Is shareholders' strategic default behavior priced? Evidence from the international cross-section of stocks*

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Abstract

We test whether stock returns reflect equity holders' incentives to strategically default on the firm's debt. We use an international cross-section of stocks to exploit the exogenous variation in recent survey data that characterizes insolvency procedures across countries. We find that stock returns increase with the degree of creditor protection. Consistent with models of strategic default, stock returns decrease with the costs of liquidation and equity holders' bargaining power, but the sensitivity of this relation weakens with the country's degree of creditor protection. These results are statistically significant, economically important, and robust to various specifications and estimation techniques.

Keywords: Debt enforcement, Strategic default, Stock returns, Liquidation costs.

JEL Classification: G12, G28, G33

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I Introduction

When firms approach bankruptcy, equity holders and debt holders may benefit from debt renegotiations to avoid inefficient liquidations. The prospect of debt renegotiations may, however, induce equity holders to default strategically, in order to defer or reduce debt obligations. The view that equity holders may serve debt obligations strategically has proved useful to understand, among other things, the determinants of corporate bond spreads [Anderson and Sundaresan (1996)], firms' optimal payout policies and reorganization boundaries [Fan and Sundaresan (2000)], or the optimal mix of short and long-term debt [Berglöf and von Tadden (1994)].

A recent debate, however, has emerged as to whether the decision to default strategically is empirically important. Davydenko and Strebulaev (2007) find, for example, that standard proxies of strategic default do not explain much of the cross-sectional variation of corporate bond prices in the US. In contrast, Garlappi, Shu, and Yan (2006) conclude that strategic default behavior helps explain the hump-shaped relation between returns and the probability of default in the cross-section of US stocks. These studies rely on firm-specific proxies of equity holders' expected payoff during distress. The underlying assumption is that strategic default can be identified from the variation in firm characteristics, keeping constant the procedures of debt enforcement. Recent evidence by Bharath, Panchapegesan, and Werner (2007) and Ayotte and Morison (2008) raises, however, some concern on the validity of this identifying assumption. They show that in recent years deviations from absolute priority in the US bankruptcy law have become very unlikely for *any* firm. Accordingly, enforcement rules and not only firms' characteristics seem to be important determinants of renegotiation outcomes following default.

The purpose of this paper is to evaluate empirically the importance of strategic default by taking into account the legal aspects of debt enforcement procedures. To do so, we study how the prospects of strategic default affect stock returns in a large sample of firms operating in countries with different legal settings. The idea behind our analysis is that, if equity holders can extract rents from debt holders in the event of default and renegotiation, then the risk of holding equity is smaller. If, ex-ante, the return on equity reflects this reduction in risk, investors would not require as high a compensation to hold equity, and, all else equal, stock returns would be lower. If, instead, the debt enforcement

procedure in a given country entitles creditors with the rights to liquidate or reorganize a company in the event of default, then stock returns should compensate equity holders for the additional risk of zero recovery from strategic default. Using a large sample of firms in 43 countries, we find that stock returns (1) increase with the degree of debt enforcement, and (2) are independent of equity holders' incentives to default strategically in countries with better enforcement of debt contracts.

We see two main advantages of carrying out a cross-country analysis. First, firm-specific measures of equity holders' bargaining power or liquidation costs may not capture the within-country variation in the incentives to default strategically if debt holders' rights are strictly enforced in that country. An international comparison of stock returns allows us to overcome this limit. Second, firm-specific proxies of equity holders' bargaining power may be subject to a potential endogeneity bias. Namely, if equity holders can expropriate debt holders in the event of default, lenders may be unwilling to lend to the firm in the first place, since their claim will be unprotected. In turn, a limited financial exposure of the firm would reduces equity holders' incentives to engage in strategic default. In our analysis, the bargaining power of equity holders depends on firm characteristics *and* the quality of debt enforcement procedures. The endogeneity problem of equity holders' bargaining power is thus mitigated, since institutional settings are exogenous to firms' decisions.

We conduct our analysis in two steps. First, we use a model of strategic debt service to derive empirical predictions relating expected stock returns to the quality of debt enforcement and equity holders' bargaining power. In our simple model, the renegotiation game between equity holders and debt holders is subject to frictions, which depend on the bankruptcy law. If the bankruptcy law is friendly to equity holders, then they have an incentive to attempt renegotiations in order to elicit concessions from debt holders. On the other hand, if the bankruptcy law is creditor friendly, renegotiations are impeded and claims settled according to absolute priority. The model suggests that the relation between expected stock returns and equity holders' bargaining power or liquidation costs is negative for firms operating in countries with weak debt enforcement procedures (debtor friendly). This is so because the value of equity includes an option to default strategically and the value of this option is higher the weaker the procedure of debt enforcement, resulting, *ceteris paribus*, in a higher value of equity and thus lower expected stock returns.

In contrast, when the system of law strictly enforces debt contracts, renegotiations prove difficult and the threat of strategic default is unlikely. In this case, the value of equity is lower and expected stock returns higher.

