The Journal of FINANCE
The Journal of THE AMERICAN FINANCE ASSOCIATION

THE JOURNAL OF FINANCE • VOL. LXVII, NO. 6 • DECEMBER 2012

Strategic Default and Equity Risk Across Countries

GIOVANNI FAVARA, ENRIQUE SCHROTH, and PHILIP VALTA*

ABSTRACT

We show that the prospect of a debt renegotiation favorable to shareholders reduces the firm's equity risk. Equity beta and return volatility are lower in countries where the bankruptcy code favors debt renegotiations and for firms with more shareholder bargaining power relative to debt holders. These relations weaken as the country's insolvency procedure favors liquidations over renegotiations. In the limit, when debt contracts cannot be renegotiated, equity risk is independent of shareholders' incentives to default strategically. We argue that these findings support the hypothesis that the threat of strategic default can reduce the firm's equity risk.

WHEN A FIRM IS IN FINANCIAL DISTRESS, its shareholders and debt holders may benefit from a debt renegotiation to avoid an inefficient bankruptcy or liquidation. The prospect of a debt reduction through renegotiation may, however, induce shareholders to default even if the firm is solvent (Hart and Moore (1994)). The view that shareholders may default for strategic rather than for solvency reasons has proved useful to understand, among other things, the theoretical determinants of corporate bond spreads (Anderson and Sundaresan (1996)), dividend policies (Fan and Sundaresan (2000)), optimal debt structure (Berglöf and von Thadden (1994), Bolton and Scharfstein (1996), Hackbarth, Hennessy, and Leland (2007)), and debt and equity valuation (Garlappi, Shu, and Yan (2006), Davydenko and Strebulaev (2007), Garlappi and Yan (2011)).

This paper asks whether shareholders' option to default strategically on the firm's debt explains differences in firms' equity risk across countries. This question is motivated by the observation that shareholders' expected recovery in default and renegotiation varies substantially across countries, depending on the characteristics of the bankruptcy code (Djankov et al. (2008)). Our claim is that equity risk should be lower for firms that operate in countries where

*Favara is with the International Monetary Fund. Schroth is with the University of Amsterdam. Valta is with HEC Paris. The authors thank Viral Acharya, Albert Chun, Stijn Claessens, Engelbert Dockner, Laurent Frésard, Erasmo Giambona, Ron Giammarino, Amit Goyal, Nishad Kapadia, Ernst Maug, Erwan Morellec, Stefano Rossi, Ilya Strebulaev, René Stulz, Kenichi Ueda, Andrea Vedolin, Elu Von Thadden, an anonymous referee, the Advisory Editor, and Cam Harvey (the Editor) for valuable suggestions that improved the paper. The authors also thank seminar participants at Cass Business School, the University of Mannheim, the 2010 WFA Meeting (Victoria), the 2010 FIRS Meeting (Florence), the 2009 EFA Meeting (Bergen), and the 2008 Swiss Doctoral Workshop (Gerzensee). The views expressed in this paper are those of the authors, and should not be attributed to the IMF, its Executive Board, or its management.

the insolvency procedure favors debt renegotiations. The reason is that the prospect of a favorable debt renegotiation not only increases the expected payoff to shareholders in default, but also induces them to anticipate the timing of default. As a result, equity risk becomes less sensitive to the firm's cash flow risk. We find supporting evidence for this claim in a sample of firms operating in countries with different debt enforcement procedures. Our findings point to a new measurable determinant of the cross-country differences in equity risk. While existing literature relates the cross-country differences in equity risk to a country's rule of law, financial development, and corporate governance, we relate equity risk to shareholders' opportunism induced by the insolvency code.

We carry out our analysis in two steps. First, we use a simple model of strategic default to derive empirical predictions relating the firm's equity risk to shareholders' payoff in default and the debt enforcement procedure. In the model, debt renegotiation is subject to frictions related to the bankruptcy law. If the bankruptcy law prevents renegotiations, shareholders have little to gain from the strategic default option. If, instead, the bankruptcy law favors a renegotiation, shareholders have incentives to default strategically in order to extract rents from debt holders. In this case, a higher shareholders' expected payoff in renegotiation increases the value of the put option to default and decreases the risk of equity. The model therefore predicts a negative relation between equity risk and shareholders' relative advantage in the renegotiation game. As debt renegotiations are less likely, the option value of strategic default falls and the equity value covaries more with the firm's cash flow. In the limit where debt renegotiations are not feasible, equity risk becomes independent of shareholders' relative bargaining advantage.

In a second step, we test these predictions in a panel of almost 6,000 firms operating in 38 countries. The main advantage of conducting an international analysis is that the cross-country variation in debt enforcement procedures is exogenous to firms' decisions. We exploit this exogenous variation to identify firms' strategic default incentives. To measure frictions in the renegotiation of debt contracts, we use data from the Djankov et al. (2008) survey on the characteristics of insolvency procedures around the world. We proxy for shareholders' bargaining advantage relative to debt holders with commonly used firm-specific variables, namely, asset intangibility for the firm's liquidation costs and the concentration of equity ownership for shareholders' bargaining power in debt reorganizations. Our main measures of equity risk are the firm's domestic market beta and total return volatility.[1]

After controlling for firm-specific and country-specific characteristics, we find that the average firm's equity beta and return volatility (1) are lower in

[1] The main drawback of a cross-country analysis is that our measures of equity risk may depend on factors besides the bankruptcy code and firms' incentives to default strategically. In our analysis, we sample firms from both developed and emerging countries, and in these countries, capital markets differ substantially in terms of liquidity and integration into the world capital market. To overcome this drawback, we follow the international asset pricing literature to control for the standard determinants of cross-country equity risk.

countries where the bankruptcy code favors a renegotiation of debt, (2) are decreasing in shareholders' bargaining advantage relative to debt holders in a renegotiation, and (3) are less sensitive to shareholders' advantage as the bankruptcy code includes more frictions in the renegotiation process. In terms of the cost of capital, our findings imply that firms operating in environments with more debt renegotiation frictions pay, on average, between 23 and 30 basis points per month more than comparable firms operating in countries with no debt renegotiation frictions. We also find that the prospect of strategic default reduces firms' systematic but not the idiosyncratic volatility. This finding rules out the possibility that firms' systematic risk reflects insolvency risk and provides further support to the strategic default hypothesis.

Our results are robust to alternative definitions of beta to account for the fact that many stocks in our sample may be illiquid or have time-varying degrees of integration with the world market. We further show that our results do not depend on other sources of equity risk that might be simultaneously determined with the strategic default option, including a firm's financial leverage. The results are also robust to the exclusion of multinational firms, minimizing the concern that these firms may strategically file for bankruptcy in a more favorable foreign jurisdiction.

Our paper makes three contributions to the literature. The first contribution is to clarify the debate on whether strategic default is an important factor for the pricing of financial securities. Although several theoretical papers suggest that the prospect of shareholders' strategic default may affect the valuation of debt and equity (Francois and Morellec (2004), Davydenko and Strebulaev (2007), Garlappi, Shu, and Yan (2008)), it is still unclear if this mechanism is empirically important. Davydenko and Strebulaev (2007) find that standard proxies for strategic default behavior do not explain much of the cross-sectional variation of corporate bond prices in the United States. In contrast, Garlappi, Shu, and Yan (2008) conclude that the possibility of strategic default helps explain the relation between stock returns and default probabilities in the cross-section of U.S. stocks. These studies measure shareholders' expected payoff in the event of financial distress using only firm-specific proxies, irrespective of the bankruptcy procedure. Our finding that strategic default affects the equity risk of firms only in countries where the bankruptcy procedure favors debt renegotiations suggests that the effects associated with strategic default cannot be examined independently of the legal context.

The second contribution is to show that cross-country differences in equity risk are explained by the interaction between firm and country characteristics. Existing literature has established a robust link between equity risk and country measures of creditor protection (e.g., Morck, Yeung, and Yu (2000), Bartram, Brown, and Stulz (2012)). We show, instead, that cross-country differences in equity risk can be explained by the interaction between characteristics of the bankruptcy code and firm-specific determinants of the incentives to default strategically. To our knowledge, this paper is the first to show that firm-specific characteristics can influence firms' equity risk if they operate in a legal environment with weak creditor rights protection.

Finally, our third contribution relates to the law and finance literature. This literature focuses mainly on how the system of law affects aggregate outcomes, such as financial development.[2] Recently, some attention has been given to the role of creditor protection in firms' decisions. Davydenko and Franks (2008) study how international bankruptcy codes affect distressed reorganizations; Acharya, Sundaram, and John (2011) and Acharya, Amihud, and Litov (2011) examine how bankruptcy codes affect firms' capital structure and risk taking, respectively; and Acharya and Subramanian (2009) investigate how bankruptcy codes affect firms' innovation strategies. In establishing a link between debt enforcement procedures, strategic default, and equity risk, our paper highlights an additional important channel through which the system of law influences corporate decisions, and has implications for firm-level outcomes.

The rest of the paper proceeds as follows. Section I outlines the real options model of strategic default and derives testable predictions. Section II describes the data and develops our measures of renegotiation frictions and equity risk. Section III presents the empirical framework and our main results. Section IV contains robustness checks, and Section V tests the model's implications for volatility and stock returns. Section VI concludes.

I. Theory and Testable Implications

In this section, we present a simple model of strategic default to derive predictions that relate frictions in the renegotiation of debt contracts to the firm's equity risk. The model extends the setup of Fan and Sundaresan (2000) to allow for the possibility that debt renegotiations between shareholders and debt holders can fail because of frictions introduced by the bankruptcy code.

A. *The Model*

Managers act in shareholders' best interest and the investment policy is fixed. Assets are traded continuously in arbitrage-free markets and the term structure is flat, with risk-free rate r at which investors may borrow and lend. The cash flow from operations, X, is independent of capital structure choices and evolves according to a geometric Brownian motion with a constant growth rate $\mu > 0$ and a constant volatility σ_X, that is,

$$dX_t = \mu X_t dt + \sigma_X X_t dB_t,$$

where B_t is a standard Brownian motion. The cash flow uncertainty is the only source of risk in this model.

[2] See, for example, La Porta et al. (1997, La Porta, Lopez-de-Silanes, and Shleifer (1998, 2000, 2002), and Djankov, McLiesh, and Shleifer (2007). A comprehensive survey is in La Porta, Lopez-de-Silanes, and Shleifer (2008).

Because of the tax deductibility of interest payments, the firm has an incentive to issue debt. Debt payments consist of a perpetual coupon payment, c,whose levels remain constant until the firm declares bankruptcy. Shareholders have the option to default on this payment, and will do so when the cash flow falls below an endogenous default threshold, X_B. If debt is renegotiated following default, debt holders are offered the firm's equity in exchange and the value of the firm is split between shareholders and debt holders according to their bargaining powers, η and $1-\eta$, respectively.[3]

To account for renegotiation frictions, we follow Davydenko and Strebulaev (2007) and allow debt renegotiation to fail with probability q.[4] If renegotiations fail, the firm is liquidated at a dissipative cost $\alpha \in [0, 1]$. Debt holders, who have absolute priority in liquidation, receive $(1-\alpha)$ of the value of the firm upon default, while shareholders receive nothing. When q is close to zero, there are few frictions in debt renegotiation and there is scope for shareholders to extract firm value from debt holders. In the limit where q equals one, the debt cannot be renegotiated and claims are settled based on absolute priority rules.[5]

B. Optimal Strategic Default

Shareholders choose X_B to maximize the value of equity, taking into account the anticipated outcome of the renegotiation. Using contingent claims techniques (see the Internet Appendix[6] for details), the after-tax value of equity, E, and the endogenous default threshold, X_B, can be written as

$$E(X;\alpha,\eta,q) = (1-\tau)\left[\left(\frac{X}{r-\mu}-\frac{c}{r}\right)+\left(\frac{1}{1-\lambda}\frac{c}{r}\right)\left(\frac{X}{X_B}\right)^{\lambda}\right], \tag{1}$$

$$X_B = \frac{r-\mu}{r}\frac{\lambda}{\lambda-1}\frac{c}{1-(1-q)\eta\alpha}, \tag{2}$$

[3] Fan and Sundaresan (2000) discuss an alternative reorganization procedure. Under "strategic debt service," debt payments are suspended until the firm's cash flow recovers above X_B. In exchange, debt holders accept a fraction of the firm's assets upon recovery. As discussed in the Appendix, our results and testable hypotheses hold under this alternative bargaining formulation.

[4] See Francois and Morellec (2004) and Broadie, Chernov, and Sundaresan (2007) for alternative specifications to incorporate such frictions.

[5] Note that q summarizes frictions during both formal bankruptcy and out-of-court renegotiations. Typically, shareholders first attempt an informal workout and then resort to formal bankruptcy. Ex ante, shareholders' payoffs from defaulting strategically depend on frictions to renegotiations that they expect to meet through both stages. In theory, private contracts may undo these frictions by a proper allocation of control rights over reorganization and liquidation decisions (Gennaioli and Rossi (2011)). Here, we assume that private contracts cannot fully override bankruptcy regimes—a plausible assumption in a world in which contracts are incomplete and enforcement is not perfect.

[6] An Internet Appendix for this article is available online in the "Supplements and Datasets" section at http://www.afajof.org/supplements.asp.

where $(X/X_B)^{\lambda}$ is the risk-neutral probability of default and renegotiation, and

$$\lambda \equiv \left(\frac{1}{2} - \frac{\mu}{\sigma_X^2}\right) - \sqrt{\left(\frac{1}{2} - \frac{\mu}{\sigma_X^2}\right)^2 + \frac{2r}{\sigma_X^2}} < 0$$

measures the riskiness of the default option.

In equation (1), the value of equity has two terms. The first term is the present value of cash flow minus outstanding debt. The second term, which depends on the distance from the current cash flow to the default threshold, captures the value of shareholders' option to default. Because $\lambda < 0$, the option to default increases the value of equity and is worth more the higher the firm's leverage, c, and the default threshold, X_B.

In equation (2), the default threshold increases with shareholders' bargaining power, η, and liquidation costs, α, but decreases with the probability of renegotiation failure, q. Intuitively, the strategic default incentives of shareholders increase with their bargaining power or with liquidation costs because both increase the share of total assets that debt holders will concede in order to avoid a costly liquidation. Conversely, the strategic default incentives decrease with more renegotiation frictions because, in that case, shareholders are less likely to extract any renegotiation rents.[7]

C. Model Predictions

Our main focus is to study how changes in debt renegotiation frictions, liquidation costs, and shareholders' bargaining power affect equity risk. To price the firm's equity and measure its risk, we follow Carlson, Fisher, and Giammarino (2004, 2006) and assume the existence of a risky asset, M, which can hedge cash flow uncertainty. We also assume that the returns on M are perfectly correlated with changes in the firm's cash flow. As a consequence, it is possible to replicate the dynamics of the firm's equity value by holding a portfolio with time-varying weights in M satisfying $\frac{dE}{E} = w_t \frac{dM}{M}$. A natural way to interpret M is to think of it as an asset that represents the market portfolio. In such a case, shocks to the firm's cash flow perfectly correlate with the undiversifiable market risk.

