8), we present results from first-stage and second-stage IV regressions where we instrument the equity volatility of the firm with estimates of the standard deviation of the firm's quarterly ROA. For the IV regressions, equity volatility is the dependent variable in the first-stage regressions, and the predicted value of equity volatility from the first-stage regressions is used as a predictor variable in the second-stage regressions. The first-stage results show that, consistent with our identifying assumptions, the standard deviation of quarterly ROA has a positive and statistically significant relation with equity volatility. In addition, the first-stage results show that takeover vulnerability has a significant positive relation with equity volatility. This result is consistent with our claim that takeover vulnerability is positively related to asset volatility. The second-stage results are consistent with the OLS results, and again show that there is no statistically significant relation between loan spreads and takeover vulnerability once we control for a firm's asset volatility with its equity volatility.

CLP cluster their robust standard errors at the firm level and we do the same. However, in order to further examine the robustness of these results, we also replicate the specifications from Table III but cluster standard errors by firm and year in order to take into account the correlation in residuals within years. These results, which are included in the Internet Appendix, show that the two-way cluster robust standard errors for the takeover vulnerability variable are larger than the robust standard errors that are only clustered by firm.

Next, we discuss instrumental-variable results for which total market stock volatility, industry stock volatility, size-decile stock volatility, and peer-firm stock volatility are used as instruments for equity volatility instead of ROA volatility in the first-stage regressions. The second-stage IV results are presented in Table IV. In all of these second-stage regression specifications, we omit year dummy variables because we do not have enough variation in our stock-return based instrumental variables to obtain reasonably precise estimates. We also omit industry dummy variables for the specifications where industry volatility is used as the instrument. The second-stage IV estimates show that the results based on the three aggregate stock volatility instruments and peer-firm stock

volatility are the same as those for which ROA volatility is used as the instrumental variable.

[PLACE TABLE IV HERE]

B. Corner Portfolio Dummy Variables Explaining Loan Spreads

Like CLP, we also consider in our empirical analysis two corner portfolios of firms sorted on the G-Index or alternatively the takeover vulnerability index: a Democracy portfolio (G $\leqslant$ 5 or takeover vulnerability index $\geqslant$ 19) and a Dictatorship portfolio (G $\geqslant$ 14 or takeover vulnerability index $\leqslant$ 10). Table V presents results for regression specifications that are identical to those in Table III except that we replace the takeover vulnerability measure with the Democracy and Dictatorship portfolio dummy variables. The OLS results in columns (1) through (4) show that the coefficient estimates on the Dictatorship variable are significant and negative, and that the coefficient estimates on the Democracy variable are not statistically significant. Furthermore, the results in columns (3) and (4) show that the Dictatorship variable still has a statistically significant, negative relation with loan spreads even after we add equity volatility to the regression specification as a control for asset volatility, although the coefficient estimate for the Dictatorship variable is smaller in absolute value than in columns (1) and (2). This latter result is consistent with the claim that there could be a downward bias in the coefficient estimate on the Dictatorship variable and that controlling for firm asset volatility with equity volatility in loan-pricing regressions mitigates this omitted-variable bias.

[PLACE TABLE V HERE]

In columns (5) through (8) of Table V, we present first-stage and second-stage IV estimates of the relation between the Democracy and Dictatorship dummy variables and loan spreads. In the first-stage regressions, ROA volatility is used an the instrument for equity volatility. The first-stage results show that the Democracy variable has a significant positive relation with equity volatility and that the Dictatorship variable has a significant negative relation with equity volatility. These

results are consistent with the claim that greater takeover vulnerability is associated with higher firm asset volatility. The second-stage results show that the Dictatorship variable has a negative and marginally statistically significant relation with loan spreads for the 1990-2004 sample period but does not have a statistically significant relation with loan spreads for the 1990-2006 sample period.

The results in Table V suggest that there may be an effect of takeover vulnerability on loan spreads, but that the result is not robust to adding an additional two years of data and approximately 2000 loan observations to the 1990-2004 sample period used by CLP. To examine further the robustness of these results, we re-estimate the regression specifications in Table V to assess whether downward-biased standard errors could be responsible for the statistically significant coefficient estimates for the Dictatorship dummy variable. The results, which we present in the Internet Appendix, show that the standard errors for the coefficient estimates on the Dictatorship variable actually decrease when we cluster by firm and year. In fact, the coefficient estimate on the Dictatorship variable actually becomes statistically different from zero at the 10 percent level for the 1990-2006 sample period. We speculate that, because there are relatively few observations in the Democracy and Dictatorship portfolios, we may have imprecise estimates of the Democracy and Dictatorship coefficients and standard errors and that sampling variation could limit the reliability of these results.