In a second step, we test these predictions using a Fama and MacBeth (1973) regression analysis on an international panel of stocks. We measure renegotiation frictions with the data compiled by Djankov, Hart, McLiesh, and Shleifer (2007b) on the characteristics of insolvency procedures around the world. We also use standard firm specific proxies of liquidation costs and equity holders' bargaining position relative to debt holders, namely asset tangibility and a measure of firms' vulnerability to liquidity shortages. After controlling for momentum, firm size, and book-to-market ratio, we find that stock returns are negatively related to liquidation costs and equity holders' bargaining power, but positively related to the quality of debt enforcement procedures. In our sample of countries, firms operating in environments where debt contracts are fully enforced earn, on average, one percentage point per month more than comparable firms operating in countries with the weakest enforcement of creditors' rights. This excess return is statistically significant and economically large. Further, we find that the effect of liquidation costs or of equity holders' bargaining power becomes irrelevant in countries with high enforcement of creditors' rights, suggesting that strategic default is unlikely to be an important determinant of the cross-section of stock returns in countries were debt contracts are effectively enforced.

This paper contributes to the literature in two ways. First, it sheds new light on the debate whether strategic default is an important factor for the pricing of financial securities [Davydenko and Strebulaev (2007) and Garlappi, Shu, and Yan (2006)]. By providing evidence that commonly used firm-specific proxies for strategic default cannot be examined independently of the legal context, this paper substantiates and generalizes the doubts raised by Bharath, Panchapegesan, and Werner (2007) that strategic default may not anymore be an important determinant of the cross-section of US equity returns.

The second contribution lies in the context of the law and finance literature.[1] While this literature has mainly focused on the importance of the system of law on aggregate outcomes such as financial development, recent attention has been given to the role of creditor protection on the valuation of firms and the pricing of financial securities. Davy-

[1] See for example, La Porta et al. (1997, 1998, 2000, 2002), Dyck and Zingales (2004), and Djankov, McLiesh and Shleifer (2007a). A comprehensive survey is in La Porta et al. (2007).

denko and Franks (2008), for example, study how international bankruptcy codes affect distressed reorganizations, and Qian and Strahan (2006) and Bae and Goyal (2008) examine the influence of creditor rights on the terms and pricing of international bank loans. In establishing a link between the quality of debt enforcement, strategic default, and stock returns, our paper highlights an additional channel through which the system of law shapes corporate decisions, and has implications for firm-level outcomes.

The rest of the paper proceeds as follows. In section 2 we outline the model and derive testable empirical predictions. Section 3 describes the data and provides summary statistics. In section 4 we discuss our main results. Section 5 contains robustness checks, and section 6 concludes.

II The Model

In this section we present a simple model of strategic debt service to derive predictions relating frictions in the renegotiation of debt contracts and expected stock returns. In the model equity holders and debt holders engage in a costless renegotiation of debt obligations upon default, and the firm is liquidated if renegotiations fail. Renegotiations may fail because of frictions that we parametrize in terms of the effectiveness of debt enforcement procedures.

A Model Assumptions

In our setup — which builds on Fan and Sundaresan (2000) and Davydenko and Strebulaev (2007) — managers act in the best interest of equity holders, the investment policy is fixed, and the default-free interest rate, r, is constant. The growth rate of firm's cash flows, dX_t/X_t, is independent of the capital structure, and evolves according to a geometric Brownian motion with constant mean μ, and volatility σ,

$$dX_t = \mu X_t dt + \sigma X_t dB_t, \tag{1}$$

where B_t is a standard Brownian motion.

Firm's profits are taxed at the rate $\tau \in [0, 1]$. This induces firms to issue debt, which we model as a perpetual claim with instantaneous constant coupon c. The firm defaults on its debt obligations if cash flows X_t fall below a threshold, denoted by X_B. Because

liquidation is costly, equity holders initiate a renegotiation procedure with debt holders upon default, which takes the form of a debt-equity swap. With this procedure, debt holders are offered the firm's equity in exchange of their debt claim. The exchange is governed by a Nash bargaining game, with bargaining power equal to η for equity holders and $(1-\eta)$ for debt holders.[2]

To account for renegotiations frictions, we follow Davydenko and Strebulaev (2007), and allow for the possibility that debt renegotiations fail with probability q. In such a case the firm is liquidated at a dissipative liquidation cost $\alpha \in [0,1]$. Debt holders — which have absolute priority in liquidation — receive $(1-\alpha)$ of the value of the firm at default, and equity holders receive nothing. We can think of q as measuring the likelihood that an out-of-court workout fails, or that a reorganization procedure is converted into a liquidation procedure.[3] For the purpose of this paper, we interpret q as measuring the quality of debt enforcement. In the limit case of q equal to one, contracts are perfectly enforced because courts adhere to priority rules. By contrast, in legal environments with weak debt enforcement, q is close to zero and there is scope for equity holders to renegotiate debt contracts and extract firm value from creditors, depending on their bargaining power.

B Model Solution

Equity holders choose the default threshold X_B that maximizes the value of equity, taking into account the anticipated costs and benefits of engaging in debt renegotiations. Using contingent claims techniques (see the Appendix 1 for the details) the after-tax value of equity is

$$E(X;\alpha,\eta,q) = (1-\tau)\left[\left(\frac{X}{r-\mu}-\frac{c}{r}\right)+\left(\frac{c}{r}\frac{1}{1-\lambda}\right)\left(\frac{X}{X_B}\right)^{\lambda}\right], \tag{2}$$

[2] An alternative form of reorganization procedure is the strategic debt service, through which the firm temporarily stops servicing debt obligations, with the promise to start repaying c when firm's fortunes improve, i.e. $X > X_B$. Debtholders are willing to accept this temporary cut in debt repayment in exchange of a fraction of the firm's value once it has recovered. As shown in Appendix 1, our results and testable hypotheses continue to hold under this alternative reorganization procedure.