C.1. Equity Beta

Under these assumptions, the firm's equity beta equals w_t and, as shown in the Internet Appendix, corresponds to the elasticity of the equity value with

[7] The mechanism in our paper is similar to that in Gertner and Scharfstein (1991) and Bolton and Sharsftein (1996), where a dispersed debt structure impedes renegotiations and deters strategic default due to free-rider problems. The crucial difference is that, in our paper, renegotiation frictions are tied to bankruptcy procedures that are exogenous to firms' capital structure.

respect to X, that is,

$$\beta_E = \frac{\partial E}{\partial X}\frac{X}{E} = 1 + \frac{(1-\tau)\frac{c}{r}}{E} - \frac{(1-\tau)\frac{c}{r}}{E}\left(\frac{X}{X_B}\right)^{\lambda}. \tag{3}$$

Therefore, the equity beta depends on q,α, and η through X_B (see equation (2)).

In equation (3), the firm's equity beta consists of three terms. The first is the firm's cash flow beta, which for simplicity is normalized to one. The second term captures the effect of financial leverage on the equity beta. Clearly, a higher leverage increases the equity beta, ceteris paribus. The third term measures the equity's option value to default. Since λ is negative, the equity beta decreases with the ratio of the default option value to total equity value.

In equation (3), β_E measures the firm's exposure to all the independent risk factors in X. As such, the equity beta in (3) is not necessarily the market (CAPM) beta. However, given the assumption that X correlates perfectly with M, β_E captures the priced market risk in X and we can therefore interpret it as the market beta.[8]

We are interested in the sensitivity of the equity beta to renegotiation frictions and to shareholders' relative advantage in default. Differentiating β_E with respect to q, we get

$$\frac{\partial \beta_E}{\partial q} > 0,$$

implying that more frictions in the renegotiation of debt contracts lead to a higher equity beta. Given two identical firms (i.e., keeping η and α constant) that operate in countries with different bankruptcy laws, the firm facing more renegotiation frictions (higher q) has, on average, a higher equity beta. The reason is that more frictions in the renegotiation of debt increase the firm's undiversifiable cash flow risk.

Next, differentiating (3) with respect to α and η, we obtain

$$\frac{\partial \beta_E}{\partial \alpha} < 0 \quad \text{and} \quad \frac{\partial \beta_E}{\partial \eta} < 0.$$

Given two firms operating in countries with the same degree of debt enforcement (i.e., keeping q constant), the equity beta is lower for a firm with larger liquidation costs and higher bargaining power (higher α and η). As α and η increase, shareholders are able to extract more rents from debt holders in renegotiation. In this case, the equity beta decreases because the option value of strategic default increases.

[8] If the firm's cash flow had an additional risk component orthogonal to M, for example, idiosyncratic risk, the market beta would be proportional to the model's overall equity beta, scaled by the correlation coefficient between X and the market portfolio M (see Garlappi and Yan (2011)).

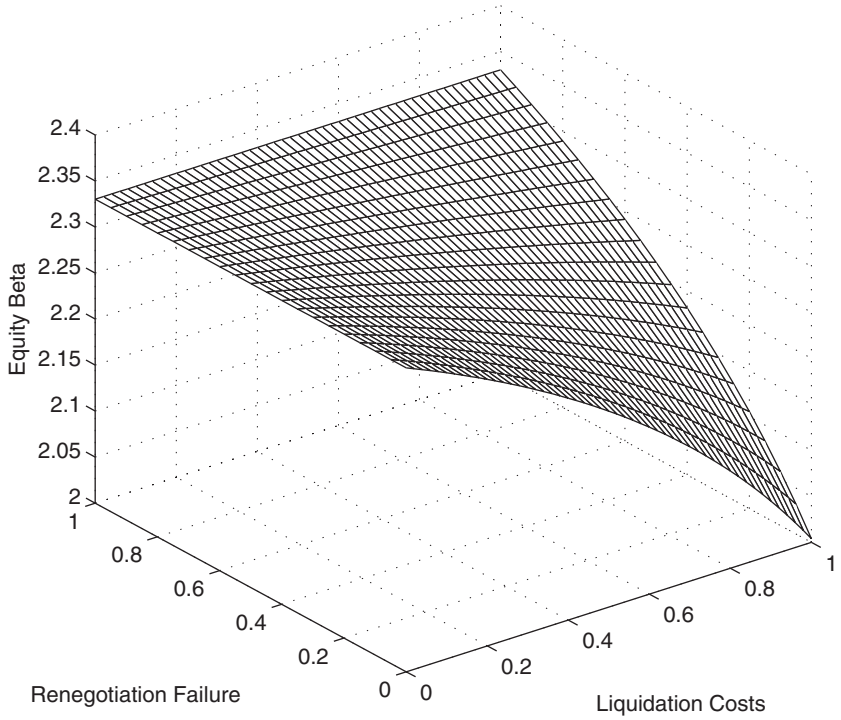

Figure 1. This figure shows the model's simulated market beta as a function of the liquidation costs, α, and the probability of renegotiation failure, q, in the model with a debt-equity swap. The model's parameters have been set to $\tau = 0.35$, $X = 10$, $c = 6$, $r = 0.06$, $\mu = 0.01$, $\sigma = 0.4$, and $\eta = 0.6$.

Furthermore, using (2) and (3), we obtain

$$\frac{\partial^2 \beta_E}{\partial \alpha \partial q} > 0, \quad \text{and} \quad \frac{\partial^2 \beta_E}{\partial \eta \partial q} > 0,$$

implying that the sensitivity of the firm's equity beta to α or η decreases with q.

These comparative statics are summarized in Figure 1, which plots the equity beta as a function of liquidation costs, α, and the frictions in the debt enforcement procedure, q.[9] As shown, the equity beta depends negatively on liquidation costs when q is low, and is independent of liquidation costs as q approaches one. The intuition is straightforward. When debt contracts can be easily renegotiated, the relative advantage of shareholders increases with liquidation costs. The reason is that debt holders would receive only a small fraction of the assets if the firm is liquidated, and therefore prefer to renegotiate the debt contract. This effect reduces the equity beta. On the other hand, liquidation costs do not affect the equity beta for values of q close to one

[9] The relation between the equity beta, q, and η is qualitatively identical and thus not shown.

because, in this case, the bankruptcy law ensures that debt holders' claims are protected.

We summarize the comparative statics results in the following hypotheses. Other things equal:

- *Firms in legal regimes that favor the renegotiation of debt contracts have a lower equity beta.*
- *Firms with higher liquidation costs or with higher shareholders' bargaining power in the case of debt renegotiations have a lower equity beta.*
- *The difference in equity beta between firms facing different liquidation costs or shareholders' bargaining power is smaller in countries with more frictions in the renegotiation of debt.*

C.2. Equity Return Volatility

In our model, the total volatility of equity returns is derived in a similar way as the equity beta. As shown in the Internet Appendix, total volatility, $\sigma_E \equiv Vol\left(\frac{dE}{E}\right)$, can can be written as follows:

$$\sigma_E = \sigma_X \frac{\partial E}{\partial X}\frac{X}{E} = \sigma_X \beta_E. \tag{4}$$

Since σ_E is linear in β_E, the comparative statics of total volatility with respect to η, α, and q are the same as those derived for β_E.

Despite this equivalence, we find it useful to look at total volatility *and* its decomposition into idiosyncratic and systematic volatility. In our model, shareholders choose the timing of default but do not control cash flow risk. Thus, if the bankruptcy code favors debt renegotiations, shareholders may reduce the firm's systematic risk by defaulting before insolvency. However, if the bankruptcy code prevents debt renegotiations, shareholders may also reduce the firm's idiosyncratic risk to avoid bankruptcy.[10] Because the model excludes this possibility, it is important to ascertain empirically which component of equity risk is most correlated with shareholders' strategic default option. We expect the bankruptcy code to affect systematic volatility via the strategic default channel, and idiosyncratic volatility via the risk of insolvency. We study these relations in Section V.

D. Discussion

The model's predictions are derived under the assumption that leverage, c, is given. A more general setting would allow c to depend also on η, α, and q. On the one hand, shareholders could lever up and default strategically if they expected high renegotiation payoffs. On the other hand, the firm's ability to raise more debt would be reduced if creditors expected lower renegotiation

[10] For example, Acharya, Amihud, and Litov (2011) find that, in countries with stronger creditor rights, firms choose investments with lower cash flow risk.

payoffs. Therefore, in order to take equation (3) to the data, it is important that we control for the variation in leverage that is exogenous to equity risk. We address this concern in Section IV.C by instrumenting firms' leverage with the country's statutory corporate tax rate. The country's tax rate is exogenous to firms' financing decisions and affects their equity beta only through leverage.

In the model, the linearity between the equity beta and expected returns also implies that we can relate α, η, and q to the cross section of returns. Although Section V.B presents results for equity returns, the main focus of our analysis is on the relation between strategic default, the firm's equity beta, and volatility. The reason is that, in our model, expected returns are affected only because the equity beta is affected. Moreover, there is the concern that α, η, and q may proxy for additional risk factors unrelated to strategic default, which a regression based on cross-sectional returns may fail to capture. Our approach follows several recent papers that study the equity beta implications of product market competition (Aguerrevere (2009)), corporate investment (Carlson, Fisher, and Giammarino (2004)), seasoned equity offerings (Carlson, Fisher, and Giammarino (2006)), mergers and acquisitions (Hackbarth and Morellec (2008)), and financial distress (Garlappi and Yan (2011)).

II. Data Description

To test the model's predictions, we construct a data set that combines country- and firm-specific characteristics. The country-specific data include characteristics of the insolvency procedures. The firm-specific data include proxies for shareholders' relative advantage in renegotiation and standard controls to capture determinants of equity risk. Table I contains an overview and definitions of the main variables in our data set. The Appendix contains a more detailed description on the data selection procedure.

A. Country-Level Data

We construct a panel of 5,958 firms in 38 countries from 1993 to 2006. We include all countries covered by the Djankov et al. (2008) survey that can be matched to Datastream or CRSP. Djankov et al. (2008) present attorneys and judges in 88 countries with an identical case of a hotel about to default on its debt, and ask them to describe in detail how the hotel's debt would be enforced in their countries. Based on these responses, they construct country-specific measures of the quality of debt enforcement, some of which form the basis of our analysis.

The surveys were conducted in 2005. Given the time-series dimension of our analysis, we project all variables into the past, assuming that they have remained stable over time. This assumption is based on the premise that a country's approach to insolvency is deeply rooted in economical, political, and societal values, which are very persistent (if not permanent) features of a country's environment. In Section IV.D, we identify those countries that changed their bankruptcy code during our sample period and check to confirm that our main

Table I

Description of Variables and Sources

This table describes the independent variables used in the analysis. The data come from Thomson-Reuters's Datastream database, the University of Chicago's Center for Research in Security Prices database (CRSP), Thomson-Reuters's Worldscope database, Standard & Poors's Compustat database, and the database from the paper "Debt Enforcement around the World" by Djankov et al. (2008).

Variable Name	Use	Variable Description	Source
Intangibiles	Liquidation costs	1 − (Cash + 0.715 × Receivables + 0.547 × Inventories + 0.535 × PPE)/Total assets.	Worldscope, Compustat
Intangibles (*with cash*)	Liquidation costs	1 − (0.715 × Receivables + 0.547 × Inventories + 0.535 × PPE)/Total assets.	Worldscope, Compustat
Insiders' shares	Sharehdolders' bargaining power	Number of shares held by insiders / Total shares.	Worldscope
Renegotiation failure	Renegotiation frictions	Measures the probability that shareholders fail to force a renegotiation of debt with creditors. The index is the average of the following binary (0 if no, 1 if yes) indicators: 1) secured creditors may seize and sell their collateral without court approval, 2) secured creditors may enforce their security either in or out of court, 3) the entire firm's assets can be pledged as collateral, 4) an insolvency or liquidation order cannot be appealed at all, 5) an insolvency case is suspended until the resolution of the appeal, 6) the firm may enter liquidation without attempting reorganization, 7) secured creditors may enforce their security upon commencement of the insolvency proceedings, 8) a defaulting firm must cease operations upon commencement of insolvency proceedings, 9) management does not remain in control of decisions during insolvency proceedings, 10) secured creditors have the right to approve the appointment of the insolvency administrator, 11) secured creditors may dismiss the insolvency administrator, 12) secured creditors vote directly on the reorganization plan.	Djankov et al. (2008)

(*Continued*)

Table I—*Continued*

Variable Name	Use	Variable Description	Source
Priority	Renegotiation frictions	Equals 0, 1, 2, 3, or 4 to reflect the order in which creditors' claims are served. A value of 4 indicates that creditors' claims are always served first.	Djankov et al. (2008)
Creditors' recovery	Renegotiation frictions	The recovery rate for secured creditors, conditional on default.	Djankov et al. (2008)
Leverage	Control	Total assets minus book equity divided by the market value of the firm.	Datastream, Worldscope, Compustat, CRSP
Leverage projection	Control	Orthogonal projection of the firm's *Leverage* in year $t > 0$ on *Renegotiation failure*, the firm's initial *Leverage* (year $t = 0$), the country's statutory corporate tax rate, the firm's *Intangibles, Insiders' share, Size*, *Book-to-market*, and yearly dummies.	
Short-term debt	Control	Debt with one to three years maturity, divided by total debt.	Worldscope, Compustat
Short-term debt projection	Control	Constructed as *Leverage projection*, except using short-term debt instead of *Leverage*.	
Domestic market beta	Equity risk	Beta of the regression of the firm's monthly returns on the contemporaneous domestic market index returns, using 60-month rolling windows.	Datastream, CRSP
World market beta	Equity risk	Beta of the regression of the firm's monthly returns on the contemporaneous MSCI World index returns, using 60-month rolling windows.	Datastream, CRSP
Overall market beta	Equity risk	Sum of the beta of the regression of the firm's monthly returns on the contemporaneous MSCI World index returns and the residuals of the regression of the domestic market returns on the MSCI returns, using 60-month rolling windows.	Datastream, CRSP
Scholes–Williams beta	Equity risk	Scholes and Williams (1977) betas, using 60-month rolling windows.	Datastream, CRSP
Total return volatility	Equity risk	Standard deviation of the monthly returns, using 60-month rolling windows.	Datastream, CRSP

Idiosyncratic return volatility	Equity risk	Standard deviation of the residuals of the regression of the firm's monthly returns on the lagged, contemporaneous, and lead local domestic market index, using 60-month rolling windows.	Datastream, CRSP
Systematic return volatility	Equity risk	Square root of *Total return volatility*^{2} minus *Idiosyncratic return volatility*^{2}.	Datastream, CRSP
Size	Control	Logarithm of the market value of equity.	Worldscope, Compustat
Book-to-market	Control	Logarithm of the book-to-market ratio (book value of equity divided by market value of equity).	Datastream, Worldscope, Compustat, CRSP
Momentum	Control	Average stock return over the past 12 months, skipping the most recent month.	Datastream, CRSP
Stock market turnover	Control	Stock market turnover ratio.	World Bank
Private credit to GDP	Control	Total private sector credit / GDP.	World Bank
Stock market cap to GDP	Control	Stock market capitalization / GDP.	World Bank
Local growth opportunities	Control	Bekaert et al. (2007) measure of local growth opportunities.	Datastream, Worldscope
Statutory tax rate	Control	The tax rate for the highest bracket of all taxes on corporate income.	Djankov et al. (2010)

findings continue to hold in the subsample of country-years following the last recorded change in the country's bankruptcy code.[11]

A.1. Renegotiation Failure, Priority, and Creditors' Recovery

In the model, a high value of q means that an attempt by shareholders to renegotiate their debt is likely to fail, that is, debt holders are better protected against shareholders' strategic default. We construct three proxies for q using the Djankov et al. (2008) survey. The first two, *Renegotiation failure* and *Priority,* summarize creditors' power to enforce their claims. The third proxy, *Creditors' recovery*, measures creditors' expected payoff in default. Table II presents these data.