In order to examine whether the reliability of the coefficient estimates for the Democracy and Dictatorship portfolios could be responsible for the ambiguous results for the Dictatorship portfolio variables, we re-estimate our IV regressions using varying cutoffs for the Democracy and Dictatorship portfolios. We vary the Democracy threshold by defining the Democracy portfolio as including firms with 5, 6, or 7 or fewer takeover defense provisions in their charters, and vary the Dictatorship threshold by defining the Dictatorship portfolio as including firms with 14, 13, or 12 or more takeover defense provisions in their charters. We estimate specifications for all nine combinations of these Dictatorship and Democracy portfolios for both sample periods. For all specifications, we

cluster standard errors by firm and also by firm and year.

[PLACE TABLE VI HERE]

The second-stage IV results, which we present in Table VI, show that the Dictatorship coefficient estimates are for the most part only statistically different from zero at meaningful significance levels when the Dictatorship variable is defined as firms having adopted 14 or more takeover defense provisions in the 1990-2004 sample period. It is important to note that we also find a negative and statistically significant coefficient estimate for the Democracy variable when the Democracy portfolio is defined as firms having adopted 6 or fewer takeover defense provisions in both the 1990-2004 and 1990-2006 sample periods. In contrast to CLP's corner portfolio results, these results suggests that greater takeover vulnerability could actually lower the cost of corporate loans.

Overall, we interpret the results presented in Table VI as suggesting that there is no reliable and consistent relation between the Democracy and Dictatorship dummy variables and loan spreads. We suggest that the pattern of coefficient estimates in Table VI is consistent with the claim that the coefficient estimates for the Democracy and Dictatorship variables are imprecise and that the marginal and inconsistent statistical significance of the Democracy and Dictatorship coefficient estimates could be due to chance sampling variation, rather than to a robust, significant statistical relation between the two corner portfolios and loan spreads.

VI. A Re-examination of the Leverage-Increasing Takeover Hypothesis

In their paper, CLP hypothesize that banks charge a higher loan spread to firms with more shareholder rights (i.e., higher takeover vulnerability) because of banks' concern with an increase in the firm's financial risk consequent to a takeover. According to this leverage-increasing takeover hypothesis, firms with low leverage at the time of loan origination are more likely to be the targets of

leverage-increasing takeovers, and therefore banks may charge a higher loan spread to protect themselves against this risk. One could argue that takeover vulnerability is related to equity volatility due to the threat of a leverage-increasing takeover, if equity volatility is greater due to an expected increase in future leverage for those firms that adopt fewer takeover defenses. If the threat of a leverage-increasing takeover is responsible for the relation between takeover vulnerability and equity volatility, then equity volatility could also be spuriously explaining the relation between takeover vulnerability and loan spreads in the loan-pricing regressions we estimated in Section V for reasons other than the correlation between takeover vulnerability and firms' asset volatility. As a result, it is important to re-examine the empirical support for CLP's leverage-increasing takeover hypothesis.

In their empirical analysis, CLP estimate leverage-channel loan-pricing regressions and show that the effect of a leverage-increasing takeover on loan spreads is greatest for lower-leverage firms with more debt capacity. In their estimations, they include the variable *takeover* and its interaction with the variable *low leverage* in their Model 1 which is presented in Table 3 of their paper. In their empirical specifications, CLP appear to have omitted a linear lowest-leverage term and, therefore, their specifications potentially have omitted a relevant variable. In Table VII, we re-estimate CLP's regression specification without a lowest-leverage tercile dummy variable but are unable to replicate their result that shows that the relation between takeover vulnerability and loan spreads is greater for lower-leverage firms for the 1990-2004 sample period. We find the same lack of empirical support for CLP's leverage-increasing hypothesis for both sample periods when we control for the linear lowest-leverage tercile dummy variable in the regression specification.[9]

[9] Another reason to call into question the validity of the leverage-increasing takeover hypothesis is based on Roberts (2014), who presents evidence that syndicated corporate loans are frequently renegotiated every 9 months on average. Roberts (2014) argues that this frequent renegotiation makes syndicated corporate loans more closely resemble state-contingent contracts, and reduces the need for lenders to contract on all future anticipated contingencies. According to Miller (2014), a change in control or ownership of a borrower triggers a default in a standing credit agreement. If loan agreements are renegotiated following a default on an outstanding credit agreement, as they typically are following covenant violations (see Nini, Smith, and Sufi (2012)), we might expect that loans could be renegotiated at higher interest rates following a leverage-increasing takeover. Therefore, lenders may not need to price the effect of leverage-increasing takeovers ex-ante into loan spreads.

[PLACE TABLE VII HERE]

VII. Conclusion

In this paper, we reproduce the finding from CLP that takeover vulnerability is positively related to the cost of corporate loans. However, we find that there is no robust, statistically significant positive relation between takeover vulnerability and loan spreads once we control for firm asset volatility using estimates of equity volatility and the instrumental-variable methods suggested by Gaul and Uysal (2013).