[3] For istance, for the US, Bris, Welch and Zhu (2006) show that the identity of the judge matters whether there is a priority rule violation or not. Outside the US, Djankov et al. (2007b) suggest that in the world as a whole, 55% percent of countries systematically deviate from absolute priority.

where $(X/X_B)^{\lambda}$ is the risk-neutral probability of default and renegotiation, $\lambda < 0$ is the elasticity of the probability of default with respect to firms cash flows, and X_B is the endogenous default boundary, where

$$X_B = \frac{r-\mu}{r}\frac{\lambda}{\lambda-1}\frac{c}{1-(1-q)\eta\alpha}. \tag{3}$$

Equation (2) shows that the value of equity has two terms. The first term is the present value of discounted profits: cash flows minus debt obligations. The second term, which depends on the distance of cash flows X from the default threshold X_B, captures equity holders' option value to stop servicing debt through renegotiations with debt holders. Because $\lambda < 0$, this 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.

From equation (3) we see that the default threshold, X_B, increases with equity holders' bargaining power, η, and liquidation costs, α, but decreases with the effectiveness of debt enforcement, q. Intuitively, the incentives of equity holders to engage in strategic default increase with liquidations costs because, in the event of liquidation, debt holders would receive only a small fraction of the firm value. This increases their willingness to engage in a reorganization procedure, with potential large concessions if equity holders' bargaining power is large. By contrast, the incentives to default strategically are lower if the legal system strictly enforces debt obligations, as in this case equity holders would not be able to extract rents of the reorganization surplus.

Our main focus is to study how changes in liquidation costs, equity holders' bargaining power, and the quality of debt enforcement affect expected stock returns.[4] Since in the model X is the only state variable, and the risk premium associated with the firm's cash flow is exogenous, the expected stock return can be written as

$$\mathbb{E}(R) \equiv \frac{rE}{E} = r + \beta_E\,(r-\mu)\,, \tag{4}$$

where β_E (the equity beta) measures the risk of equity with respect to X,

$$\beta_E \equiv \frac{\partial E}{\partial X}\frac{X}{E} = \frac{(1-\lambda)X/\,(r-\mu) - \lambda c/r}{E/(1-\tau)} + \lambda, \tag{5}$$

which is inversely related to the value of equity.

[4] Our goal is to derive general predictions for expected stock returns unconditional of default and not to model explicitly the dynamics of betas as firms approach default. See, for instance, the paper by Hackbarth and Morellec (2008) for a paper that models the dynamics of betas relative to an event.

C Model Predictions

In equation (4), expected stock returns depend on q, α and η through β_E and X_B. Differentiating (4) with respect to q, we get

$$\frac{\partial \mathbb{E}(R)}{\partial q} > 0,$$

suggesting that expected stock returns are higher in countries with better enforcement of debt contracts. Given two firms with identical liquidation costs and bargaining power in the event of default, but operating in different legal environments, the firm facing legal institutions with more stringent procedures of debt enforcement earns on average a higher expected stock return. The reason is that as debt payments are more likely to be enforced equity holders have little room for extracting rents in renegotiations. Thus, the option to default becomes less valuable and the risk of the value of equity to cash flows increases.

Next, differentiating (4) with respect to α and η we obtain our second comparative static results,

$$\frac{\partial \mathbb{E}(R)}{\partial \alpha} < 0, \quad \text{and} \quad \frac{\partial \mathbb{E}(R)}{\partial \eta} < 0.$$

Given two firms operating in the same legal environment (i.e. keeping q constant), the expected stock return is lower for a firm with large liquidation costs or high bargaining power. As α and η increase, equity holders are able to extract more rents from debt holders in case of renegotiation. Thus, the option value to default increases, and the sensitivity of the value of equity to residual cash flows fall.

Finally, using (3) and (VI) we obtain

$$\frac{\partial^2 \mathbb{E}(R)}{\partial \alpha \partial q} > 0, \quad \text{and} \quad \frac{\partial^2 \mathbb{E}(R)}{\partial \eta \partial q} > 0,$$

and

$$\lim_{q \to 1} \frac{\partial \mathbb{E}(R)}{\partial \alpha} = \lim_{q \to 1} \frac{\partial \mathbb{E}(R)}{\partial \eta} = 0,$$

suggesting that the sensitivity of firms' expected stock return to α or η decreases monotonically in q. Moreover, stock returns are independent of the equity holders' advantage in the event of default if the firm operates in a legal setting where debt contracts are perfectly enforced, i.e., when $q \to 1$.

Figure 1 summarizes these comparative static results. It plots expected stock returns

as function of liquidation costs, α, and the quality of debt enforcement procedures, q.[5] As shown, liquidation costs have a strong negative effect on expected stock returns when q is low. In contrast, expected stock returns do not depend on liquidation costs, α, as q approaches 1. The intuition is straightforward. In weak institutional environments, the relative bargaining power of equity holders increases with liquidation costs, since debt holders would otherwise receive only a small fraction of the firm value upon default if they liquidate the firm instead of renegotiating its debt obligations. In this instance the option value to default and the value of firm's equity are higher, or equivalently the expected stock returns are lower. On the other hand, liquidation costs do not affect stock returns for values of q close to one, as in this case the system of law ensures that debt holders' claims are fully protected and the value of equity becomes independent of equity holders' option to default strategically.