The *Renegotiation failure* index summarizes a number of characteristics of debt enforcement procedures that protect creditors from shareholders' strategic default. It includes the rights of creditors to seize and sell debt collateral without court approval, to enforce their claims in an out-of-court procedure, to approve the appointment of an insolvency administrator and dismiss it, and to vote directly on the reorganization plan of a defaulting firm. The *Renegotiation failure* index also includes information on whether an insolvency procedure cannot be appealed, and whether management is automatically dismissed during the resolution of the insolvency procedure. The precise definition of this index is in Table I. Essentially, *Renegotiation failure* is an index of the frictions that shareholders will face if they try to renege on the outstanding debt, whether it is through a formal insolvency procedure or outside of court. The index ranges from zero to one: the higher the score, the stronger the protection of creditors' rights. Table II shows that the average value of *Renegotiation failure* in our sample is 0.54, with a standard deviation of 0.25.

Our second proxy, *Priority*, is narrower than *Renegotiation failure* because it records only the order in which creditors' claims are paid upon default. The *Priority* index ranges from one to four and equals four in countries where creditors are ranked first in the distribution of proceeds during the insolvency procedure. In countries where *Priority* has a value smaller than four, other claimants, such as tax authorities, employees, or even shareholders, have priority over creditors in the distribution of proceeds. In our sample, deviations from absolute priority occur in 14 countries. As expected, *Priority* varies much less across countries than the index of *Renegotiation failure*. Moreover, while more than half of the sampled countries exhibit no violations of absolute priority, only five countries have an index of *Renegotiation failure* equal to one.[12]

[11] An alternative approach to identify the effect of the bankruptcy code on equity risk is to conduct a difference-in-differences analysis around changes in the bankruptcy code *within* countries. The paucity of such changes in our sample, however, renders this alternative approach infeasible.

[12] For the United States, the maximum *Priority* score is consistent with the fact that absolute priority violations, conditional on filing for Chapter 11, have become extremely rare since the 1990s (Bharath, Panchapegesan, and Werner (2007) and Ayotte and Morrison (2009)). The fact that the United States has a *Renegotiation failure* index equal to the sample mean confirms that this index more broadly captures what shareholders can expect from a renegotiation in or out of

Table II

Summary Statistics of Country-Specific Variables

This table summarizes the number of firms by country and our proxies of debt renegotiation frictions. Country-level data come from Djankov et al. (2008) and Andrei Shleifer's website (http://www.economics.harvard.edu/faculty/shleifer/dataset). The sample period is from 1993 to 2006. Sources and definitions of all variables are given in Table I.

Country	Number of Firms	Renegotiation Failure	Failure Ranking	Priority	Ranking	Creditors' Recovery Rate	Creditors' Recovery Rate Ranking
Australia	185	1.00	1	4	1	0.85	10
Austria	34	0.67	3	4	1	0.77	13
Belgium	43	0.62	4	4	1	0.91	6
Brazil	48	0.42	11	2	3	0.08	31
Canada	295	0.67	3	4	1	0.93	4
Chile	36	0.00	16	1	4	0.22	29
China	99	0.00	16	4	1	0.42	23
Denmark	65	0.50	8	4	1	0.74	14
Finland	79	0.69	2	4	1	0.92	5
France	275	0.23	15	3	2	0.47	21
Germany	242	0.45	10	4	1	0.56	19
Greece	64	0.42	11	2	3	0.39	24
Hong Kong	24	1.00	1	4	1	0.86	9
Ireland	22	0.62	4	4	1	0.90	7
Israel	55	0.56	6	4	1	0.51	20
Italy	119	0.23	15	3	2	0.37	25
Japan	1,501	0.54	7	4	1	0.96	1
Korea	154	0.54	7	4	1	0.88	8
Malaysia	63	0.58	5	2	3	0.34	26
Mexico	13	0.27	13	2	3	0.51	20
Netherlands	68	0.25	14	4	1	0.94	3
New Zealand	34	1.00	1	4	1	0.80	12
Norway	31	0.38	12	4	1	0.92	5
Peru	5	0.54	7	2	3	0.31	28
Philippines	3	0.54	7	4	1	0.18	30
Poland	35	0.42	11	2	3	0.47	21
Portugal	24	0.54	7	2	3	0.61	16
Russia	13	0.25	14	3	2	0.33	27
Singapore	47	1.00	1	4	1	0.95	2
South Africa	92	0.45	10	4	1	0.39	24
Spain	67	0.46	9	2	3	0.59	18
Sweden	91	0.67	3	4	1	0.81	11
Switzerland	109	0.54	7	4	1	0.60	17
Taiwan	123	0.54	7	2	3	0.71	15
Thailand	52	0.69	2	3	2	0.45	22
Turkey	76	0.69	2	4	1	0.07	32
UK	447	1.00	1	4	1	0.91	6
USA	1,225	0.54	7	4	1	0.86	9
Total firms	5,958						
Mean		0.54		3		0.62	
Std. Dev.		0.25		1		0.27	
Median		0.54		4		0.61	
Minimum		0.00		1		0.07	
Maximum		1.00		4		0.96	

Shareholders' strategic default incentives are affected not only by the law's ability to enforce debt repayments, but also by their expected payoff in default. Accordingly, we also use creditors' recovery rate, which is an inverse measure of shareholders' benefits to engage in strategic default. The *Creditors' recovery* index refines *Priority* because it depends not only on the order in which secured creditors are paid, but also on the time it takes for a creditor to get paid and on the overall estimated costs of the insolvency procedure. In our model, creditors' recovery rate, conditional on default, is strictly increasing and concave in q.[13] Therefore, we expect the same comparative statics as with respect to *Renegotiation failure* and *Priority*. Table II shows that, in our sample, the highest *Creditors' recovery* rate is in Japan and Singapore, and the lowest in Brazil; the average in our sample is 58%.

A.2. Country-Level Controls

In our estimations, we use other country-level data to control for countries' heterogeneity in legal institution and financial market development. In particular, we control for the origin of the country's legal system to account for unobservable characteristics of the insolvency code. We also control for the depth of the financial market because it may influence shareholders' growth opportunities and outside options, and thus their strategic default incentives. We measure financial development with the ratio of private credit to GDP (*Private credit to GDP*), and the depth and liquidity of the stock market with the stock market turnover ratio (*Stock market turnover*) and the stock market capitalization to GDP ratio (*Stock market cap to GDP*). Finally, we measure *Local growth opportunities* with the price to earnings ratios of industry portfolios, following Bekaert et al. (2007).

B. Firm-Level Data

We compute a firm's monthly stock return using share prices from Thomson-Reuters's Datastream and CRSP. We match these monthly returns to the firm's annual financial statements in Thomson-Reuters Worldscope and *Compustat*. We follow Fama and French (1992) and match the accounting data ending in

court. The relatively average *Renegotiation failure* value for the United States is explained by a combination of strong creditor rights in Chapter 11 (e.g., creditor rights to vote on a reorganization) but relatively strong manager rights (e.g., automatic stay of management) and shareholder rights during out-of-court workouts (e.g., a reorganization must be attempted).

[13] Creditors' expected recovery rate, conditional on default, is

$$R \equiv \frac{(1-q)(1-\eta\alpha)X_B + q(1-\alpha)X_B}{\frac{c}{r}} = \frac{\lambda}{\lambda - 1}\left[1 - \frac{\alpha q}{1-(1-q)\eta\alpha}\right].$$

It thus follows that $\frac{\partial R}{\partial q} > 0$ and $\frac{\partial^2 R}{\partial q^2} < 0$. Intuitively, conditional on default, an increase in q makes liquidation more likely but delays the default timing, decreasing the value of assets upon liquidation.

calendar year $t-1$ to the 12 monthly stock returns from July of year t to June of year $t+1$.

Given that our cross section of countries includes several emerging markets, it is likely that many stocks are infrequently traded. Bekaert, Harvey, and Lundblad (2007) propose a measure of trading frequency based on the incidence of observed daily zero returns. Since we use monthly data, we exclude firms that have a sequence of at least three consecutive zero monthly stock returns. We verify that our results hold when using different cutoffs (up to six).[14]

To reduce the impact of outliers, we trim all variables at the 1% level in each tail and exclude observations for which the stock price is less than USD 1. Our sample also excludes financial firms because financial firms' accounting data are largely dependent on statutory capital requirements.

To minimize the risk that firms may be subject to insolvency procedures in countries where they cross-list rather than at home, we exclude all firms where the first two characters of the International Security Identification Number (ISIN) code do not match with the country of origin. This exclusion, however, does not rule out the possibility that a firm may file for bankruptcy in a foreign jurisdiction with an insolvency law that best protects it from its creditors. Section IV.D discusses the extent to which a multinational firm can engage in international forum shopping and confirms the robustness of our results to the exclusion of firms that operate internationally.

The total number of firms in our sample is 5,958. Table II shows that the number of firms varies substantially across countries. In our sample, the countries with the largest number of firms are Japan (1,501) and the United States (1,225). In Section IV.E, we show that our results are not affected by the predominance of these two countries in the sample.

B.1. Equity Beta

We use *Domestic market beta* as our first measure of equity risk. Following standard methodology, we estimate monthly firm-specific domestic market betas by regressing each firm's stock return on the contemporaneous domestic stock market index return using 60 historical monthly observations. Domestic market betas are the appropriate measure of the model's equity beta only when the stock is held in a domestic portfolio and the domestic stock market is segmented from the world market.

As an alternative, we define *Overall market beta* as the sum of the betas in the regression of firms' stock returns on the contemporaneous world market return (MSCI World) and the residual of the orthogonal projection of the domestic market return on the world market return. This definition of beta also corresponds to the equity beta in our model but allows for the risk factor itself to be an arbitrary combination of the world factor and an orthogonal domestic factor. Karolyi and Stulz (2003) derive an upper bound for the asset pricing mistake of

[14] Bartram, Brown, and Stulz (2011) exclude stocks with more than 30% zero weekly returns. None of our findings are affected when we apply this less stringent filter.

the domestic CAPM, when the world CAPM is the correct model.[15] Accordingly, we use *Overall market beta* for stocks with an asset pricing mistake larger than 0.5% return per year, and *Domestic market beta* for all others stocks.

As a second alternative, we use *World market beta* by regressing firms' stock returns on the contemporaneous world stock market return (MSCI World) using 60 observations. To identify the stocks that are integrated into the world market, we construct the country-year segmentation measure suggested by Bekaert, Harvey, and Lundblad (2011). Specifically, we collect annual earnings yields from Datastream and use the 38 Fama-French industries to construct the segmentation measure. Next, we use *World market beta* for all stocks in a given country for the years in which the segmentation index is lower than the country's median. Otherwise, we use *Domestic market beta*. The advantage of this approach is that it defines segmentation independently of an asset pricing model. We explore the robustness of our results to different segmentation cutoff values in Section IV.B.

Table III summarizes the sample distribution of our firm-specific variables. We find that the distributions of domestic and world betas are very similar. We report the country average Karolyi and Stulz (2003) upper bound mistake in the Appendix (Table A.I). The asset pricing mistakes tend to be high, on average, only in countries where the world market covaries poorly with firms' returns (e.g., in China, Russia, Taiwan, and Thailand).

B.2. Returns Volatility

Our first measure of volatility, *Total volatility*, is defined as the annualized standard deviation of monthly stock returns over the same rolling five-year window as the betas. We follow Bartram, Brown, and Stulz (2011) and decompose total volatility into systematic risk and idiosyncratic risk using a market model. Specifically, for each firm i, we estimate

$$r_{it} = \alpha + \beta_{it-1} r^M_{t-1} + \beta_{it} r^M_t + \beta_{it+1} r^M_{t+1} + \varepsilon_{it}, \tag{5}$$

where r_{it} is the firm's monthly stock return, r^M_t is the return on the domestic market index, and ε_{it} is an error term. We define *Idiosyncratic volatility* as the annualized standard deviation of ε_{it}. Our estimate of *Systematic volatility* is then the square root of the difference between total return variance and the variance of ε_{it}.

B.3. Liquidation Costs and Bargaining Power

We use two firm-specific proxies of shareholders' strategic default incentives: the firm's liquidation costs and shareholders' bargaining power in renegotiations. We measure liquidation costs, α, with the firm's intangibility of assets.

[15] The authors show that the asset pricing mistake is small when (i) the domestic market portfolio is strongly correlated with the world portfolio and (ii) the stock's volatility is low relative to the world market portfolio's.

Table III

Summary Statistics of Firm-Specific Variables

This table summarizes our firm-level data pooled across countries and time. Monthly stock market data come from Datastream and CRSP, and annual financial statement data are from Worldscope and Compustat. The sample period is from 1993 to 2006. Sources and definitions of all variables are given in Table I.