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Table I. **G-Index and the number of bank loans**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	CLP Sample			**1990-2004**			**1990-2006**		
G-Index	Freq.	Perc.	Cum.	Freq.	Perc.	Cum.	Freq.	Perc.	Cum.
2				1	0	0	1	0	0
3	398	6	6	38	1	1	41	0	1
4				181	3	3	192	2	3
5				332	5	8	368	4	7
6	442	7	13	466	6	14	528	6	14
7	604	9	22	647	10	24	806	10	23
8	833	13	35	837	12	36	984	12	35
9	912	14	49	1,003	14	50	1,235	15	50
10	896	14	63	985	14	64	1,133	14	64
11	896	14	77	925	13	77	1,072	13	77
12	633	10	87	653	9	86	777	9	86
13	480	7	94	535	8	94	630	8	94
14				290	4	98	336	4	98
15	374	6	100	128	2	99	145	2	99
16				37	1	100	41	0	100
17				4	0	100	4	0	100
Total	6,468	100		7,089	100		8,293	100	

Description: This table reports the frequency distribution of sample loans across the G-Index of Gompers, Ishii, and Metrick (2003). Column (1) reproduces the numbers from Table I of CLP which reports the aggregated number of loans for G $\leqslant$ 5 or G $\geqslant$ 14. We calculated columns (2) and (3) using the information in column (1). Columns (4)-(6) report the frequency distribution for our data sample for the same time period as CLP and columns (7)-(9) report the frequency distribution for the extended time period.

Table II. **Descriptive statistics for the 1990-2004 and 1990-2006 sample periods**

	Panel A: Sample characteristics					
	Mean	Median	Std. dev.	Mean	Median	Std. dev.
(i) **Loan characteristics**		**1990-2004**			**1990-2006**	
Spread *(bps.)*	129	88	119	128	88	118
Loan size *(mil. $)*	423	200	725	453	225	833
Maturity *(months)*	40	36	27	42	37	27
No of lenders	11	8	10	11	8	10
(ii) **Firm-level characteristics**		**1990-2004**			**1990-2006**	
Takeover vulnerability	14.52	14.00	2.67	14.50	15.00	2.63
Equity volatility	36.59	34.21	14.26	35.16	32.79	14.02
ROA volatility	2.29	1.20	3.51	2.24	1.19	3.46
Market cap.	6.74	1.57	18.59	7.17	1.69	19.39
EBITDA/Sales	0.16	0.14	0.31	0.16	0.14	0.30
Leverage	0.31	0.30	0.18	0.30	0.30	0.18
Modified Altman-Z	1.85	1.80	1.36	1.85	1.80	1.34
(iii) **Macro variables**		**1990-2004**			**1990-2006**	
Credit spread	0.83	0.76	0.20	0.83	0.81	0.19
Term spread	1.48	1.58	1.03	1.34	0.94	1.06

	Panel B: Correlation Matricies					
	Spread	Equity volatility	Takeover vulnerability	Spread	Equity volatility	Takeover vulnerability
		1990-2004			**1990-2006**	
Spread	1.00	0.46***	0.12***	1.00	0.45***	0.12***
Equity volatility	0.46***	1.00	0.19***	0.45***	1.00	0.19***
Takeover vulnerability	0.12***	0.19***	1.00	0.12***	0.19***	1.00
ROA volatility	0.21***	0.28***	0.09***	0.21***	0.27***	0.08***
Loan size	–0.21***	–0.16***	–0.02*	–0.20***	–0.17***	–0.01
Maturity	0.13***	–0.01	0.05***	0.12***	–0.06***	0.04***
No of lenders	–0.14***	–0.14***	–0.08***	–0.15***	–0.14***	–0.07***
Market cap.	–0.21***	–0.09***	0.03***	–0.22***	–0.11***	0.04***
EBITDA/Sales	–0.10***	–0.11***	-0.03**	–0.10***	–0.11***	–0.03**
Leverage	0.25***	0.02*	0.01	0.26***	0.04***	0.02*
Modified Altman-Z	–0.22***	–0.12***	–0.05***	–0.22***	–0.10***	–0.05***

Description: Spread is the all-in-drawn spread on the corporate loan measured over LIBOR and expressed in basis points (bps). Equity volatility is the stock return volatility of the firm. Takeover vulnerability is defined as 24–G, where G denotes the G-Index, which measures the number of takeover defense provisions in the firm's charter. Loan size is the amount of the loan in millions of U.S. dollars. Maturity indicates the maturity of the loan in months. No of lenders refers to the number of lenders in the syndicate. Market cap refers to the market capitalization of the firm in billions of U.S. dollars in the month before the loan origination. EDITDA/Sales is the ratio of EBITDA of the firm to the sales of the firm. Leverage is the total debt (long-term plus short-term) divided by total assets of the firm. Modified Altman-Z is the modified version of Altman-Z without leverage. Credit spread is the credit spread expressed in bps, and measured as the difference of BAA and AAA yields. Term spread is the term spread expressed in bps, and measured as the difference of 10-year and 1-year U.S. Treasury notes. *, **, and *** denote estimated Pearson correlation coefficients that are significantly different from zero at the 0.10, 0.05, and 0.01 levels, respectively.