<INSERT FIGURE 1 ABOUT HERE>

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

H1. *Firms in a legal regime with better enforcement of debt contracts have higher expected stock returns.*

H2. *Firms with higher liquidation costs or higher bargaining power in case of debt renegotiations have lower expected stock returns.*

H3. *Firms's expected stock returns are independent of equity holders' incentives to engage in strategic default in legal settings with efficient enforcement of debt contracts.*

D Discussion

Before testing the model's predictions it is worth relating our theoretical results to those in Garlappi, Shu, and Yan (2006), who use the same model of Fan and Sundaresan (2000) to explain the US market "anomaly" that firms with a higher probability of default earn

[5] The relation between expected stock returns, q and η, is not shown as it is qualitatively identical to the one reported in Figure 1.

lower, rather than higher, stock returns. In their analysis, a higher probability of default does not necessarily translate into a higher equity risk if equity holders can renegotiate down a large fraction of their debt upon default. Investors need to be compensated with a positive premium for holding stocks of firms close to default only if equity holders have no bargaining power in renegotiations. Thus, the relation between stock returns and default probability is hump shaped: positive if α (or η) is close to zero and negative as α (or η) gets closer to one.

Our predictions complement those of Garlappi, Shu, and Yan (2006) because they are not conditional on the firm's distance to default. We find it useful to derive unconditional predictions for two reasons. First, there is a non-trivial problem with the available data, given that measures of firms' default probability cannot be easily constructed for most of the countries in our sample.[6] Second, and more importantly, the relation between stock returns and default probability may be biased because of a potential endogeneity problem. In Garlappi, Shu, and Yan's set up, and in our model, the probability of default depends on firm's leverage, c, and on equity holders' ability to extract rents in case of default and renegotiation, α and η. In turn, liquidation costs and equity holders' bargaining power shape the firm's ex-ante ability to raise outside funds (and a fortiori its probability of default), because they affect the payoff lenders can receive in case of default. However, the financial structure is taken as given in the model, and as such it cannot account for the two way interaction between firm characteristics, firms' leverage, and the probability of default. By relating stock returns to proxies of strategic default across different countries we are able to bypass this endogeneity problem, since institutional settings are admittedly exogenous to firm characteristics, unlike the probability of default.[7]

The focus on the relation between stock returns and debt enforcement procedures give us also the opportunity to clarify the ongoing debate about the role of strategic debt

[6] Garlappi, Shu and Yan (2006) use Moody's KMV as index for expected default probabilities which is available for US firms only. Other proxies for financial distress include the distance to default based on a contingent claim model [Vassalou and Xing (2004)], Altman's Zscore [Altman (1968)], and Zmijewski's (1984) probability of default. It is, however, difficult (or not very meaningful) to compute these alternative measures of default probablity for non-US firms.

[7] It may be argued — as suggested by the law and finance literature — that legal insitutions affect also the capital structure of firms across countries, and thus their likelihood to default. This concern, however, is irrelevant for our purposes since, again, our predictions are independent of firms distance to default.

service on expected stock returns of firms operating in creditor-friendly legal settings. A case in point is the evidence of Bharath, Panchapegesan, and Werner (2007) that in the US the bankruptcy law has increasingly moved from an equity friendly system to a creditor friendly one, with a frequency of absolute priority deviations in favor of equity as low as 9% over the period 2000-2005. This evidence suggests that equity holders' benefits to engage in strategic default might have eroded through time in the US. Thus, an analysis of the effects of strategic default that does not consider the specifics of a bankruptcy procedure must be interpreted with caution. Clearly, our panel of international firms allows us to overcome this important criticism.

III 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 debt enforcement procedure, and creditors' expected recovery rates upon firms' default. The firm-specific data include measures of liquidation costs, equity holders' bargaining power in the event of a renegotiation, and control variables commonly used as determinants of firms' stock returns. Table I contains an overview and definitions of the variables in our data set. Appendix 2 contains a more detailed description on the data selection procedure.

<INSERT TABLE I ABOUT HERE>

A Firm-level Data

We have a panel of 28,518 firms from 43 countries from 1989 to 2006. We compute the firm's monthly stock returns using share prices from Thomson Datastream and CRSP. We match these monthly returns to the firm's annual financial statements in Thomson Worldscope and COMPUSTAT. We follow Fama and French (1992) and match the accounting data ending in calendar year *t-1* to the twelve monthly returns from July of year t to June of year *t+1*.

Our sample excludes financial firms because financial firms' accounting data is largely dependent on statutory capital requirements. To reduce the impact of outliers, we trim all variables at the one percent level in each tail.

1. Liquidation Costs and Bargaining Power

We measure the firm-specific liquidation costs, α, with two variables. Our first variable uses Berger, Ofek and Swary's (1996) tangibility index.[8] We define asset intangibility *(Intangibility)* as 1 minus the average of the expected exit values, weighted by the proportions of receivables, inventories, net property, plant, and equipment, and cash, with respect to total book assets. This measure of intangibility is the same as the one used by Garlappi, Shu and Yan (2006).