Variable	Mean	Std. Dev.	1st Percentile	First Quartile	Median	Third Quartile	99th Percentile	Observations
Domestic market beta	0.772	0.409	−0.097	0.487	0.763	1.042	1.799	376,884
World market beta	0.746	0.545	−0.235	0.363	0.670	1.044	2.354	376,884
Overall market beta	1.546	0.865	−0.214	0.943	1.478	2.084	3.817	376,884
Scholes–Williams beta	0.813	0.516	−0.250	0.456	0.780	1.129	2.193	367,289
Total return volatility (annual)	0.358	0.108	0.157	0.278	0.346	0.425	0.649	376,846
Systematic return volatility (annual)	0.175	0.085	0.029	0.112	0.164	0.229	0.412	376,846
Idiosyncratic return volatility (annual)	0.304	0.096	0.132	0.233	0.292	0.364	0.570	376,846
Book-to-market (level)	0.155	0.779	−1.785	−0.335	0.165	0.654	1.990	376,884
Momentum	1.282	3.023	−5.800	−0.570	1.159	2.978	9.801	376,864
Size ($ Billions)	5.949	1.664	2.149	4.794	5.904	7.121	9.454	376,884
Leverage	0.274	0.224	0.000	0.079	0.234	0.432	0.820	375,806
Leverage projection	0.275	0.182	−0.088	0.140	0.260	0.399	0.721	376,884
Short-term debt	0.443	1.078	0.000	0.160	0.391	0.664	1.000	330,022
Short-term debt projection	0.456	1.316	−0.026	0.184	0.403	0.661	1.063	348,226
Intangibles	0.459	0.109	0.208	0.392	0.449	0.514	0.784	376,884
Intangibles (*with cash*)	0.593	0.103	0.417	0.519	0.576	0.650	0.883	376,884
Insiders' share	0.399	0.228	0.002	0.236	0.391	0.558	0.933	376,884

The *Intangibles* measure is defined as one minus the average of the expected exit values per dollar of the different tangible assets, that is, receivables, inventories, net property, plant, and equipment, and cash, weighted by their proportion of total book assets. We use the same exit values for inventories and net property, plant, and equipment as Berger, Ofek, and Swary (1996). As in Garlappi, Shu, and Yan (2008) and Almeida and Campello (2007), we set the exit value of cash to one, that is, we consider cash as 100% tangible. Since there is disagreement as to whether cash should be included or excluded from the definition of tangible assets, we evaluate the robustness of our results using a second variable, *Intangibles* (*with cash*), which sets the exit value of cash to zero. The average *Intangibles* is 45.9% and the average *Intangibles* (*with cash*) is 59.3%. Both variables have a standard deviation of 11%.

As a measure of shareholders' bargaining power, η, we use the proportion of shares held by insiders to total shares outstanding (*Insiders' share*). This proportion includes shares held by officers, directors, and their immediate families; shares held in trust or by pension plans; and shares held by individuals who hold 5% or more of the outstanding shares. Shares held by insiders play an important role in potential renegotiations of debt contracts because larger insider ownership could improve shareholder coordination and increase insiders' incentives to work in the interest of all shareholders. For instance, Betker (1995) shows that a 10% increase in CEO share holdings increases equity deviations from the absolute priority in Chapter 11 by as much as 1.2% of firm value. Our proxy of shareholders' bargaining power in renegotiations is closely related to similar proxies used for the United States only, as in, for example, Davydenko and Strebulaev (2007).[16] In our sample, *Insiders' share* is, on average, 39.9% and its standard deviation is 22.8%.

B.4. Firm-Level Controls

We also control for additional firm-specific variables that can affect equity risk. Firm *Size* is the logarithm of the market value of equity. The firm's book-to-market ratio (*Book-to-market*) is the total book value of assets minus the total value of liabilities, divided by the market value of equity. As suggested by Carlson, Fisher, and Giammarino (2004), we control for *Size* to capture differences in firm maturity, and for *Book-to-market* to capture differences in operational leverage. The average firm in the international cross section has assets worth $5.95 billion (median $5.90 billion).

We also control for financial leverage, which we expect to affect the firm's systematic risk not only through the traditional leverage channel but also through its relation with the firm's investment opportunities, as suggested by Gomes and Schmid (2010). Since leverage may be endogenously determined with the default threshold and equity risk, we follow Lemmon, Roberts, and

[16] Due to data limitations, we are not able to construct proxies for shareholders' bargaining power based on the tenure of managers, the investment of human capital, and the concentration of creditors, as Davydenko and Strebulaev (2007) do.

Zender (2008) to identify the exogenous variation in leverage. They show that in the cross section of *Compustat* firms, the variation in leverage is stable over time and largely explained by the initial level of leverage. We apply their analysis to our international sample of firms and perform a first-stage regression of firm i's leverage at time $t > 0$ ($Leverage_{it}$) on firm i's initial leverage ($Leverage_{i0}$) as well as on country- and firm-specific determinants of leverage. In particular, our variable *Leverage projection* is the orthogonal projection of leverage on $Leverage_{i0}$, the country's statutory corporate tax rate, *Renegotiation failure, Intangibles, Insiders' share, Size, Book-to-market,* and yearly dummies.[17] The country's statutory tax rate is the main instrument in this first-stage regression because it is unlikely that firms' financing decisions affect the country's statutory tax rate.[18] The results from this regression are reported in Table A.II in the Appendix.

III. Empirical Analysis

This section and the next present our empirical method and the results of our tests concerning equity beta. Section V focuses on volatility and equity returns.

A. Method

Our hypothesis is that shareholders' risk related to strategic default is higher in countries where debt renegotiations are more likely to fail due to frictions introduced by the insolvency code. The testable implications, derived from equation (3), are that (i) more renegotiation frictions increase the individual firm's equity beta, and (ii) the sensitivity of the equity beta to liquidation costs and shareholders' bargaining power is lower in countries where debt renegotiations are less likely. To test these predictions, we regress *Domestic market beta* on our measures of the firm's liquidation costs and shareholders' bargaining power, as well as on the country-specific measures of debt enforcement.

By construction, our monthly panel of firms is likely to exhibit time-series dependence in firm-specific variables. Therefore, we follow Petersen (2009) and use a pooled ordinary least squares (OLS) estimator with firm-time-clustered standard errors. For robustness, we rerun our analysis using a Fama and MacBeth (1973) estimator, which has been shown to produce unbiased inferences in the presence of cross-sectional dependence (Petersen (2009)).

All our specifications control for *Size* and *Book-to-market* in order to capture cross-sectional differences in the maturity of firms and the operational leverage of assets in place, respectively. To account for the effect of financial leverage

[17] The results using *Leverage* instead of *Leverage projection* are qualitatively identical. However, the sensitivity of equity beta to q is higher when we use *Leverage projection*. Our interpretation is that the endogenous component of *Leverage* is a substitute for strategic default in countries where q is high. If it is not removed, it biases downward the estimated sensitivity of beta to q.

[18] We use countries' statutory tax rates reported by Djankov et al. (2010).

on the equity beta, we use *Leverage projection*. Provided that the instruments for *Leverage* are exogenous, this projection is orthogonal to the cross-country determinants of equity risk that jointly determine leverage.

B. Direct Effects of Renegotiation failure

We measure the direct effect of debt enforcement on the equity beta through the coefficient δ_q in the regression

$$\begin{aligned}\beta_{it} = \underbrace{\mathbf{x}'_{it}\gamma}_{controls} &+ \delta_q \textit{Renegotiation failure}_C \\ &+ \delta_\alpha \textit{ Intangibles}_{it} + \delta_\eta \textit{Insiders' share}_{it} + \varepsilon_{it},\end{aligned} \tag{6}$$

where β_{it} is the month t's equity beta for firm i in country C. Column 1 of Table IV shows the estimates of this equation. Column 2 reports the results after replacing *Intangibles* with *Intangibles* (*with cash*).

Controlling for *Size*, *Book-to-market*, and *Leverage*, we find that an increase in the likelihood that a debt renegotiation fails is associated, on average, with a higher beta. This effect is statistically significant at the 1% level.

We find that *Insiders' share* of equity, used here as a proxy for shareholders' bargaining power, has a negative and significant effect on the firm's beta. While *Intangibles* also has the hypothesized negative and significant effect on the equity beta, *Intangibles* (*with cash*) has the opposite sign.

Finally, we note that, in our international cross section, value stocks have a larger equity beta, on average, than growth stocks (*Book-to-market*), although the effect is only significant at the 1% level in column 2. This result is consistent with the prediction by Carlson, Fisher, and Giammarino (2004) that *Book-to-market* is a close proxy for operational leverage, and therefore increases the equity beta. Surprisingly, we find that *Size* has a positive, although small, effect on beta. One explanation is that, outside the United States, the population of listed firms is heavily concentrated on mature ones, and the international cross section fails to identify the effect of firms' maturity.

C. Interactions between Liquidation Costs, Shareholders' Bargaining Power, and Renegotiation Failure

To investigate if the empirical relation between *Renegotiation failure* and the equity beta operates through the strategic default channel, we interact *Renegotiation failure* with our proxies for shareholder's bargaining power

$$\begin{aligned}\beta_{it} = \underbrace{\mathbf{x}'_{it}}_{controls}\gamma &+ \delta_q \textit{Renegotiation failure}_C + \delta_\eta \textit{Insiders' share}_{it} \\ &+ \delta_{q\eta} \textit{Renegotiation failure}_C \times \textit{Insiders' share}_{it} + \varepsilon_{it},\end{aligned} \tag{7}$$

Table IV

Equity Beta and Renegotiation Frictions

Panel A of this table shows the pooled OLS estimates of the regression of the firm's *Domestic market beta* on proxies of shareholders' bargaining power (*Insiders' share*), liquidation costs (*Intangibles* and *Intangibles* (*with cash*)), our measure of renegotiation frictions (*Renegotiation failure*), and firm-specific controls. Sources and definitions for all variables are in Table I. The sample consists of monthly observations from 1993 to 2006. Each firm's domestic market beta is computed each month from the regression of the past 60 monthly returns on the domestic market's contemporaneous return. Standard errors are adjusted for correlation within firms and time, and are reported in parentheses. Panel B reports statistics for the economic significance of the estimates in Panel A, expressed in terms of average monthly excess returns. Estimates followed by ***, **, and * are statistically different from zero with 0.01, 0.05, and 0.1 significance levels, respectively.

Panel A: Pooled OLS Estimates

	(1)	(2)	(3)	(4)	(5)
Size	0.042***	0.033***	0.035***	0.045***	0.036***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Book-to-market	0.022**	0.055***	0.053***	0.019*	0.054***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Leverage projection	0.096**	−0.092**	−0.112**	0.110**	−0.086*
	(0.048)	(0.044)	(0.044)	(0.048)	(0.044)
Renegotiation failure	0.118***	0.106***	−0.044	−0.305***	−0.209*
	(0.027)	(0.026)	(0.049)	(0.101)	(0.114)
Insiders' share	−0.086***	−0.073***	−0.275***		
	(0.027)	(0.028)	(0.065)		
Intangibles	−0.631***			−1.186***	
	(0.054)			(0.140)	
Intangibles (*with cash*)		0.217***			−0.115
		(0.050)			(0.127)
Insiders' share × *Renegotiation failure*			0.354***		
			(0.095)		
Intangibles × *Renegotiation failure*				0.959***	
				(0.209)	
Intangibles (*with cash*) × *Renegotiation failure*					0.576***
					(0.195)
Constant	0.750***	0.434***	0.647***	0.940***	0.568***
	(0.039)	(0.044)	(0.046)	(0.068)	(0.078)
Observations	376,884	376,884	376,884	376,884	376,884
Average adjusted R^2	0.05	0.03	0.03	0.05	0.03

Panel B: Further Tests of the Model's Implications

$$H_0: \frac{\partial \mathbb{E}(r_i - r | \textit{Renegotiation failure} = 1)}{\partial \textit{Intangibles} \text{ or } \textit{Insiders' share}} = 0$$

	(3)	(4)	(5)
Test statistic Standard error	0.067*	−0.195*	0.396*
	(0.039)	(0.082)	(0.080)

$$H_0 : \mathbb{E}(r_i - r \,|\, \textit{Renegotiation failure} = 1) - \mathbb{E}(r_i - r \,|\, \textit{Renegotiation failure} = 0) = 0$$

	(3)	(4)	(5)
Test statistic evaluated at average *Intangibles* or *Insiders' share*	0.083***	0.116***	0.115***
Standard error	(0.023)	(0.022)	(0.022)
Test statistic evaluated at maximum *Intangibles* or *Insiders' share*	0.265***	0.444***	0.315***
Standard error	(0.065)	(0.092)	(0.093)

and liquidation costs

$$\beta_{it} = \underbrace{\mathbf{x}_{it}'\gamma}_{controls} + \delta_q Renegotiation\ failure_C + \delta_\alpha Intangibles_{it} + \delta_{q\alpha} Renegotiation\ failure_C \times Intangibles_{it} + \varepsilon_{it}. \quad (8)$$

According to the model, equity beta is decreasing in the bargaining power or liquidation costs, but the sensitivity of beta should decrease monotonically as a debt renegotiation is more likely to fail. Therefore, we expect $\delta_\eta < 0$ and $\delta_{q\eta} > 0$, and $\delta_\alpha < 0$ and $\delta_{q\alpha} > 0$.

The results in columns 3–5 of Table IV support these hypotheses. The firm's equity beta is decreasing in shareholders' bargaining power (column 3) and this effect is significant at the 1% level. Moreover, the coefficient on the interaction term between *Insiders' share* and *Renegotiation failure* is, as expected, positive and statistically significant. Similarly, column 4 shows that the direct effect of asset intangibility on the equity beta is negative and significant, and the interaction with *Renegotiation failure* has the predicted positive and significant coefficient. Column 5 shows that our previous result for the interaction between asset intangibility and *Renegotiation failure* (column 4) is robust to a measure of liquidation costs that includes cash as an intangible asset.

In summary, the results show that the sensitivity of equity beta to liquidation costs or shareholders' bargaining power decreases with the probability of renegotiation failure, as predicted by the model.

D. Economic Interpretation

Panel B of Table IV shows the results of further tests regarding the quantitative implications of strategic default on equity beta. The model implies that, in a country where debt renegotiation is impossible ($q = 1$), the strategic default option is worthless. As a consequence, equity beta should be independent of shareholders' bargaining power and liquidation costs. Therefore, we test the null hypotheses that $\partial\beta_E\partial\eta|_{q=1}$ and $\partial\beta_E\partial\alpha|_{q=1}$ are zero. From (7) and (8), the relevant test statistics are $\hat{\delta}_\eta + \hat{\delta}_{q\eta}$ and $\hat{\delta}_\alpha + \hat{\delta}_{q\alpha}$, respectively. To show whether these statistics are economically significant, we multiply them by the sample average market risk premium. Thus, we report the statistics in monthly excess returns, that is, cost of capital, rather than beta units.

In line with the model's predictions, column 3 shows that the effect of bargaining power, as measured by *Insiders' share*, almost disappears (less than seven basis points per month) when debt renegotiations are difficult. Column 4 shows, however, that *Intangibles* has a significant negative effect on equity beta, equivalent to 20 basis points excess returns per month, as *Renegotiation failure* approaches one. Interestingly, we estimate a larger effect (40 basis points, column 5) when we use *Intangibles* (*with cash*). Our interpretation is that *Intangibles* overstates the tangibility of cash (it assumes that cash is 100% tangible), whereas *Intangibles* (*with cash*) understates it (it assumes that cash is 100% intangible). Therefore, the estimates of δ_α may be capturing a

return premium to cash that is unrelated to the strategic default channel, as in Dittmar and Mahrt-Smith (2007).