Table III. **OLS and IV results for takeover vulnerability explaining loan spreads**

	(1) OLS no vol **1990-2004**	(2) OLS no vol **1990-2006**	(3) OLS w/vol **1990-2004**	(4) OLS w/vol **1990-2006**	(5) IV-1st **1990-2004**	(6) IV-2nd **1990-2004**	(7) IV-1st **1990-2006**	(8) IV-2nd **1990-2006**
Takeover vulnerability$_t$	0.02***	0.02***	0.01*	0.01	0.57***	0.00	0.58***	0.00
	0.01	0.01	0.00	0.00	0.09	0.01	0.08	0.01
Equity volatility$_{t-1}$			0.01***	0.02***		0.02***		0.02***
			0.00	0.00		0.01		0.01
log(Market cap.$_{t-1}$)	–0.28***	–0.28***	–0.24***	–0.25***	–2.31***	–0.22***	–2.26***	–0.22***
	0.01	0.01	0.01	0.01	0.17	0.02	0.16	0.02
EBITDA$_{t-1}$/Sales$_{t-1}$	–0.04*	–0.04*	–0.03*	–0.03	–0.67	–0.02*	–0.85	–0.02
	0.02	0.03	0.02	0.02	0.50	0.01	0.60	0.02
Leverage$_{t-1}$	0.63***	0.60***	0.60***	0.58***	2.83	0.59***	1.97	0.57***
	0.09	0.09	0.08	0.08	1.73	0.08	1.67	0.08
Modified Altman-Z$_{t-1}$	–0.07***	–0.07***	–0.04**	–0.05**	–1.51***	–0.03	–1.44***	–0.03*
	0.02	0.02	0.02	0.02	0.34	0.02	0.29	0.02
Maturity$_t$	0.00	0.00	0.00	0.00	–0.00	0.00	–0.00	0.00
	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
No. of lenders$_t$	0.00	0.00	0.00	0.00	–0.01	0.00	–0.01	0.00
	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00
Performance pricing$_t$	–0.03	–0.05**	–0.02	–0.04*	–0.63	–0.01	–0.77**	–0.03
	0.02	0.02	0.02	0.02	0.38	0.02	0.34	0.02
Term loan$_t$	0.70***	0.62***	0.68***	0.61***	1.32	0.67***	0.72	0.60***
	0.04	0.04	0.04	0.04	0.81	0.04	0.65	0.04
Corp. spread$_{t-1}$	0.02	–0.04	0.08	0.01	–3.37**	0.10	–3.07**	0.04
	0.11	0.10	0.10	0.09	1.64	0.11	1.43	0.10
Term spread$_{t-1}$	0.01	0.02	0.01	0.02	–0.08	0.01	–0.24	0.03
	0.02	0.02	0.02	0.02	0.44	0.02	0.40	0.02
ROA volatility$_{t-1}$					0.53***		0.51***	
					0.07		0.06	
R^2	0.52	0.52	0.55	0.55	0.26		0.26	
N	7089	8293	7089	8293	7089	7089	8293	8293
Under-Id						0.00		0.00
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan-Purpose Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Description: The dependent variable in the OLS and 2^{nd}-stage IV regressions is the natural logarithm of the all-in-drawn spread on the loan. The dependent variable in the 1^{st}-stage IV regressions is the equity volatility of the firm and firm-specific ROA volatility is the instrumental variable for equity volatility. Takeover vulnerability is defined as 24–G, where G denotes the G-Index, which measures the number of takeover defense provisions in the firm's charter. Equity volatility is the stock return volatility of the firm. The explanatory variables include firm-specific, loan-specific, and term-structure variables. Maturity indicates the maturity of the loan in months. No. of lenders refers to the number of lenders in the syndicate. Market cap refers to the market capitalization of the firm in billions of U.S. dollars in the month before the loan origination. EDITDA/Sales is the ratio of EBITDA of the firm to the sales of the firm. Leverage is the total debt (long-term plus short-term) divided by total assets of the firm. Modified Altman-Z is the modified version of Altman-Z without leverage. Performance pricing is a dummy variable that equals one if the loan has a performance pricing component. Term loan is a dummy variable that equals one if the loan is a term loan and zero if the loan is a revolver. Credit spread is the credit spread expressed in bps, and measured as the difference of BAA and AAA yields. Term spread is the term spread expressed in bps and measured as the difference between 10-year and 1-year U.S. Treasury notes. All standard errors are clustered at the firm level and are reported below the coefficient estimates. Regressions also include Fama-French industry fixed effects, year fixed effects, and loan purpose indicators. The p-value is reported for the Under-Id test of the null hypothesis of underidentification. *, **, and *** denote coefficient estimates that are significantly different from zero at the 0.10, 0.05, and 0.01 levels, respectively.