We define our second measure of liquidation costs as one minus the proportion of net property, plant, and equipment to total assets *(Non-fixed assets).* Alderson and Betker (1995) show that the proportion of non-fixed assets is an important determinant of their direct estimates of liquidation costs. Davydenko and Strebulaev (2007) use it to explore the effect of liquidation costs on corporate credit spreads.[9]

As a measure of equity holders' bargaining power, η, we use one minus the ratio of R&D expenditures to total assets *(1 - R&D ratio).* This proxy is used by Garlappi, Shu and Yan (2006) and is motivated by the fact that firms with high R&D expenses are vulnerable to liquidity shortages and thus more likely to experience cash flow problems, putting them at a disadvantaged bargaining position with respect to their creditors.[10] Alternative proxies of equity holders' bargaining power in renegotiations, such as those used by Davydenko and Strebulaev (2007), i.e., measures of managerial entrenchment and dispersion of debt holdings, rely on detailed US data not available for most of the countries in our sample.

2. Firm-level Controls

The remaining firm-specific variables are those commonly used in the empirical asset pricing literature. 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

[8] The authors find that tangibility is strongly associated to the expected value of assets in liquidation: a dollar of book asset value generates, on average, 71.5 cents in exit value for total receivables, 54.7 cents for inventory, and 53.5 cents for capital.

[9] Alderson and Betker (1995) show also that the market-to-book ratio and the R&D expenses are well correlated with liquidation costs. As we explain below, we use the market-to-book ratio as a control variable in the returns regressions and the R&D intensity as a proxy for shareholder's bargaining power.

[10] At the international level, R&D expenditures are heavily concentrated at zero. This fact casts doubt on the use of this variable to capture R&D heterogeneity within the country.

value of liabilities, divided by the market value of equity. *Momentum* is the firm's past 12-month average return, skipping the most recent month.

<INSERT TABLE II ABOUT HERE>

Table II contains summary statistics of our firm-specific variables. The average monthly stock return is 0.84%, the average momentum return is 1.27% per month, and the average book-to-market ratio is 1.53. Average *Intangibility* is 44.6%, the average proportion of *Non-fixed assets* is 68%, and the average *1-R&D ratio* is 98.1%. The *R&D ratio* is small because R&D expenses are clustered at zero.

B Country-level Data

We include all countries covered by Djankov et al.'s (2007b) survey where at least 20 firms can be matched to Datastream or CRSP.[11] Djankov et al. (2007b) present attorneys and judges in the insolvency practice from 88 countries with an identical case of a hotel about to default on its debt, and ask them to describe in detail how debt enforcement against this hotel will proceed in their countries. Based on these responses, they construct several measures of the quality of debt enforcement in each country two of which we use in this study. The surveys were conducted in January 2005. In order to exploit the time-series dimension in our sample, we project all variables into the past, assuming that they have remained stable through time. These measures are strongly correlated with the country' legal origins and are deeply rooted in national legal traditions which, as argued by the authors, are very persistent, if not permanent, features of a country's institutional environment.

Table III presents the data together with the number of firms in each country. The number of firms varies substantially across countries. Not surprisingly, the country with the largest number of firms is the US (9,483). Other countries with a large number of firms are Japan (3,495), the UK (1,547), China (1,488), Australia (1,409), and Canada (1,417). Countries with the least number of firms are Hungary (21) and Venezuela (20).

[11] This criterion excludes Colombia, Czech Republic, Morocco, Panama, Slovenia, India, Pakistan, and Zimbabwe.

<INSERT TABLE III ABOUT HERE>

1. Renegotiation frictions

In our model, q denotes the frictions related to debt renegotiation. We find two proxies of such renegotiation frictions in Djankov et al.'s (2007b) survey. The first is *Efficiency*, which assesses the overall quality of debt enforcement institutions in a given country. It comprises both the time and the costs associated with the insolvency procedures prevailing in each country, i.e. foreclosure, straight liquidation, or reorganization. According to this index, the higher its score, the lower the benefit of equity holders to extract rents during an insolvency.

Table III shows that the average value of *Efficiency* in our sample is 0.58, with a maximum value of 0.96, a minimum value of 0.07, and with a standard deviation of 0.28. This large variation in the data enables us to test*, in sample,* whether or not stock return discounts due to high equity holders' bargaining power disappear completely in countries with almost full enforcement of creditors rights.

Equity holders' incentives to default strategically are not only driven by the frictions associated with renegotiating debt obligations, but also by the payoff expected upon default. Accordingly, we also use the *Creditors' recovery rate,* which directly measures the costs borne by equity holders following strategic default. The *Creditors' recovery* rate is based on the order of priority at which secured creditors are served in each country, as well as the time it takes for a creditor to get paid. Table III 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%. We use Creditors' recovery as an alternative measure of renegotiation frictions (quality of debt enforcement).

2. Country-level Controls

As additional control variables, our data set includes the stock market turnover ratio (*Stock market turnover*) and the ratio of the total stock market capitalization to GDP (*Stock market cap to GDP*). We include these variables to control for liquidity effects and for the development of the stock market, as the depth of these markets may influence equity holders' growth opportunities and outside options, and thus their incentives to default

strategically. We also include the legal origin of countries, to capture further unobserved features of the legal system, not measured by the characteristics of the insolvency code.