We also evaluate the economic significance of the strategic default effect on equity beta by computing the implied difference between the average monthly excess returns in a country where debt renegotiation is certain ($q = 0$) and in a country where it is impossible ($q = 1$). The test statistics

$$\mathbb{E}(r_i - r | q = 1) - \mathbb{E}(r_i - r | q = 0) = (\hat{\delta}_q + \hat{\delta}_{q\eta}\eta) \times (r^M - r),$$

and

$$\mathbb{E}(r_i - r | q = 1) - \mathbb{E}(r_i - r | q = 0) = (\hat{\delta}_q + \hat{\delta}_{q\alpha}\alpha) \times (r^M - r),$$

computed at the sample means of *Insiders' share*, *Intangibles,* and *Intangibles* (*with cash*) are shown in Panel B of Table IV. We find that, ceteris paribus, stock returns in a country with the highest debt renegotiation frictions are, on average, 8 and 12 basis points higher per month than for similar stocks in countries with no renegotiation frictions. This difference is statistically and economically significant. We also report an upper bound for this difference by evaluating the statistics above when α or η equal one; the maximum return difference can reach up to 44 basis points per month.

IV. Robustness

So far, our results establish that a country's debt renegotiation procedure has important effects on firms' beta. The fact that this effect goes through the interaction with our measure of liquidation costs and shareholders' bargaining power suggests that shareholders' strategic default behavior is at play. However, our results also show that q has a direct effect on beta even if firms have no advantage vis-à-vis creditors in renegotiations. In this section, we account for effects on equity risk that are unrelated to strategic default incentives and show that the interaction effects that identify strategic default prevail and are even stronger. We also evaluate the robustness of our results to alternative measures of beta.

A. Additional Cross-Country Variation

Following recent studies on the effect of institutions on firm-level outcomes (Bae and Goyal (2009) or Qian and Strahan (2008)), we control for the country's ratio of private credit to GDP (*Private credit to GDP*), the stock market turnover ratio (*Stock market turnover*), and the stock market capitalization to GDP ratio (*Stock market cap to GDP*). We also construct the measure *Local growth opportunities* along the lines of Bekaert et al. (2007) to control for growth opportunities and firms' outside options. In addition, we include dummy variables for the origin of the country's legal system to account for unobserved country characteristics unrelated to the insolvency code.

The estimates, reported in columns 1 and 2 of Table V, are consistent with our previous evidence.

Table V

Equity Beta, Renegotiation Frictions, and Institutional Variables

Panel A of this table shows the pooled OLS estimates of the regression of alternative definitions of firm's beta on proxies for shareholders' bargaining power (*Insiders' share*), liquidation costs (*Intangibles*), our measure of renegotiation frictions (*Renegotiation failure*), and firm and country controls. Sources and definitions for all variables are in Table I. The sample consists of monthly observations from 1993 to 2006. In columns 1 and 2, the dependent variable is the firm's *Domestic market beta*; in columns 3 and 4, the dependent variable is *Overall market beta* for all stocks where the Karolyi and Stulz's (2003) upper bound for asset pricing mistakes from using the domestic CAPM when the world CAPM is correct exceeds 0.5% return per year; otherwise, it is *Domestic market beta*; in columns 5 and 6, the dependent variable is the *World market beta* for all stocks in all countries and years where the Bekaert, Harvey, and Lundblad (2011) segmentation measure is lower than the country's median; otherwise, it is *Domestic market beta*. Standard errors are adjusted for correlation within firms and time, and are reported in parentheses. Panel B reports statistics for the economic significance of the estimates in Panel A, expressed in terms of average monthly excess returns. Estimates followed by ***, **, and * are statistically different from zero with 0.01, 0.05, and 0.1 significance levels, respectively.

Panel A: Pooled OLS Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Stock market turnover	−0.163***	−0.138***	−0.376***	−0.326***	−0.112***	−0.088***
	(0.009)	(0.01)	(0.027)	(0.027)	(0.011)	(0.011)
Stock market cap to GDP	−0.092***	−0.092***	−0.318***	−0.320***	−0.151***	−0.152***
	(0.013)	(0.013)	(0.025)	(0.025)	(0.012)	(0.012)
Private credit to GDP	0.077***	0.082***	0.616***	0.622***	0.235***	0.242***
	(0.014)	(0.014)	(0.045)	(0.044)	(0.017)	(0.017)
Local growth opportunities	−0.030**	−0.022*	−0.055**	−0.047**	−0.062***	−0.053***
	(0.012)	(0.011)	(0.024)	(0.024)	(0.013)	(0.013)
French	0.230***	0.174***	0.780***	0.666***	0.287***	0.229***
	(0.024)	(0.023)	(0.063)	(0.062)	(0.037)	(0.036)
German	0.203***	0.156***	0.416***	0.327***	0.098***	0.057***
	(0.018)	(0.018)	(0.039)	(0.038)	(0.02)	(0.02)
Scandinavian	−0.037	−0.056**	0.409***	0.368***	0.146***	0.133***
	(0.025)	(0.025)	(0.061)	(0.061)	(0.031)	(0.031)
Socialist	0.238*	0.13	1.173***	0.960***	0.408***	0.288***
	(0.13)	(0.127)	(0.326)	(0.33)	(0.112)	(0.111)
Size	0.021***	0.034***	0.071***	0.094***	0.046***	0.057***
	(0.004)	(0.004)	(0.007)	(0.007)	(0.004)	(0.004)
Book-to-market	−0.01	−0.019*	−0.054***	−0.082***	−0.005	−0.013
	(0.011)	(0.011)	(0.02)	(0.021)	(0.01)	(0.011)
Leverage projection	−0.018	0.105**	0.057	0.364***	−0.03	0.083*
	(0.041)	(0.045)	(0.079)	(0.087)	(0.041)	(0.046)
Renegotiation failure	0.222***	−0.038	0.539***	0.201	0.049	−0.109
	(0.052)	(0.1)	(0.12)	(0.203)	(0.064)	(0.115)
Insiders' share	−0.422***		−0.907***		−0.532***	
	(0.063)		(0.125)		(0.065)	
Insiders' share ×	0.328***		1.036***		0.575***	
Renegotiation failure	(0.096)		(0.195)		(0.101)	
Intangibles		−0.813***		−1.788***		−0.763***
		(0.137)		(0.256)		(0.141)

(*Continued*)

Table V—*Continued*

Panel A: Pooled OLS Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Intangibles × *Renegotiation failure*		0.872***		1.602***		0.842***
		(0.201)		(0.382)		(0.212)
Constant	0.717***	0.779***	0.257	0.474**	0.552***	0.558***
	(0.063)	(0.081)	(0.172)	(0.187)	(0.083)	(0.099)
Observations	351,099	351,099	351,099	351,099	347,211	347,211
Average adjusted R^2	0.14	0.13	0.18	0.18	0.11	0.10

Panel B: Further Tests of the Model's Implications

$$H_0 : \frac{\partial \mathbb{E}(r_i - r | \textit{Renegotiation failure} = 1)}{\partial \textit{Intangibles or Insiders' share}} = 0$$

	(1)	(2)	(3)	(4)	(5)	(6)
Test statistic	−0.078**	0.049	0.052	−0.079	0.036	0.066
Standard error	(0.036)	(0.075)	(0.036)	(0.072)	(0.039)	(0.082)

$$H_0 : \mathbb{E}\left(r_i - r | \textit{Renegotiation failure} = 1\right) - \mathbb{E}\left(r_i - r | \textit{Renegotiation failure} = 0\right) = 0$$

	(1)	(2)	(3)	(4)	(5)	(6)
Test statistic evaluated at average						
Intangibles or *Insiders' share*	0.294***	0.299***	0.385***	0.374***	0.232***	0.228***
Standard error	(0.030)	(0.030)	(0.036)	(0.035)	(0.040)	(0.039)
Test statistic evaluated at maximum						
Intangibles or *Insiders' share*	0.456***	0.588***	0.631***	0.630***	0.515***	0.506***
Standard error	(0.057)	(0.072)	(0.058)	(0.068)	(0.063)	(0.074)

Moreover, for average values of *Insiders' share* or *Intangibles*, the effect of strategic default on equity risk strengthens: a change in *Renegotiation failure* from zero to one has an estimated effect on excess stock returns between 29 and 30 basis points per month. We also find that the estimate of $\delta_q$is either small relative to $\hat{\delta}_\eta$ and $\widehat{\delta}_{q\eta}$ (column 1) or zero (column 2). The coefficient δ_q measures the effect of q on equity risk when shareholders have no bargaining power or when liquidation costs are zero, that is, an effect unrelated to the strategic default option. Therefore, an estimate of zero not only is in line with the model's predictions but also suggests that our control variables well capture any residual correlation between institutional characteristics and the equity beta beyond the strategic default channel. We use this specification for all subsequent tests.

Given that our measures of renegotiation frictions only vary across countries, it is possible that other *unobservable* country-specific variables affect the estimates of δ_q, δ_α, or δ_η.[19] To address this issue, we reestimate (7) and (8)

[19] Such unobservable characteristics could include, for example, the treatment of tax carry-forward in bankruptcy or the costs of renegotiation outside a formal insolvency procedure.

with all variables expressed as deviations from their country's average in the same month. As shown in the Appendix (Table A.III), the results are qualitatively and quantitatively similar to those in Tables IV and V. These results suggest that the effect of renegotiation frictions on equity beta is not driven by unobservable country determinants of equity risk, but rather by the interaction between *Renegotiation failure* and liquidations costs or shareholders' bargaining power.

B. Domestic and World Betas

In columns 3 and 4 of Table V, the dependent variable is *Overall market beta* for stocks where the Karolyi and Stulz (2003) upper bound for asset pricing mistakes is larger than 0.5% return per year. For all other stocks, the dependent variable is *Domestic market beta*. Qualitatively, the results are as in columns 1 and 2. Quantitatively, the effect of *Renegotiation failure* on equity risk is slightly stronger: between 37 and 38 basis points per month, on average. Our results are also robust to using *World market beta* for stocks in years where the country is less segmented than the median (columns 5 and 6), and to using *Overall market beta* or *World market beta* for all stocks.

C. Interactions between Leverage and Renegotiation Failure

C.1. Total Leverage

Our sample includes some firms with very low leverage. With little debt to default on, it is unlikely that debt renegotiation frictions will affect the equity risk of these firms. Indeed, inspection of equation (3) reveals that, for a given cash flow $X > X_B$, the lower the firm's leverage, c, the later shareholders will default strategically. As shown in the Internet Appendix, the model implies

$$\frac{\partial^2 \beta_E}{\partial c \partial q} > 0,$$

suggesting that the sensitivity of the equity beta to renegotiation frictions increases with leverage. To test this prediction, we estimate (7) and (8) in two subsamples: high leverage (HL) and low leverage (LL), which contain, respectively, firms in the top and bottom three deciles of the *Leverage projection* distribution. Table VI shows the estimates of the relevant parameters (the full set of estimates is available in the Internet Appendix).

Panel A of Table VI shows that, in general, the model with interactions better fits the subsample of HL firms. The adjusted R^2s are equal or higher for the HL firms than the LL firms. The sensitivity of the equity beta to q is slightly larger in the HL subsample for intermediate values of *Intangibles* (column 2) but twice as large for the HL subsample at the average of *Insiders' share* (column 1). When *Intangibles* or *Insiders' share* are set to one, that is, when the strategic default incentives are maximized, in both cases, the estimate of $\partial \beta_E / \partial q$ is much larger for the relatively more levered firms (HL). In summary,

Table VI

Equity Beta, Renegotiation Frictions, and Leverage

This table shows the pooled OLS estimates of the regression of the firm's *Domestic market beta* on proxies for liquidation costs (*Intangibles*), shareholders' bargaining power (*Insiders' share*), and our measure of renegotiation frictions (*Renegotiation failure*). Sources and definitions for all variables are in Table I, and the full set of estimates is available in the Internet Appendix. The sample consists of monthly observations from 1993 to 2006. Each firm's *Domestic market beta* is computed each month from the regression of the past 60 monthly returns on its country's contemporaneous market return. The estimates in Panel A are for high leverage (HL) and low leverage (LL) firms. The HL and LL subsamples include, respectively, the top and bottom three deciles of the distribution of *Leverage projection*. *Leverage projection* is the orthogonal projection of the firm's *Leverage* in year $t > 0$ on *Renegotiation failure*, the firm's initial *Leverage* (year $t = 0$), the country's statutory corporate tax rate, the firm's *Intangibles, Insiders' share, Size*, *Book-to-market*, and yearly dummies. Standard errors adjusted for correlation within firms and time are reported in parentheses. This panel also reports statistics for the sensitivity of equity beta to *Renegotiation failure* implied by the parameter estimates and evaluated at different values of the proxies for liquidation costs and shareholder's bargaining power. In Panel B, HSD and LSD contain firms in the top and bottom three deciles of the distribution of *Short-term debt projection*, which is defined following the same method as for *Leverage projection*. Estimates followed by ***, **, and * are statistically different from zero with 0.01, 0.05, and 0.1 significance levels, respectively.

Panel A: Estimates Conditional on Subsamples Defined by *Leverage*

	(1)		(2)	
	LL	HL	LL	HL
Renegotiation failure	−0.111	−0.042	−0.154	−0.814***
	(0.087)	(0.084)	(0.158)	(0.197)
Insiders' share	−0.485***	−0.170		
	(0.107)	(0.108)		
Insiders' share ×	0.416**	0.433***		
Renegotiation failure	(0.164)	(0.159)		
Intangibles			−1.015***	−1.849***
			(0.231)	(0.268)
Intangibles ×			0.692*	1.931***
Renegotiation failure			(0.366)	(0.392)
Observations	113,284	112,837	113,284	112,837
Average adjusted R^2	0.04	0.04	0.04	0.07

Further Tests of the Model's Implications

$$H_0 : \frac{\partial \beta}{\partial \textit{Renegotiation failure}}|_{HL} - \frac{\partial \beta}{\partial \textit{Renegotiation failure}}|_{LL} = 0$$

$\frac{\partial \beta}{\partial \textit{Renegotiation failure}}$ evaluated at:				
Average *Intangibles* or				
Insiders' share	0.063	0.126***	0.131***	0.134***
Standard error	(0.044)	(0.047)	(0.044)	(0.045)
Intangibles or				
Insiders' share = 1	0.305***	0.391***	0.539**	1.117***
Standard error	(0.099)	(0.101)	(0.219)	(0.205)

(*Continued*)

Table VI—*Continued*

Panel B: Estimates Conditional on Subsamples Defined by *Short-Term Debt*

	(1)		(2)	
	LSD	HSD	LSD	HSD
Renegotiation failure	0.085	−0.272***	−0.450***	−0.100
	(0.080)	(0.095)	(0.163)	(0.199)
Insiders' share	−0.146	−0.601***		
	(0.110)	(0.116)		
Insiders' share ×	0.299**	0.772***		
Renegotiation failure	(0.161)	(0.179)		
Intangibles			−1.255***	−1.023***
			(0.210)	(0.299)
Intangibles ×			1.297***	0.531
Renegotiation failure			(0.308)	(0.450)
Observations	104,669	104,255	104,669	104,255
Average adjusted R^2	0.02	0.05	0.05	0.06

Further Tests of the Model's Implications

$$H_0 : \frac{\partial \beta}{\partial \, Renegotiation\ failure}|_{HL} - \frac{\partial \beta}{\partial \, Renegotiation\ failure}|_{LL} = 0$$

$\frac{\partial \beta}{\partial \, Renegotiation\ failure}$ evaluated at:				
Average *Intangibles* or				
Insiders' share	0.201***	0.059	0.176***	0.129**
Standard error	(0.045)	(0.051)	(0.044)	(0.051)
Intangibles or				
Insiders' share = 1	0.384***	0.500***	0.847***	0.432
Standard error	(0.104)	(0.111)	(0.157)	(0.263)

these results suggest that the strategic default option is unlikely to affect the equity beta for firms with very low leverage, validating the interpretation of our earlier results.