Interpretation: The OLS results presented in the first two columns confirm CLP's findings that there is a significant positive relation between takeover vulnerability and loan spreads for both sample periods. The OLS results presented in the third and fourth columns show that the coefficient estimate for takeover vulnerability is smaller and less significant for the 1990-2004 period and is insignificant for the 1990-2006 period when equity volatility is added as an explanatory variable. The 1^{st}-stage IV regressions show that takeover vulnerability and equity volatility are significantly positively related and the 2^{nd}-stage regressions show that takeover vulnerability does not explain loan spreads but equity volatility does.

Table IV. **Additional 2^{nd}-stage IV results for takeover vulnerability explaining loan spreads using alternative instruments for equity volatility**

	(1) **1990-2004**	(2) **1990-2006**	(3) **1990-2004**	(4) **1990-2006**	(5) **1990-2004**	(6) **1990-2006**	(7) **1990-2004**	(8) **1990-2006**
Instruments Used								
Market Vol.$_{t-1}$	Yes	Yes						
Industry Vol.$_{t-1}$			Yes	Yes				
Size Decile Vol.$_{t-1}$					Yes	Yes		
Peer Vol.$_{t-1}$							Yes	Yes
Takeover vulnerability$_t$	–0.00	0.00	0.00	0.00	–0.00	–0.00	0.00	0.00
	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Equity volatility$_{t-1}$	0.03***	0.02***	0.03***	0.02***	0.03***	0.03***	0.03***	0.02***
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
log(Market cap.$_{t-1}$)	–0.19***	–0.20***	–0.20***	–0.20***	–0.19***	–0.20***	–0.20***	–0.21***
	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01
EBITDA$_{t-1}$/Sales$_{t-1}$	–0.03**	–0.04**	–0.00	–0.01	–0.03**	–0.03**	–0.04***	–0.04***
	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02
Leverage$_{t-1}$	0.53***	0.53***	0.70***	0.63***	0.54***	0.52***	0.55***	0.54***
	0.09	0.08	0.09	0.09	0.09	0.08	0.08	0.08
Modified Altman-Z$_{t-1}$	–0.02	–0.05*	–0.05**	–0.06***	–0.02	–0.04*	–0.03	–0.05**
	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02
Maturity$_t$	0.00	0.00	–0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
No. of lenders$_t$	0.00	–0.00	0.00	–0.00	0.00	–0.00	0.00	–0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Performance pricing$_t$	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	0.04	0.03	0.04	0.03	0.04	0.03	0.04	0.03
Term loan$_t$	0.74***	0.72***	0.74***	0.71***	0.74***	0.71***	0.76***	0.73***
	0.08	0.06	0.07	0.06	0.07	0.06	0.07	0.06
Corp. spread$_{t-1}$	0.11	0.31*	0.21	0.34**	0.12	0.29*	0.19	0.36**
	0.17	0.16	0.14	0.15	0.16	0.16	0.13	0.15
Term spread$_{t-1}$	0.06*	0.01	0.05	0.01	0.06*	0.01	0.06*	0.02
	0.04	0.03	0.04	0.03	0.04	0.04	0.04	0.03
R^2	0.53	0.53	0.57	0.57	0.53	0.53	0.55	0.54
N	7089	8293	7089	8293	7089	8293	7089	8293
Under-Id	0.03	0.02	0.00	0.00	0.03	0.02	0.01	0.01
Year Fixed Effects								
Industry Fixed Effects	Yes	Yes			Yes	Yes	Yes	Yes
Loan-Purpose Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Description: The dependent variable in the 2^{nd}-stage IV regressions reported in this table is the natural logarithm of the all-in-drawn spread on the loan. Takeover vulnerability is defined as 24–G, where G denotes the G-Index, which measures the number of takeover defense provisions in the firm's charter. Equity volatility is the stock return volatility of the firm. The explanatory variables include firm-specific, loan-specific, and term-structure variables. Maturity indicates the maturity of the loan in months. No. of lenders refers to the number of lenders in the syndicate. Market cap refers to the market capitalization of the firm in billions of U.S. dollars in the month before the loan origination. EDITDA/Sales is the ratio of EBITDA of the firm to the sales of the firm. Leverage is the total debt (long-term plus short-term) divided by total assets of the firm. Modified Altman-Z is the modified version of Altman-Z without leverage. Performance pricing is a dummy variable that equals one if the loan has a performance pricing component. Term loan is a dummy variable that equals one if the loan is a term loan and zero if the loan is a revolver. Credit spread is the credit spread expressed in bps, and measured as the difference of BAA and AAA yields. Term spread is the term spread expressed in bps, and measured as the difference of 10-year and 1-year U.S. Treasury notes. All standard errors are clustered by firm and year and are reported below the coefficient estimates. *, **, and *** denote coefficient estimates that are significantly different from zero at the 0.10, 0.05, and 0.01 levels, respectively.