IV Empirical Analysis

A Methodology

Our main hypotheses are that the country's quality of debt enforcement has a positive effect on expected stock returns, and that the efficient enforcement of debt contracts mitigates the sensitivity of expected stock returns to liquidation costs and equity holders' bargaining power. We test these hypotheses with regressions of firms' monthly stock returns in excess of the local market return on control variables, firm specific proxies of strategic default behavior, and our measures of efficiency and creditors' recovery rate.

We compute our regression estimates using an unbalanced panel of 28,518 firms in 43 countries, from 1989 to 2006 (198 months) with a Fama and MacBeth (1973) estimator. The standard errors are corrected for serial correlation using the Newey-West adjustment [Newey and West (1987)]. All our regressions include the typical determinants of the international cross-section of stock returns: *Size*, *Book to market,* and *Momentum*.

B Direct effects of Efficiency

We measure the direct effect of *Efficiency* on expected stock returns through the coefficient ϕ in the regression

$$r_{it} - r_t^M = \underbrace{\mathbf{x}_i'\beta}_{controls} + \phi \times \text{Efficiency} + \varepsilon_i, \tag{6}$$

where r_{it} is the firm's realized returns in month t, and r_t^M is the contemporaneous local market return. Table IV reports these results in columns **1** through **3**.

<INSERT TABLE IV ABOUT HERE>

Controlling for size, book-to-market, and momentum, we find that an increase in the efficiency of a debt enforcement procedure is associated, on average, with a positive excess return (column 1). This effect is statistically different from zero with 95% confidence. In

columns 2 and 3 we include controls for liquidation costs and equity holders' bargaining power. The effect of our proxy of renegotiation frictions (*Efficiency*) is virtually unchanged, and remains significant at the 0.05 level. Moreover, either measure of liquidation costs has a negative effect on stock returns, as predicted by our model.

We find that the firm's R&D intensity, used here as a proxy for the equity holders' bargaining power (*1-R&D ratio*), also has a negative effect on firms' excess returns. Garlappi, Shu and Yan (2006) find a negative association between R&D and returns in a cross-section of only US stocks. They interpret this result as a confirmation that the higher the equity holders' bargaining power, the lower the expected returns. As we mentioned above, in our international panel R&D expenditures are highly concentrated around zero, casting doubt on the use of this variable to capture R&D expenditures heterogeneity within and across countries. Therefore, even though we find a negative and significant effect of this variable on stock returns, we remain cautious when interpreting the results.

Finally, we note that in our international cross-section, value stocks outperform growth stocks (*Book to market*) and that *Momentum* has a significant positive effect on returns in our sample. For size, we do not find any negative effect, corroborating earlier findings that the small size effect may have disappeared in more recent sample periods. These findings are in line with the large empirical literature on the determinants of the cross-section of stock returns [see for example Fama and French (1998), and Rouwenhorst (1998, 1999)].

C Interactions between Liquidation Costs and Efficiency

We test our hypothesis of the cross derivative through the interaction effect between liquidation costs and *Efficiency* in the regression

$$\begin{aligned} r_{it} - r_t^M = & \underbrace{\mathbf{x}_i'\beta}_{controls} + \phi_0 \times \text{Liquidation costs}_i \\ & + \phi_1 \times \text{Liquidation costs}_i \times \text{Efficiency} + \varepsilon_i, \end{aligned} \tag{7}$$

where we alternate between asset *Intangibility* and the proportion of *Non-fixed assets* as measures of liquidation costs. According to the model, stock returns are decreasing in liquidation costs ($\phi_0 < 0$). Further, the sensitivity of returns to liquidation costs should decrease monotonically as a renegotiation failure becomes more likely, i.e. as *Efficiency* increases ($\phi_1 > 0$).

The results shown in columns 4 and 5 of Table IV support this hypothesis. In both cases, returns are decreasing in asset intangibility, either under the *Intangibility* measure of Berger, Ofek and Swary (1996), or *Non-fixed assets*. The effect of liquidation costs is significant with 99% and 95% confidence, respectively. Finally, the coefficient of the interaction term between either of these measures and *Efficiency* is, as expected, positive and statistically significant.

Column 6 reports the results of replacing our indices of liquidation costs in equation (7) for our measure of equity holders' bargaining power, *1 - R&D ratio*. The direct effect of bargaining power has a negative effect on stock returns, and the interaction term has a predicted positive coefficient, significant at the 0.05 level. In summary, the results show that the negative return premium associated with liquidation costs or equity holders' bargaining power decreases with the efficiency of a debt enforcement procedure. These results are fully consistent with our model's predictions.

D Economic Interpretation

Panel B of Table IV shows the results of testing our hypothesis that, when shareholders expect no payoff after strategic default, the return premium is insensitive to liquidation costs or to equity holders' bargaining power. For any level of liquidation costs or equity holders' bargaining power, our null hypothesis implies that the statistic

$$\frac{\partial\, \mathbb{E}\left(r_t - r_t^M\right)}{\partial \text{ Liquidation costs}} = \phi_0 + \phi_1 \times \text{ Maximum Efficiency}$$

is zero. We see from columns 4 and 5 of Panel B in Table IV that we cannot reject this null hypothesis for all of our measures of liquidation costs. The null hypothesis is rejected for the interaction between efficiency with bargaining power. We abstain from interpreting this result as evidence against our theory given the caveat on our proxy for bargaining power.