C.2. Short-Term Debt

Shareholders can alter equity risk not only by choosing when to strategically default, but also by adjusting leverage. For example, expecting more renegotiations frictions, shareholders may reduce leverage ex-ante or use short-term debt, which can be easily rolled over, rather than attempt a debt renegotiation. In the results above, the strategic default option is less valuable for firms that use less leverage. In this section, we explore the sensitivity of the equity beta to the firm's use of short-term debt.

We conjecture that the differences in equity beta across countries are smaller for firms that use relatively more short-term debt. Indeed, firms in countries with more debt renegotiation frictions may not bear much equity risk if they can roll over short-term debt in bad states. We conduct the same analysis as

for total leverage, but we divide the sample into firms with high and low *Short-term debt projection* (HSD and LSD, respectively). We define *Short-term debt* as the total debt that is due within one and three years, divided by total debt. As with total leverage, we extract its permanent component from the orthogonal projection of firm i's *Short-term debt* in $t > 0$ on the firm's initial short-term debt ($t = 0$), the country's statutory corporate tax rate, *Renegotiation failure*, and other firm-, time-, and country-specific controls (Table A.II).

We find that the equity beta of firms with relatively more short-term debt is less sensitive to *Renegotiation failure* (Table VI, Panel B). That is, as q increases, the beta for firms that use more short-term debt does not change significantly. This evidence suggests that, in order to reduce equity risk, firms can use short-term debt as an alternative to strategic default.

D. Issues Regarding the Measurement of Renegotiation Failure

D.1. Multinational Firms and Bankruptcy Forum Shopping

One important assumption in our analysis is that the insolvency procedures of national and international corporations follow the law of the firms' home country. This assumption reflects the common practice in cross-border insolvencies that the jurisdiction of the debtor's home country is the one that takes the lead in the bankruptcy procedure (see Bufford et al. (2001) and Westbrook et al. (2010)). For example, in the UNCITRAL Model Law and the European Union Regulation—the two major sources of law for international cooperation of transnational insolvency cases—the home country for the insolvency case is the country where the multinational firm's "center of main interests" (COMI) is located. Without proof to the contrary, the COMI is presumed to be the debtor's registered office (UNCITRAL (1997), Article 16(3)).[20]

Our assumption may not hold for multinational corporations that can move their COMI to shop internationally for a more favorable bankruptcy law. Although we are not aware of any systematic evidence that multinational corporations change their place of incorporation for insolvency reasons, we argue that the possibility of international forum shopping, if anything, would bias the results against our findings.[21] The reason is that our analysis assigns to a firm the bankruptcy code of the country where it is incorporated. If this firm had the option to open an insolvency case abroad, it would choose a country where it is better protected against creditors' actions, that is, a jurisdiction with a lower q. But then this firm would appear to have higher q than its "true" one and thus a relatively lower beta than its peers.

[20] Adams and Fincke (2008) argue that these two model laws have been adopted by many countries outside the European Union, including the United States, Australia, Canada, India, New Zealand, Japan, Eritrea, Montenegro, Mexico, South Africa, and many others.

[21] The prevailing view in the legal literature is that changing the COMI is a complicated procedure (Pottow (2007)) because it requires not only that the firm move its place of incorporation, but also that third parties consider the new location as the place where the firm conducts its main business (see, however, LoPucki (2005)). Furthermore, there is evidence that other factors such as business reasons or tax laws affect a firm's choice of incorporation (Rasmussen (2007)).

To address any residual concern that our results can be affected by the possibility of international forum shopping, we conduct our tests in a smaller sample of firms with a distinctive "domestic" character. Specifically, we exclude multinational firms that have the proportion of foreign sales or assets above a 5% threshold. As shown in columns 1 and 2 of Table VII, our results hold after this exclusion. We obtain the same results if we exclude firms with a proportion of foreign sales or foreign assets above their respective country median.

D.2. Time Variation in the Bankruptcy Code

Our measure of q uses survey data from 2005 imputed to all the years in the sample. We justify this procedure on the basis that this survey is meant to capture permanent features of the country's bankruptcy code. To address the concern that some countries may have introduced bankruptcy code reforms during our sample period, we estimate the same specifications as in Table V using the subsample of country-years following the last recorded change in the bankruptcy code.

Djankov, McLiesh, and Shleifer (2007) track the major changes in the bankruptcy laws of 129 countries between 1978 and 2004. In our sample, the countries that changed the bankruptcy code during the sample period are Israel (1995), Russia (1994, 1998, and 2004), Spain (2004), Sweden (1995), and Thailand (1993).[22] Columns 3 and 4 of Panel A in Table VII show the results of excluding all stocks in these countries in the years up to the last bankruptcy code change. The remaining sample is likely to satisfy the condition that the bankruptcy code reflects the one prevailing in Djankov et al.'s (2008) survey. The exclusion of these observations does not significantly affect the results.

D.3. Other Measures of Renegotiation Frictions

If the prospect of strategic default affects firms' equity betas, it is likely that the betas also depend on the expected shareholders' recovery rate. All other things constant, stocks in countries where shareholders expect a low recovery should have a higher equity beta than stocks in countries where shareholders expect a high recovery.

To test these conjectures, we estimate equations (7) and (8) using the *Priority* index and *Creditors' recovery* rate instead of the *Renegotiation failure* index. Panel B of Table VII reports the results. Overall, the predictions of the model are confirmed in columns 1 and 3, where we interact *Insiders' share* with *Priority* and *Creditors' recovery*. For liquidation costs, we see in column 2 that the effect of *Creditors' recovery* on equity beta is picked up by its direct effect rather than through its interaction with *Intangibles*. The fact that *Creditors' recovery* rate is concave in the probability that the renegotiation fails may imply that

[22] Japan also went through two important reforms in 2000 and 2002. However, the 2002 reform undid the changes introduced in 2000. Thus, for the purpose of our paper, we take Japan as not changing its bankruptcy code.

Table VII
Robustness Analysis

This table presents robustness results of pooled OLS estimates of the regression of the firm's *Domestic market beta* on proxies for shareholders' bargaining power (*Insiders' share*), liquidation costs (*Intangibles*), and alternative measures of renegotiation frictions. Sources and definitions for all variables are in Table I, and the full set of estimates is available in the Internet Appendix. The sample period consists of monthly observations from 1993 to 2006. The firm's *Domestic market beta* is computed for every month from the regression of the latest 60 historical monthly returns on its country's contemporaneous market return. Standard errors are adjusted for correlation within firms and time, and are reported in parentheses. In Panel A, our measure of renegotiation frictions is *Renegotiation failure*. Columns 1 and 2 report estimates for a subsample of firms with the proportion of foreign sales or foreign assets below a 5% threshold. Columns 3 and 4 report the results for a subsample of countries that have never changed their bankruptcy code between 1993 and 2005. Panel B reports estimates for the full sample of firms and countries, but uses the index of priority at which creditors are served in default (*Priority*) and creditors' recovery rate (*Creditors' recovery*) as alternative measures of debt renegotiation frictions. Estimates followed by ***, **, and * are statistically different from zero with 0.01, 0.05, and 0.1 significance levels, respectively.

Panel A: Excluding Multinational Firms or Years before Last Bankruptcy Code Change

	(1)	(2)	(3)	(4)
Renegotiation failure	0.323***	−0.209	0.245***	−0.009
	(0.098)	(0.209)	(0.053)	(0.102)
Insiders' share	−0.324**		−0.434***	
	(0.136)		(0.064)	
Intangibles		−1.219***		−0.828***
		(0.271)		(0.139)
Insiders' share × *Renegotiation failure*	0.328		0.330***	
	(0.206)		(0.096)	
Intangibles × *Renegotiation failure*		1.474***		0.848***
		(0.414)		(0.204)
Observations	101,827	101,827	342,672	342,672
Adjusted R^2	0.22	0.22	0.14	0.13

Panel B: Creditors' Priority and Recovery

Priority	−0.103***	0.169***		
	(0.023)	(0.042)		
Recovery			−0.719***	0.166
			(0.090)	(0.115)
Insiders' share	−0.920***		−0.791***	
	(0.132)		(0.082)	
Intangibles		1.079***		0.449**
		(0.351)		(0.195)
Insiders' share × *Priority*	0.174***			
	(0.035)			
Intangibles × *Priority*		−0.362***		
		(0.091)		
Insiders' share × *Creditors' recovery*			0.739***	
			(0.103)	
Intangibles × *Creditors' recovery*				−0.890***
				(0.237)
Observations	351,099	351,099	351,333	351,333
Adjusted R^2	0.12	0.11	0.14	0.13

there is not enough variation in the distribution of the recovery rate, allowing only for the identification of its overall effect and not the interaction effect.[23]

E. Further Robustness Checks

We perform four additional robustness checks. The results are available in the Internet Appendix. First, we use Scholes and Williams's (1977) betas as the dependent variable, to rule out the possibility that asynchronous trading may affect our monthly return observations. We find that our results are not driven by this possibility.

Second, we ask whether Japanese and U.S. stocks, which together represent 46% of the sampled firms, drive our results. Both Japan and the United States have an average *Renegotiation failure* of 0.54. The average beta in the United States is lower than the overall average (see Table A.I), whereas the sampled Japanese firms' average beta is among the highest. However, our sample also has many firms in (i) countries with high average betas and a high q (the United Kingdom, Australia, Singapore), (ii) countries with low betas and low q (China, Mexico, Russia), and (iii) countries with both average betas and q (Canada, Korea, Denmark, Sweden). Therefore, we believe that the model is identified by all countries in our sample, and not just by the comparison between either Japan or the United States and countries on only one-half of the range of q. When we run our regressions in a sample that either excludes Japanese and U.S. stocks or includes only a random sample of 1,000 stocks for each country, we find that the results are identical to those for the full sample of firms.

Third, we reestimate equations (7) and (8) using a Fama and MacBeth (1973) estimator, correcting the standard errors for serial correlation using the Newey–West adjustment (Newey and West (1987)). We find that the Fama–MacBeth estimator produces qualitatively identical results.

Finally, to address the concern that the firms in our sample may not be comparable across countries, we match firms by *Size*, *Book-to-market*, and *Leverage projection* across countries using the propensity score approach suggested by Hirano and Imbens (2004). This approach generalizes the matching procedure to the case of a continuous treatment variable. The results using this approach are identical to our main findings.

V. Volatility and Returns

A. Returns Volatility

The results presented so far support a robust relation between the country's debt renegotiation frictions, the firm's strategic default incentives, and equity

[23] Identification of the strategic default effect may be complicated by the possibility of significant covariance between the recovery rate and the country's business cycle. In a boom, creditors could expect a higher recovery rate than in a recession, ceteris paribus. We control for the interaction between the recovery rate and the Hodrick–Prescott filtered GDP series. We find a strong positive and significant coefficient, confirming this conjecture.

Table VIII

Volatility, Renegotiation Frictions, and Institutional Variables

This table shows the pooled OLS estimates of the regression of the firm's volatility on proxies for shareholders' bargaining power (*Insiders' share*), liquidation costs (*Intangibles*), and our measure of renegotiation frictions (*Renegotiation Failure*). Sources and definitions for all variables are in Table I, and the full set of estimates is available in the Internet Appendix. The sample period consists of all monthly observations from 1993 to 2006. In columns 1 and 2, the dependent variable is *Total return volatility*, defined as the annualized standard deviation of monthly stock returns over the past 60-month window. In columns 3 and 4, the dependent variable is *Systematic return volatility*, defined as the annualized square root of the difference between the variance of monthly stock returns and the variance of residuals from a regression of monthly returns on the lagged, contemporaneous, and lead domestic market index. In columns 5 and 6, the dependent variable is *Idiosyncratic return volatility*, defined as the annualized standard deviation of the residuals from a regression of monthly returns on the lagged, contemporaneous, and lead domestic market index. Standard errors are adjusted for correlation within firms and time, and are reported in parentheses. Estimates followed by ***, **, and * are statistically different from zero with 0.01, 0.05, and 0.1 significance levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Renegotiation failure	−0.073***	−0.069***	−0.012	−0.031	−0.078***	−0.069***
	(0.013)	(0.026)	(0.012)	(0.022)	(0.011)	(0.021)
Insiders' share	−0.080***		−0.106***		−0.030**	
	(0.017)		(0.014)		(0.013)	
Insiders' share ×	0.105***		0.145***		0.031	
Renegotiation failure	(0.024)		(0.02)		(0.02)	
Intangibles		−0.149***		−0.176***		−0.073***
		(0.033)		(0.029)		(0.027)
Intangibles × *Renegotiation*		0.076		0.159***		0.005
failure		(0.049)		(0.042)		(0.04)
Volatility ($q = 1$) −	−2.50%	−3.82%	5.42%	3.34%	−6.38%	−6.70%
Volatility ($q = 0$)						
Observations	351,082	351,082	351,082	351,082	351,082	351,082
Average adjusted R^2	0.08	0.09	0.11	0.11	0.17	0.18

beta. The equity beta in our model, however, is not necessarily the CAPM beta—it measures the exposure to any priced risk in X, which need not only be the market risk. Since the volatility of returns captures the same concept of equity risk in the model, we can test the comparative statics of risk with respect to η, α, and q using total volatility as the dependent variable.

Columns 1 and 2 of Table VIII show the estimates of equations (7) and (8) when the dependent variable is *Total volatility*. We use the same specification as in Table V. The full set of estimates is available in the Internet Appendix. For both specifications, the coefficients on *Insider's share* and *Intangibles* are negative and significant. The coefficient on the interaction between *Renegotiation failure* and *Insider's share* is also consistent with the theory: positive and significant. Further, the interaction between *Renegotiation failure* and *Intangibles* has the predicted positive sign, although it is not significantly different from zero.