Interpretation: This table shows that employing instruments for firm-specific equity volatility based on aggregate market volatility measures, such as value-weighted market volatility, industry volatility, size decile volatility, and peer volatility, yields coefficient estimates similar to those reported in Table III where firm-specific ROA volatility was the instrument for equity volatility of the firm.

Table V. **OLS and IV results for dictatorship and democracy dummy variables explaining loan spreads**

	(1) OLS no vol **1990-2004**	(2) OLS no vol **1990-2006**	(3) OLS w/vol **1990-2004**	(4) OLS w/vol **1990-2006**	(5) IV-1st **1990-2004**	(6) IV-2nd **1990-2004**	(7) IV-1st **1990-2006**	(8) IV-2nd **1990-2006**
Democracy$_t$	0.03	0.02	–0.01	–0.02	2.23**	–0.02	2.52***	–0.05
	0.05	0.05	0.05	0.05	0.86	0.05	0.81	0.05
Dictatorship$_t$	–0.14***	–0.13**	–0.11**	–0.10*	–2.00**	–0.09*	–1.79**	–0.08
	0.05	0.05	0.05	0.05	0.78	0.05	0.73	0.05
Equity volatility$_{t-1}$			0.02***	0.02***		0.02***		0.02***
			0.00	0.00		0.01		0.01
log(Market cap.$_{t-1}$)	–0.28***	–0.28***	–0.24***	–0.25***	–2.36***	–0.22***	–2.30***	–0.22***
	0.01	0.01	0.01	0.01	0.17	0.02	0.16	0.02
EBITDA$_{t-1}$/Sales$_{t-1}$	–0.04*	–0.04*	–0.03*	–0.03	–0.71	–0.02*	–0.90	–0.02
	0.02	0.02	0.02	0.02	0.49	0.01	0.60	0.01
Leverage$_{t-1}$	0.63***	0.60***	0.60***	0.58***	2.69	0.59***	1.85	0.57***
	0.09	0.09	0.08	0.08	1.76	0.08	1.70	0.08
Modified Altman-Z$_{t-1}$	–0.07***	–0.08***	–0.04**	–0.05**	–1.57***	–0.03	–1.50***	–0.03*
	0.02	0.02	0.02	0.02	0.35	0.02	0.29	0.02
Maturity$_t$	0.00	0.00	0.00	0.00	–0.00	0.00	–0.00	0.00
	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
No. of lenders$_t$	0.00	0.00	0.00	0.00	–0.01	0.00	–0.01	0.00
	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00
Performance pricing$_t$	–0.03	–0.05**	–0.02	–0.04*	–0.62	–0.02	–0.79**	–0.03
	0.02	0.02	0.02	0.02	0.39	0.02	0.35	0.02
Term loan$_t$	0.70***	0.62***	0.68***	0.61***	1.42*	0.67***	0.83	0.60***
	0.04	0.04	0.04	0.04	0.81	0.04	0.65	0.04
Corp. spread$_{t-1}$	0.02	–0.04	0.08	0.01	–3.33**	0.10	–3.07**	0.04
	0.11	0.10	0.10	0.09	1.67	0.11	1.46	0.10
Term spread$_{t-1}$	0.01	0.02	0.01	0.02	–0.12	0.01	–0.27	0.03
	0.02	0.02	0.02	0.02	0.44	0.02	0.41	0.02
ROA volatility$_{t-1}$					0.54***		0.51***	
					0.08		0.08	
R^2	0.52	0.52	0.55	0.55	0.25		0.24	
N	7089	8293	7089	8293	7089	7089	8293	8293
Under-Id						0.00		0.00
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan-Purpose Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Description: The dependent variable in the OLS and 2^{nd}-stage IV regressions is the natural logarithm of the all-in-drawn spread on the loan. The dependent variable in the 1^{st}-stage regressions is the equity volatility of the firm and firm-specific ROA volatility is the instrumental variable for equity volatility. The explanatory variables include firm-specific, loan-specific, and term-structure variables. Democracy is a dummy variable that equals one if the firm's G-Index is less than or equal to 5 and zero otherwise. Dictatorship is a dummy variable that equals one if the firm's G-Index is greater than or equal to 14, and zero otherwise. Maturity indicates the maturity of the loan in months. No. of lenders refers to the number of lenders in the syndicate. Equity volatility is the stock return volatility of the firm. Market cap refers to the market capitalization of the firm in billions of U.S. dollars in the month before the loan origination. EDITDA/Sales is the ratio of EBITDA of the firm to the sales of the firm. Leverage is the total debt (long-term plus short-term) divided by total assets of the firm. Modified Altman-Z is the modified version of Altman-Z without leverage. Performance pricing is a dummy variable that equals one if the loan has a performance pricing component. Term loan is a dummy variable that equals one if the loan is a term loan and zero if the loan is a revolver. Credit spread is the credit spread expressed in bps, and measured as the difference of BAA and AAA yields. Term spread is the term spread expressed in bps, and measured as the difference of 10-year and 1-year U.S. Treasury notes. All standard errors are clustered at the firm level and are reported below the coefficient estimates. Regressions also include Fama-French industry fixed effects, year fixed effects, and loan purpose indicators. The p-value is reported for the Under-Id test of the null hypothesis of underidentification. *, **, and *** denote coefficient estimates that are significantly different from zero at the 0.10, 0.05, and 0.01 levels, respectively.