Panel B of Table IV also analyzes the economic significance of our estimates of ϕ_0 and ϕ_1. We compute the change in average excess returns attributed to the efficiency of a debt enforcement procedure and implied by our estimates. This change is given by the difference between the expected returns when *Efficiency* goes from minimum to the maximum value in the sample, evaluated at the sample median of liquidation costs (or

equity holders' bargaining power), i.e.,

$$\mathbb{E}\left(r_t - r_t^M | Maximum\ Efficiency\right) - \mathbb{E}\left(r_t - r_t^M | Minimum\ Efficiency\right)$$
$$= \phi_1 \times \text{Liquidation costs}_i.$$

For a median level of liquidation costs, an increase from the lowest to the highest efficiency of debt enforcement implies an average excess return premium of 106 and 116 basis points per month (columns 4 and 5). This premium is statistically significant with 99% confidence and economically large. Similarly, for equity holders' bargaining power, this average premium is 105 basis points per month when the efficiency of debt enforcement increases from the lowest to the highest value (column 6).

V Robustness

In this section we explore the role of other determinants of the incentives of equity holders to default strategically and address alternative interpretations of our model. Moreover, we test the robustness of our main results to different specifications of our regression model.

A Other Strategic Variable

So far, our evidence on the effects of efficiency of the debt enforcement procedure and of liquidation costs on stock returns is strongly indicative of strategic default behavior by equity holders and consistent with our model's prediction. If this result indeed corresponds to the pricing of the risk that equity holders' payoff is low due to renegotiation failure, then stock returns should also depend, in a similar way, to the expected equity holders' recovery rate. In particular, all other things constant, stocks in countries where equity holders expect a low recovery should outperform stocks in countries where equity holders expect a high recovery. Further, the lower returns associated with higher liquidation costs should be monotone decreasing in equity holders' expected recovery rate.

We test these conjectures by estimating models (6) and (7), and replacing the *Efficiency* index with *Creditors recovery* rate. Table V reports the results. Panel A confirms our predictions: all other things constant, stocks returns are increasing *Creditor's recovery* rate (columns 1 through 3). As before, both measures of liquidation costs have the predicted

negative effect on stock returns, as well as our proxy for bargaining power (*1 - R&D to assets*).

<INSERT TABLE V ABOUT HERE>

As predicted by our model, stock returns should be lower due to liquidation costs when creditors' recovery rate is high: the more creditors expect to recover in a renegotiation, the smaller the difference between the equity holders' payoff in a renegotiation or a liquidation, and the smaller the sensitivity of the risk premium to liquidation costs. The coefficient of the interaction term confirms this intuition. It is always positive and significant (columns 4 to 6). Further, the model predicts that as we approach perfect enforcement of creditors' rights, stock returns become insensitive to liquidation costs. Therefore, we should not reject the null hypothesis that the statistic

$$\frac{\partial \mathbb{E}\left(r_t - r_t^M\right)}{\partial \text{ Liquidation costs}} = \phi_0 + \phi_1 \times \text{Maximum Creditors' recovery}$$

is equal to zero. Panel B of Table V shows that we cannot reject this hypothesis for *Non-fixed assets*. Moreover, we also observe that there is a significant return premium in excess returns as we move from countries with the lowest to the highest *Creditors' recovery*. An increase from the lowest to the highest creditor's recovery implies an average excess return premium of over 80 basis points per month. Overall, the findings in this section corroborate our main findings and support our hypothesis that the institutional setting affects the strategic default behavior of equity holders and that this effect has economically important asset pricing implications.

B Market Beta

Until now we have relied on an interpretation of our model in which firm-characteristics and exogenous institutional settings directly affect expected stock returns. Since expected stock returns are a linear function of the beta in our model, and the risk premium is exogenous, this interpretation is justified. Alternatively, however, we could think of the beta in our model as the market beta, i.e., as a firm's return sensitivity to the local market index return. Therefore, an alternative way to test our model's prediction is to

estimate individual market betas for every firm in our sample and then use those market betas to test our model's predictions [see, for instance, Hackbarth and Morellec (2008)]. We perform this analysis and find that the results obtained using this alternative model interpretation fully support our main results.

More specifically, we estimate the local market beta of every firm in our sample using the market model. We require a minimum of 36 monthly return observations and obtain a cross-section of over 22'057 firm-specific market betas. Next, we regress those estimated market betas on time-series averages of our liquidation cost proxies, our bargaining power proxy, and on *Efficiency* and *Creditors' recovery*. Table VI presents the estimation results.

<INSERT TABLE VI ABOUT HERE>

According to the model, the coefficients of liquidation cost and bargaining power should be negative, and the interaction term between those firm-specific proxies and *Efficiency* and *Creditors' recovery* should be positive and significant. The results in Table VI support these predictions. Across all specifications, *Intangibles*, *Non-fixed assets*, and *1-R&D* are negative and statistically significant, and the interaction terms between these proxies and *Efficiency* and *Creditors' recovery* are positive. The results of this alternative specification are reassuring, corroborate our earlier findings, and suggest that our conclusions are independent of the model's interpretation of beta.