B. Systematic and Idiosyncratic Volatility

To gain further insight into which component of equity risk is most correlated with strategic default risk, we decompose total volatility into systematic and idiosyncratic volatility. This decomposition is useful because q may also affect total volatility through insolvency risk. In particular, with more debt renegotiation frictions, the value of the strategic default option is lower and the sensitivity of equity to insolvency risk is higher. Shareholders may then engage in risk-reducing activities to avoid the deadweight costs of bankruptcy, as in, for example, Acharya, Amihud, and Litov (2011). Although shareholders in our model do not choose cash flow risk, it is important to evaluate this possibility empirically. We expect that as q increases, equity beta increases because the strategic default option loses value, but the idiosyncratic volatility falls because shareholders reduce the firm's idiosyncratic risk.

In line with our model's prediction, we find that the results for *Systematic volatility* are similar to those for equity beta (columns 3 and 4): the sums of the coefficients $\delta_\alpha+\delta_{\alpha q}$ and $\delta_\eta+\delta_{\eta q}$ are both close to zero, and the estimates of δ_q are almost zero. Instead, the results for *Idiosyncratic volatility* (columns 5 and 6) are remarkably different. The estimated coefficients on the interactions between *Renegotiation failure* and *Insider's share* or *Intangibles* are much smaller than for the *Systematic volatility* model, and they are not significantly different from zero. Interestingly, the direct effect of *Renegotiation failure* is *negative* and significant, and almost identical to that for the *Total volatility* model (columns 1 and 2). We also evaluate, at the sample means of *Insider's share* or *Intangibles*, the volatility of firms in countries with the highest or lowest debt renegotiation frictions, that is, $q = 1$ or $q = 0$, respectively. As expected, in countries where debt renegotiations are impossible, the firm's systematic volatility is higher and idiosyncratic volatility is lower.

We thus conclude that, empirically, the likelihood that a debt renegotiation fails has two different effects on *Total volatility*: as creditors' rights strengthen and the firm's systematic risk increases, while the idiosyncratic risk decreases. These findings not only provide further support to the strategic default hypothesis, but also help reconcile the apparent conflicting results in the literature on the cross-country determinants of firms' systematic and idiosyncratic risk. Acharya, Amihud, and Litov (2011) find that a better protection of creditor rights reduces firms' idiosyncratic risk. By contrast, Morck, Yeung, and Yu (2000), Jin and Myers (2006), and Bartram, Brown, and Stulz (2012) find that stronger creditor rights increase the systematic risk of firms but do not affect their idiosyncratic risk.

C. Equity Returns

We now test whether the variation in equity betas that is explained by strategic default incentives also helps explain the cross-sectional variation in stock returns. In the model, the linearity between systematic risk and expected returns suggests the same comparative statics of expected returns with respect to α, η, and q as for the equity beta. Panel A of Table IX shows the average

Table IX

Stock Returns and Renegotiation Frictions

This table shows average monthly returns for portfolios of stocks sorted by our measure of renegotiation frictions (*Renegotiation failure*) and by proxies for shareholders' bargaining power (*Insiders' share*) and liquidation costs (*Intangibles*). Panel A shows the average raw, market-adjusted, and BM-size-market-adjusted returns for firms in the low quartile (LQ, where *Renegotiation failure* < 0.42) and the high quartile (HQ, where *Renegotiation failure* > 0.67). The market-adjusted returns are computed by subtracting the contemporaneous domestic market return from the firm's individual stock return. The BM-size-market-adjusted returns are computed by subtracting the contemporaneous domestic market return from firms' BM-size-adjusted returns. The BM-size-adjusted returns take into account the premia associated with book-to-market and size. We compute these adjustments across all countries and within each country using a three-by-three sort. Panel B shows the average BM-size-market-adjusted stock returns for portfolios of firms sorted into the within-country terciles of *Insiders' share* or *Intangibles*. Difference of means tests are based on Student's *t* tests. The sample period consists of monthly observations from 1993 to 2006. Sources and definitions for all variables are in Table I. Estimates followed by ***, **, and ** are statistically different from zero with 0.01, 0.05, and 0.1 significance levels, respectively.

Panel A: Monthly Stock Returns for *Renegotiation Failure* Quartiles

	LQ		HQ		HQ − LQ
Raw (mean/std. error)	1.708	(0.043)	1.831	(0.036)	0.123**
Market adjusted (mean/std. error)	0.122	(0.039)	0.535	(0.034)	0.412***
BM-size-mkt across adj. (mean/std. error)	−1.286	(0.044)	−0.871	(0.038)	0.415***
BM-size-mkt within adj. (mean/std. error)	−1.578	(0.043)	−1.340	(0.037)	0.238***

Panel B: Monthly Stock Returns Across Terciles for *Insiders' Share* and *Intangibiles*

	LQ			HQ		
	Tercile 1	T3	T1 − T3	T1	T3	T1 − T3
Insiders' Share						
BM-size-market across adjusted	−1.159	−1.189	−0.03	−0.798	−0.978	−0.179*
BM-size-market within adjusted	−1.075	−1.079	−0.004	−1.245	−1.412	−0.167*
Intangibles						
BM-size-market across adjusted	−1.091	−1.256	−0.165***	−0.930	−0.887	0.043
BM-size-market within adjusted	−0.961	−1.163	−0.202***	−1.397	−1.369	0.029

monthly returns of portfolios of stocks sorted into quartiles by the country's index of *Renegotiation failure*. We report the portfolios' raw returns, the market-adjusted returns, and the *Book-to-Market-Size*–market-adjusted returns. The market-adjusted returns are the raw returns minus the contemporaneous return on the domestic market index. We use two alternative three-by-three *Size* and *Book-to-market* sorts: across all countries or within each country, as in Rouwenhorst (1999) or Bekaert, Hodrick, and Zhang (2009).[24] Hence,

[24] In July of each year, we sort the firms in our sample into *Size* terciles, and within each *Size* tercile into *Book-to-Market* terciles. We subtract the average returns within each of these nine portfolios from the firm's individual stock return. We do these sorts either within each country or across all countries.

the *Book-to-Market-Size*-market-adjusted returns are the *Book-to-Market-Size*-adjusted returns minus the contemporaneous return on the domestic market index.

Panel A shows the average stock returns for the low quartile and high quartile of *Renegotiation failure* (LQ and HQ, respectively). For all four definitions of returns, the return difference between the high and low quartiles is positive and statistically significant. For instance, the difference for raw returns is 12 basis points per month, while the difference for the across-country sorted *Book-to-Market-Size*-market-adjusted returns is 41.5 basis points. This difference is economically large and consistent with both our model and the results using equity beta.

In Panel B, we report the average *Book-to-Market-Size*-market-adjusted (within and across-country sorted) stock returns for portfolios of firms sorted by *Renegotiation failure* and then into within-country terciles of *Insiders' share* or *Intangibles*. To be consistent with the model and the previous results, we should observe decreasing average stock returns when we move from tercile 1 (low shareholders' bargaining power or liquidation costs) to tercile 3 (high shareholders' bargaining power or liquidation costs) in the lowest quartiles of the *Renegotiation failure* index, but not in the highest quartile of *Renegotiation failure*.

While the results are not so strong for our bargaining power proxy (*Insiders' share*), we find results consistent with these predictions using our proxy for liquidation costs (*Intangibles*).

VI. Conclusion

We argue that the prospect of strategic default on the firm's debt affects the firm's equity beta, and that this effect weakens in countries where debt contracts cannot easily be renegotiated. We find evidence supporting these predictions using a recent international survey of insolvency procedures to measure debt renegotiation frictions. We also find that the prospect of strategic default affects the firm's total volatility. Overall, the evidence in this paper suggests that the bankruptcy code is an important determinant of the differences in cost of capital across countries through its effects on firms' strategic default incentives.

A natural extension of our analysis is to study cross-country differences in the tax treatment of bankruptcy, in order to identify other important determinants of shareholders' expected payoff in default. The nonlinear effects of the strategic default option may also have important implications for the skewness of stock returns, a topic worth studying in future research.

Initial submission: July 22, 2010; Final version received: March 28, 2012
Editor: Campbell Harvey

Appendix: Data

We start with all the countries in the paper by Djankov et al. (2008) that are also covered by Worldscope. We match 55 countries, including all OECD and some Latin American, Middle Eastern, and Asian countries.

Our main firm identifier is the ISIN code. We download yearly accounting data and monthly price data for all active and inactive firms between 1989 and 2006. For many countries, there are no accounting and price data available prior to 1989.

FIRM-LEVEL DATA. First, we download from Worldscope a comprehensive list of annual accounting variables, in USD, for every firm in each country. From Compustat, we download annual data for U.S. firms. We merge both, dropping missing or duplicate ISIN and year observations. Second, we download monthly price data in USD for every firm in Datastream. For the United States, we download price data from the monthly CRSP files. Third, we download a representative stock market index for each country. Where possible, we use the Datastream USD Market index. If this index is not available, we use the respective MSCI country index. If the country's index is not reported in USD in Datastream, we convert it using the exchange rate reported by Datastream on the same closing day of the month. For the United States, we use the equally weighted CRSP index. We use the MSCI World index in USD as the world market index.

INSTITUTIONAL DATA. We match the firm-level data with several country-specific institutional variables that come from Andrei Shleifer's webpage (http://www.economics.harvard.edu/faculty/shleifer/dataset) and the World Bank. For every sampled country, we collect variables related to insolvency proceedings and the recovery rate. These variables are not available for India, Pakistan, and Zimbabwe.

OTHER DATA SCREENS. We remove all nonequity listings. For Datastream, we only keep listings where TYPE is equal to "EQ." For U.S. data, we only keep listings with share codes 10 or 11. This restriction automatically excludes American Depository Receipts. We also exclude firms with fewer than five years of monthly returns and with fewer than six monthly observations to compute the 12-month momentum return. Finally, we exclude observations for which the stock price is less than USD 1 to ensure that stocks with very low prices do not drive our results. We end up with a sample of 5,958 firms from 38 countries.

Table A.I
Domestic versus World Betas

This table summarizes the means of beta estimates and other statistics by country. R^2_{wd} is the R^2 of the regression of world market returns on domestic market returns. $\frac{Var(r_i)}{Var(r_w)}$ is the average ratio of individual firms' variance to the variance of world returns. *Upper bound* is the Karolyi and Stulz (2003) upper bound for the asset pricing mistake of using the domestic CAPM when the world CAPM is the correct model. β_{id} is the domestic market beta, β_{iw} is the world market beta, and β^{SW}_{id} is the Scholes and Williams (1977) beta using the domestic market index. The sample period is from 1993 to 2006.

	R^2_{wd}	$\frac{Var(r_i)}{Var(r_w)}$	*Upper Bound*	Proportion of Significant β_{iw}	β_{id}	β_{iw}	$\frac{\lvert\beta_{id}\rvert}{\lvert\beta_{id}\rvert + \lvert\beta_{iw}\rvert}$	β^{SW}_{id}
Australia	0.564	5.426	0.688	0.692	0.923	0.771	0.572	0.706
Austria	0.241	4.943	0.893	0.346	0.831	0.426	0.642	0.457
Belgium	0.390	4.657	0.802	0.564	0.784	0.666	0.519	0.745
Brazil	0.509	11.454	0.898	1.000	0.867	1.721	0.329	1.679
Canada	0.655	6.805	0.732	0.533	0.756	0.726	0.522	0.743
Chile	0.318	6.648	0.892	0.542	0.891	0.624	0.597	0.827
China	0.074	7.061	1.281	0.017	0.347	0.119	0.618	0.256
Denmark	0.407	5.832	0.917	0.291	0.567	0.450	0.561	0.538
Finland	0.441	6.104	0.893	0.517	0.340	0.738	0.249	0.779
France	0.675	6.317	0.685	0.404	0.634	0.630	0.563	0.767
Germany	0.609	5.582	0.700	0.314	0.494	0.508	0.525	0.475
Greece	0.263	10.389	1.181	0.436	0.993	0.766	0.595	0.904
Hong Kong	0.432	5.976	0.750	0.665	0.699	0.804	0.485	0.801
Ireland	0.523	5.684	0.778	0.609	0.760	0.728	0.501	1.059
Israel	0.257	7.777	0.934	0.802	1.067	1.110	0.488	1.391
Italy	0.497	6.321	0.775	0.649	0.850	0.866	0.479	0.975
Japan	0.398	8.110	0.948	0.448	0.926	0.809	0.595	1.214
Korea	0.469	11.309	1.109	0.665	0.727	1.106	0.413	1.073
Malaysia	0.121	5.867	0.857	0.333	0.747	0.556	0.594	0.586
Mexico	0.480	7.872	0.843	0.558	0.716	0.947	0.424	1.100
Netherlands	0.682	5.170	0.603	0.527	0.717	0.669	0.559	0.763
New Zealand	0.357	4.601	0.732	0.731	0.881	0.715	0.560	0.570
Norway	0.467	6.970	0.849	0.750	0.874	0.983	0.452	1.023
Peru	0.124	4.582	0.896	0.243	0.359	0.361	0.427	0.526
Philippines	0.155	6.823	0.944	0.602	0.800	0.887	0.540	1.346
Poland	0.345	8.262	1.004	0.723	0.798	1.070	0.406	1.058
Portugal	0.338	4.989	0.824	0.410	0.755	0.545	0.611	0.610
Russia	0.228	12.308	1.398	0.378	0.741	0.960	0.420	1.199
Singapore	0.382	5.603	0.788	0.668	0.861	0.809	0.530	0.764
South Africa	0.271	8.231	1.097	0.430	0.810	0.670	0.569	0.681
Spain	0.590	5.167	0.655	0.657	0.760	0.777	0.525	0.927
Sweden	0.587	7.195	0.758	0.713	0.709	0.987	0.399	0.885
Switzerland	0.500	5.544	0.801	0.492	0.772	0.649	0.551	1.000
Taiwan	0.278	9.140	1.126	0.359	0.794	0.702	0.571	0.815
Thailand	0.239	6.131	1.042	0.365	0.370	0.514	0.457	0.449
Turkey	0.373	17.700	1.157	0.901	0.816	1.862	0.320	1.812
UK	0.717	6.120	0.644	0.441	0.758	0.634	0.572	0.845
USA	0.510	7.867	0.951	0.464	0.625	0.739	0.432	0.843
Average	0.489	7.302	0.868	0.473	0.772	0.746	0.533	0.951

Table A.II

First-Stage Leverage Regressions

This table shows the OLS estimates of the regressions $Leverage_{it} = \phi_0 + \phi_1 \times Leverage_{i0} + \phi'_{\mathbf{z}}\mathbf{z}_{it} + \phi'_{\mathbf{x}}\mathbf{x}_C + \upsilon^L_{it}$ and $Short\text{-}term\ debt_{it} = \omega_0 + \omega_1 \times Short\text{-}term\ debt_{i0} + \omega'_{\mathbf{z}}\mathbf{z}_{it} + \omega'_{\mathbf{x}}\mathbf{x}_C + \upsilon^{ST}_{it}$, where $Leverage_{it}$ is firm i's market leverage at time $t > 0$, $Leverage_{i0}$ is firm i's initial leverage, $Short\text{-}term\ debt_{it}$ is firm i's short-term debt to total debt at time $t > 0$, and $Short\text{-}term\ debt_{i0}$ is firm i's initial short-term debt ratio. The vectors $\mathbf{x}_c$ and $\mathbf{z}_{it}$ include all country-specific and firm-month-specific variables, respectively, which are listed below. All these variables are defined in Table I. The sample period is from 1993 to 2006. Estimates followed by ***, **, and * are statistically different from zero with 0.01, 0.05, and 0.1 significance levels, respectively.