Interpretation: The Democracy portfolio dummy variable does not explain the loan spreads, while the Dictatorship portfolio dummy explains loan spreads in the OLS specifications. In the IV specifications, the coefficient estimate for the Dictatorship portfolio dummy variable is smaller in absolute value compared to the OLS coefficient estimates and is not significant in the extended sample period.

Table VI. 2^{nd}**-stage IV results for different democracy and dictatorship portfolio thresholds explaining loan spreads**

	Dictatorship ⩾ 14		Dictatorship ⩾13		Dictatorship ⩾12	
Panel A: Robust Standard Errors Clustered by Firm						
Results for 1990-2004						
	Dem	Dic	Dem	Dic	Dem	Dic
Democracy ⩽ 5	–0.02	–0.09*	–0.02	–0.04	–0.03	–0.05
	0.05	0.05	0.05	0.04	0.05	0.03
Democracy ⩽ 6	–0.06*	–0.10*	–0.06*	–0.04	–0.07*	–0.05
	0.04	0.05	0.04	0.04	0.04	0.03
Democracy ⩽ 7	–0.02	–0.09*	–0.01	–0.04	–0.02	–0.05
	0.03	0.05	0.03	0.04	0.03	0.03
Results for 1990-2006						
	Dictatorship ⩾ 14		Dictatorship ⩾13		Dictatorship ⩾12	
	Dem	Dic	Dem	Dic	Dem	Dic
Democracy ⩽ 5	–0.05	–0.08	–0.05	–0.03	–0.05	–0.03
	0.05	0.05	0.05	0.04	0.05	0.03
Democracy ⩽ 6	–0.07**	–0.08	–0.07**	–0.04	–0.07**	–0.04
	0.03	0.05	0.03	0.04	0.03	0.03
Democracy ⩽ 7	–0.02	–0.08	–0.02	–0.03	–0.02	–0.03
	0.03	0.05	0.03	0.04	0.03	0.03
Panel B: Robust Standard Errors Clustered by Firm and Year						
Results for 1990-2004						
	Dictatorship ⩾ 14		Dictatorship ⩾13		Dictatorship ⩾12	
	Dem	Dic	Dem	Dic	Dem	Dic
Democracy ⩽ 5	–0.02	–0.09*	–0.02	–0.04	–0.03	–0.05
	0.04	0.05	0.04	0.04	0.04	0.04
Democracy ⩽ 6	–0.06**	–0.10**	–0.06**	–0.04	–0.07**	–0.05
	0.03	0.05	0.03	0.04	0.03	0.04
Democracy ⩽ 7	–0.02	–0.09*	–0.01	–0.04	–0.02	–0.05
	0.03	0.05	0.03	0.04	0.03	0.04
Results for 1990-2006						
	Dictatorship ⩾ 14		Dictatorship ⩾13		Dictatorship ⩾12	
	Dem	Dic	Dem	Dic	Dem	Dic
Democracy ⩽ 5	–0.05	–0.08	–0.05	–0.03	–0.05	–0.03
	0.05	0.05	0.05	0.04	0.04	0.04
Democracy ⩽ 6	–0.07**	–0.08*	–0.07**	–0.04	–0.07***	–0.04
	0.03	0.05	0.03	0.04	0.03	0.04
Democracy ⩽ 7	–0.02	–0.08	–0.02	–0.03	–0.02	–0.03
	0.03	0.05	0.03	0.04	0.03	0.04

Description: This table reports the2nd-stage IV results for the Democracy and Dictatorship portfolio dummy variables for various G-Index thresholds. The Democracy thresholds are 5, 6, or 7, and the Dictatorship thresholds are 12, 13, or 14. The columns "Dem" and ""Dic" present the coefficient estimates for the Democracy and Dictatorship dummy variables in the regressions. The dependent variable in the 2^{nd}-stage IV regressions is the natural logarithm of the all-in-drawn spread on the loan and firm-specific ROA volatility is the instrumental variable for bank-specific equity volatility in the 1^{st}-stage regressions. Log(Market Cap.), EBITDA/Sales, Leverage, Modified Altman-Z, Maturity, No. of Lenders, Credit Spread, Term Spread variables, Performance Pricing, Term Loan, Year, Industry, and Loan-Purpose dummy variables are included in the regressions but are omitted from the table. Panel A reports the estimation results which use robust standard errors clustered by firm, and Panel B reports the estimation results which use robust standard errors clustered by firm and year. The top sub-panels in Panel A and Panel B present results for the time period 1990-2004 and the bottom sub-panels in Panel A and Panel B present results for the time period 1990-2006. *, **, and *** denote coefficient estimates that are significantly different from zero at the 0.10, 0.05, and 0.01 levels, respectively.

Interpretation: Varying the threshold cut-offs for the Democracy and Dictatorship portfolios shows that there is no reliable and consistent relation between the Democracy and Dictatorship portfolio dummy variables and loan spreads.

Table VII. **OLS results for leverage interaction specification explaining loan spreads**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Robust Standard Errors		Clustered by Firm		Robust Standard Errors		Clustered by Firm Year	
Takeover vulnerability$_t$	0.02***	0.01**	0.02***	0.01**	0.02***	0.01**	0.02***	0.01**
	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01
Low Tercile Leverage 1990-2004*Takeover vulnerability$_t$	0.00	0.01			0.00	0.01		
	0.00	0.01			0.00	0.01		
Low Tercile Leverage 1990-2004		–0.09				–0.09		
		0.14				0.16		
Low Tercile Leverage 1990-2006*Takeover vulnerability$_t$			0.00	0.01			0.00	0.01
			0.00	0.01			0.00	0.01
Low Tercile Leverage 1990-2006				-0.16				-0.16
				0.13				0.17
log(Market cap.$_{t-1}$)	–0.28***	–0.28***	–0.28***	–0.28***	–0.28***	–0.28***	–0.28***	–0.28***
	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
EBITDA$_{t-1}$/Sales$_{t-1}$	–0.04*	–0.04*	–0.04*	–0.04*	–0.04**	–0.04**	–0.04**	–0.04**
	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.02
Leverage$_{t-1}$	0.70***	0.70***	0.63***	0.62***	0.70***	0.70***	0.63***	0.62***
	0.12	0.12	0.11	0.11	0.10	0.10	0.11	0.11
Modified Altman-Z$_{t-1}$	–0.07***	–0.07***	–0.07***	–0.07***	–0.07***	–0.07***	–0.07***	–0.07***
	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Maturity$_t$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
No of lenders$_t$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Performance pricing$_t$	–0.03	–0.03	–0.05**	–0.05**	–0.03	–0.03	–0.05	–0.05
	0.02	0.02	0.02	0.02	0.04	0.04	0.03	0.03
Term loan$_t$	0.70***	0.70***	0.62***	0.62***	0.70***	0.70***	0.62***	0.62***
	0.04	0.04	0.04	0.04	0.08	0.08	0.08	0.08
Corp. spread$_{t-1}$	0.02	0.02	–0.04	–0.04	0.02	0.02	–0.04	–0.04
	0.11	0.11	0.10	0.10	0.16	0.16	0.15	0.15
Term spread$_{t-1}$	0.01	0.01	0.02	0.02	0.01	0.01	0.02	0.02
	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03
R^2	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
N	7089	7089	8293	8293	7089	7089	8293	8293
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan-Purpose Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Description: The dependent variable in the OLS regressions is the natural logarithm of the all-in-drawn spread on the loan. Takeover vulnerability is defined as 24-G, where G denotes the G-Index, which measures the number of takeover defense provisions in the firm's charter. The explanatory variables include firm-specific, loan-specific, and term-structure variables. Maturity indicates the maturity of the loan in months. No. of lenders refers to the number of lenders in the syndicate. Market cap refers to the market capitalization of the firm in billions of U.S. dollars in the month before the loan origination. EDITDA/Sales is the ratio of EBITDA of the firm to the sales of the firm. Leverage is the total debt (long-term plus short-term) divided by total assets of the firm. Modified Altman-Z is the modified version of Altman-Z without leverage. Performance pricing is a dummy variable that equals one if the loan has a performance pricing component. Term loan is a dummy variable that equals one if the loan is a term loan and zero if the loan is a revolver. Credit spread is the credit spread expressed in bps, and measured as the difference of BAA and AAA yields. Term spread is the term spread expressed in bps, and measured as the difference of 10-year and 1-year U.S. Treasury notes. All standard errors are clustered at the firm level and are reported below the coefficient estimates. Regressions also include Fama-French industry fixed effects, year fixed effects, and loan purpose indicators. *, **, and *** denote coefficient estimates that are significantly different from zero at the 0.10, 0.05, and 0.01 levels, respectively.

Interpretation: We could not replicate CLP's result that the Low Tercile Leverage*Takeover vulnerability term is significant. Once we include the level term, Low Tercile Leverage in both sample periods, the coefficient estimate on the interaction term is larger, but it is still insignificant.