	Leverage		*Short-Term Debt*	
	Estimates	Standard Errors	Estimates	Standard Errors
$Leverage_{i0}$	0.604***	(0.001)		
$Short\text{-}term\ debt_{i0}$			1.042***	(0.001)
Renegotiation failure	0.013***	(0.001)	−0.034***	(0.004)
Statutory tax rate	0.001***	(0.000)	0.004***	(0.000)
Size	0.001***	(0.000)	−0.007***	(0.001)
Book-to-Market	0.001***	(0.000)	0.008***	(0.001)
Insiders' share	−0.022***	(0.002)	0.059***	(0.004)
Intangibility	0.281***	(0.002)	−0.268***	(0.008)
Constant	−0.071***	(0.002)	0.022***	(0.009)
Year Dummies	yes		yes	
F statistic	38,665.751		83,868.371	
Observations	370,518		325,426	
Average adjusted R^2	0.65		0.83	

Table A.III

Equity Beta and Renegotiation Frictions

This table shows the estimates of the regression of the difference between the firm's beta and the average beta of all firms in the same country-month on proxies for shareholders' bargaining power (*Insiders' share*) and liquidation costs (*Intangibles*). All firm-specific variables are in deviation from the average of all firms in the same country-month. Sources and definitions for all variables are in Table I, and the full set of estimates is available in the Internet Appendix. The sample period consists of monthly observations from 1993 to 2006. In columns 1 and 2, the dependent variable is the firm's *Domestic market beta* computed for every month from the regression of the latest 60 historical monthly returns on the contemporaneous domestic market return; in columns 3 and 4, it is either *Domestic market beta* or *Overall market beta* depending on whether the Karolyi and Stulz (2003) upper bound for asset pricing mistakes of using the domestic CAPM when the world CAPM is the correct model is larger than 0.5% return per year; in columns 5 and 6, it is either *Domestic market beta* or *World market beta* depending on whether the Bekaert, Harvey, and Lundblad (2011) country-year segmentation measure of stocks that are not integrated into the world market is lower than the country's median. Standard errors are adjusted for correlation within firms and time, and are reported in parentheses. The table also reports statistics for the economic significance of the estimates, expressed in terms of average monthly excess returns, evaluated at the average and maximum values of the proxies for the firm's liquidation costs and shareholder's bargaining power. Estimates followed by ***, **, and * are statistically different from zero with 0.01, 0.05, and 0.1 significance levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Δ *Insiders' share*	−0.310***		−0.787***		−0.454***	
	(0.064)		(0.113)		(0.065)	
Δ *Intangibles*		−0.608***		−1.144***		−0.608***
		(0.126)		(0.234)		(0.133)
Δ (*Insiders' share* ×	0.162		0.617***		0.361***	
Renegotiation failure)	(0.102)		(0.181)		(0.101)	
Δ (*Intangibles* ×		0.547***		0.887**		0.591***
Renegotiation failure)		(0.196)		(0.348)		(0.201)
Observations	376,884	376,884	376,884	376,884	376,884	376,884
Average adjusted R^2	0.03	0.02	0.04	0.03	0.06	0.05
$H_0 : \frac{\partial \mathbb{E}\left(r_i - r \mid \textit{Renegotiation failure} = 1\right)}{\partial \textit{Intangibles or Insiders' share}} = 0$						
Test statistic	−0.125***	−0.051	−0.072*	−0.108	−0.079**	−0.014
Standard error	(0.040)	(0.076)	(0.037)	(0.070)	(0.040)	(0.079)
$H_0 : \mathbb{E}\left(r_i - r \mid \textit{Renegotiation failure} = 1\right) - \mathbb{E}\left(r_i - r \mid \textit{Renegotiation failure} = 0\right) = 0$						
Test statistic evaluated at average						
Intangibles or *Insiders' share*	0.055	0.211***	0.104***	0.171**	0.121***	0.228***
Standard error	(0.034)	(0.076)	(0.031)	(0.067)	(0.034)	(0.077)
Test statistic evaluated at maximum						
Intangibles or *Insiders' share*	0.137	0.395***	0.259***	0.320**	0.304***	0.426**
Standard error	(0.086)	(0.141)	(0.076)	(0.126)	(0.085)	(0.145)

REFERENCES

Acharya, Viral, Yakov Amihud, and Lubomir Litov, 2011, Creditor rights and corporate risk-taking, *Journal of Financial Economics* **102**, 150–166.

Acharya, Viral, and Krishnamurthy Subramanian, 2009, Bankrupcty codes and innovation, *Review of Financial Studies* 22, 4949–4988.

Acharya, Viral, Rangarajan Sundaram, and Kose John, 2011, Cross-country variations in capital structure: The role of bankruptcy codes, *Journal of Financial Intermediation* **20**, 25–54.

Adams, Edward, and Jason Fincke, 2008, Coordinating cross-border bankruptcy: How territorialism saves universalism, *Columbia Journal of European Law* 15, 43–87.

Aguerrevere, Felipe, 2009, Real options, product market competition, and asset returns, *Journal of Finance* 64, 957–983.

Almeida, Heitor, and Murillo Campello, 2007, Financial constraints, asset tangibility, and corporate investment, *Review of Financial Studies* 20, 1429–1460.

Anderson, Ron, and Suresh Sundaresan, 1996, The design and valuation of debt contracts, *Review of Financial Studies* 9, 37–68.

Ayotte, Kenneth, and Edward Morrison, 2009, Creditor control and conflict in Chapter 11, *Journal of Legal Analysis* 1, 511–551.

Bae, Kee-Hong, and Vidhan Goyal, 2009, Creditor rights, enforcement, and bank loans, *Journal of Finance* 64, 823–860.

Bartram, Sohnke, Gregory Brown, and René Stulz, 2012, Why are U.S. stocks more volatile? *Journal of Finance* **67**, 1329–1370.

Bekaert, Geert, Campbell Harvey, and Christian Lundblad, 2007, Liquidity and expected returns: Lessons from emerging markets, *Review of Financial Studies* 20, 1783–1831.

Bekaert, Geert, Campbell Harvey, and Christian Lundblad, 2011, What segments equity markets? *Review of Financial Studies* 24, 3841–3890.

Bekaert, Geert, Campbell Harvey, Christian Lundblad, and Stephan Siegel, 2007, Global growth opportunities and market integration, *Journal of Finance* 62, 1081–1137.

Bekaert, Geert, Robert Hodrick, and Xiaoyan Zhang, 2009, International stock return comovements, *Journal of Finance* 64, 2591–2626.

Berger, Philip, Eli Ofek, and Itzhak Swary, 1996, Investor valuation and the abandonment option, *Journal of Financial Economics* 42, 257–287.

Berglof, Erik, and Ernst-Ludwig von Thadden, 1994, Short-term versus long-term interests: Capital structure with multiple investors, *Quarterly Journal of Economics* 109, 1055–1084.

Betker, Brian, 1995, Management's incentives, equity's bargaining power and deviations from absolute priority in Chapter 11 bankruptcies, *Journal of Business* 68, 161–184.

Bharath, Sreedhar, Venky Panchapegesan, and Ingrid Werner, 2007, The changing nature of Chapter 11, Working paper, University of Michigan.

Bolton, Patrick, and David Scharfstein, 1996, Optimal debt structure and the number of creditors, *Journal of Political Economy* 104, 1–25.

Broadie, Mark, Mikhail Chernov, and Suresh Sundaresan, 2007, Optimal debt and equity values in the presence of Chapter 7 and Chapter 11, *Journal of Finance* 62, 1341–1377.

Bufford, Samuel, Loiuse DeCarl, Sidney Brooks, and Marcia Krieger, 2001, *International Insolvency* (Federal Judicial Center, Washington, DC).

Carlson, Murray, Adlai Fisher, and Ron Giammarino, 2004, Corporate investment and asset price dynamics: Implications for the cross-section of returns, *Journal of Finance* 59, 2577–2603.

Carlson, Murray, Adlai Fisher, and Ron Giammarino, 2006, Corporate investment and asset price dynamics: Implications for SEO event studies and long-run performance, *Journal of Finance* 61, 1009–1034.

Davydenko, Sergei, and Julian Franks, 2008, Do bankruptcy codes matter? A study of defaults in France, Germany, and the U.K., *Journal of Finance* 63, 565–608.

Davydenko, Sergei, and Ilya Strebulaev, 2007, Strategic actions and credit spreads: An empirical investigation, *Journal of Finance* 62, 2633–2671.

Dittmar, Amy, and Jan Mahrt-Smith, 2007, Corporate governance and the value of cash holdings, *Journal of Financial Economics* 83, 599–634.

Djankov, Simeon, Tim Ganser, Caralee McLiesh, Rita Ramalho, and Andrei Shleifer, 2010, The effect of corporate taxes on investment and entrepreneurship, *American Economic Journal: Macroeconomics* 2, 31–64.

Djankov, Simeon, Oliver Hart, Caralee McLiesh, and Andrei Shleifer, 2008, Debt enforcement around the world, *Journal of Political Economy* 116, 1105–1149.

Djankov, Simeon, Caralee McLiesh, and Andrei Shleifer, 2007, Private credit in 129 countries, *Journal of Financial Economics* 84, 299–329.

Fama, Eugene, and Kenneth French, 1992, The cross-section of expected stock returns, *Journal of Finance* 47, 427–465.

Fama, Eugene, and James MacBeth, 1973, Risk, return, and equilibrium: Empirical tests, *Journal of Political Economy* 81, 607–636.

Fan, Hua, and Suresh Sundaresan, 2000, Debt valuation, renegotiation, and optimal dividend policy, *Review of Financial Studies* 13, 1057–1099.

François, Pascal, and Erwan Morellec, 2004, Capital structure and asset prices: Some effects of bankruptcy procedures, *Journal of Business* 77, 387–411.

Garlappi, Lorenzo, Tao Shu, and Hong Yan, 2008, Default risk, shareholder advantage, and stock returns, *Review of Financial Studies* 21, 2743–2778.

Garlappi, Lorenzo, and Hong Yan, 2011, Financial distress and the cross-section of equity returns, *Journal of Finance* 66, 789–822.

Gennaioli, Nicola, and Stefano Rossi, 2011, Contractual resolution of financial distress, Working paper, Unversitat Pompeu Fabra.

Gertner, Robert, and David Scharfstein, 1991, A theory of workouts and the effects of reorganization law, *Journal of Finance* 46, 1189–1222.

Gomes, Joao, and Lukas Schmid, 2010, Levered returns, *Journal of Finance* 65, 467–494.

Hackbarth, Dirk, Christopher Hennessy, and Hayne Leland, 2007, Can the trade-off theory explain debt structure? *Review of Financial Studies* 20, 1389–1428.

Hackbarth, Dirk, and Erwan Morellec, 2008, Stock returns in mergers and acquisitions, *Journal of Finance* 63, 1203–1242.

Hart, Oliver, and John Moore, 1994, A theory of debt based on the inalienability of human capital, *Quarterly Journal of Economics* 109, 841–879.

Hirano, Keisuke, and Guido Imbens, 2004, The propensity score with continuous treatments, in Andrew Gelman and Xiao-Li Meng, eds.: *Applied Bayesian Modeling and Causal Inference from Incomplete-Data Perspectives* (Wiley Interscience, New York, NY).

Jin, Li, and Stewart Myers, 2006, R^2 around the world: New theory and new tests, *Journal of Financial Economics* 79, 257–292.

Karolyi, Andrew, and René Stulz, 2003, Are financial assets priced globally or locally? in George Constantinides, Milton Harris, and René Stulz, eds.: *Handbook of the Economics of Finance* (North Holland, Amsterdam, the Netherlands).

La Porta, Rafael, Florencio Lopez-de Silanes, and Andrei Shleifer, 1998, Law and finance, *Journal of Political Economy* 106, 1113–1155.

La Porta, Rafael, Florencio Lopez-de Silanes, and Andrei Shleifer, 2000, Agency problems and dividend policies around the world, *Journal of Finance* 55, 1–33.

La Porta, Rafael, Florencio Lopez-de Silanes, and Andrei Shleifer, 2002, Investor protection and corporate valuation, *Journal of Finance* 55, 1147–1170.

La Porta, Rafael, Florencio Lopez-de Silanes, and Andrei Shleifer, 2008, The economic consequences of legal origins, *Journal of Economic Literature* 46, 285–332.

La Porta, Rafael, Florencio Lopez-de Silanes, Andrei Shleifer, and Robert Vishny, 1997, Legal determinants of external finance, *Journal of Finance* 52, 1131–1150.

Lemmon, Michael, Michael Roberts, and Jaime Zender, 2008, Back to the beginning: Persistence and the cross-section of corporate capital structure, *Journal of Finance* 63, 1575–1608.

LoPucki, Lynn M., 2005, Universalism unravels, *American Bankruptcy Law Review* 79, 143–167.

Morck, Randall, Bernard Yeung, and Wayne Yu, 2000, The information content of stock markets: Why do emerging markets have synchronous stock price movements? *Jounal of Financial Economics* 58, 215–260.

Newey, Whitney, and Kenneth West, 1987, A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix, *Econometrica* 55, 703–708.

Petersen, Mitchell, 2009, Estimating standard errors in finance panel data sets: Comparing approaches, *Review of Financial Studies* 22, 435–480.

Pottow, John, 2007, The myth (and realities) of forum shopping in transnational insolvency, *Brooklyn Journal of International Law* 32, 785–817.

Qian, Jun, and Philip Strahan, 2008, How laws and institutions shape financial contracts: The case of bank loans, *Journal of Finance* 62, 2803–2834.

Rasmussen, Bob, 2007, Where are all the transnational bankruptcies? The puzzling case for universalism, *Brooklyn Journal of International Law* 32, 983–1003.

Rouwenhorst, Geert, 1999, Local return factors and turnover in emerging stock markets, *Journal of Finance* 54, 1439–1464.

Scholes, Myron, and Joseph Williams, 1977, Estimating betas from nonsynchronous data, *Journal of Financial Economics* 5, 309–327.

United Nations Commission on International Trade Law (UNCITRAL), 1997, *Model law on cross-border insolvency with guide to enactment* United Nations, (New York, NY).

Westbrook, Jay, Charles Booth, Christoph Paulus, and Harry Rajak, 2010, Law justice and development series, in *A Global View of Business Insolvency Systems* (The World Bank, Washington, DC).