C Leverage

A potential concern with our analysis arises because our sample of firms includes firms with almost zero or a very low leverage. Indeed, low leverage firms might not be subject to strategic default by equity holders because there is simply no debt to default on. We address this concern by grouping firms within each country into leverage deciles. We then define two sub-samples of low and a high leverage. The low leverage group includes all firms in leverage deciles one and two, and the high leverage group includes those in deciles 9 and 10.[12] We then estimate separate regressions for these two samples using our

[12] This grouping is admittedly arbitrary, but results are qualitatively and quantitatively similar when we consider only firms that are in the lowest leverage decile or firms in deciles one to three as low leverage firms.

firm-specific proxies for liquidation costs and bargaining power and *Efficiency*. Table VII presents the results.

<INSERT TABLE VII ABOUT HERE>

Panel A of Table VII shows the results for the high leverage sample, and Panel B the results for the low leverage sample. As expected, the coefficients of *Intangibles*, *Non-fixed assets*, and *1-R&D* are negative. More importantly, the coefficients of the interaction terms between *Intangibles* and *Efficiency* and *Non-fixed asset* and *Efficiency* are positive and statistically significant with 95% confidence. These results are in line with our earlier findings and support the conjecture that strategic default is important for firms with (high) leverage.

In Panel B of Table VII we see that the coefficients of *Intangibles* and *1-R&D* are negative, but the coefficient of *Non-fixed assets* is positive, and the interaction terms between the liquidation cost proxies and *Efficiency* are not statistically significant. Indeed, these results suggest that strategic default is of little concern for firms with very low leverage and they substantiates the interpretation of our earlier results.

D Data Filters

Another question that arises is whether firms are subject to the insolvency procedure of their home country or of the country where they cross-list their shares. To mitigate this problem, we exclude all firms where the first two characters of the ISIN code do not match with the country of origin. Moreover, by restricting ourselves to share codes 10 and 11 (CRSP) and to sharetype "EQ" (Datastream), we automatically exclude ADRs. Although with this procedure we might not capture all the cases where firms file for bankruptcy in another country than their home country, we believe that the remaining bias is small.

As additional filters, we exclude firms for which we do not have at least five years of monthly returns and where we do not have at least six monthly observations to compute the 12-month momentum return. Finally, we exclude observations where the stock price is less than USD 0.25.[13] This exclusion should ensure that stocks with very low prices do

[13] We have also excluded observations with stock prices of less than 0.1 or 1 USD, obtaining very similar results.

not drive our results.

We repeat our estimations after applying these filters and, as shown in Table VIII, our results dot not change. It seems that neither a bias due to cross-listed firms nor stocks with very low prices drive our results.

<INSERT TABLE VIII ABOUT HERE>

E Additional Country Control Variables

As suggested by recent papers that study the effect of institutions on firm-level outcomes [see e.g. Bae and Goyal (2008) or Qian and Strahan (2006)], we include two commonly used control variables, namely the stock market turnover ratio (*Stock market turnover*) and the stock market capitalization to GDP (*Stock market cap to GDP*). We aim at capturing with these variables aggregate market liquidity and growth and outside options of firms. It is very likely that growth and outside options influence equity holders' decision to default (strategically). In addition, we include dummy variables for the legal origins of the countries, where the common law legal origin is the reference country group. Columns 1 and 2 of Table IX show estimation results using *Efficiency*. As before, the coefficients of *Intangibility* and *Non-fixed assets* are negative, and the interaction terms with *Efficiency* are positive and significant, as predicted by our model. Columns 3 and 4 report the results using *Creditors' recovery* rate. These results are also fully consistent with our previous evidence. Note that the additional control variables do not have a systematic and significant effect on stock returns, and that the standard control variables have the expected signs.

<INSERT TABLE IX ABOUT HERE>

Overall, Table IX provides further support for our model's prediction. The inclusion of time-varying country specific variables as well as the legal origin of countries do not change our conclusions but strengthen our conjecture that strategic default matters, but only in legal environments with weak debt enforcement procedures.

F Firm and Time Effects

Finally, we re-estimate equation (7) by pooled OLS, and cluster by firm and time. With this procedure we estimate standard errors that are robust to simultaneous correlation across both firm and time [see Petersen (2008) and Thompson (2006)]. Since the Fama and MacBeth (1973) procedure gives standard errors only robust to correlation across firms, we demonstrate that the statistical significance of our estimates do not depend on the way we compute standard errors. Table X reports the results, and we notice that they are consistent with our previous results.

<INSERT TABLE X ABOUT HERE>

VI Conclusion

This paper shows empirically that stock returns incorporate the equity holders' incentives to strategically default on the firm's debt. The main difficulty in trying to identify such effect is to find sources of exogenous variation in the determinants of the equity holders' strategic default decision. We argue that an *international* cross-section of firms is the best data to capture such heterogeneity.

We exploit a recent survey that directly measures the quality of debt enforcement and hence the likelihood that a firm's debt is renegotiated during an insolvency procedure. An increase in the likelihood of a renegotiation (decrease in quality of debt enforcement), rather than a liquidation, should decrease equity risk. We present robust evidence in support of this effect. We also show that commonly used measures of the costs of liquidation, such as asset intangibility, are negatively associated with stock returns in the international cross-section. We argue that this effect operates through the strategic default channel because this association weakens monotonically with the quality of debt enforcement. Indeed, the less likely it is that debt is renegotiated, the less relevant liquidation costs will be to the default decision, and the less sensitive will the risk of equity be to such costs. Our evidence is also robust to other determinants of the costs and benefits of strategic default, such as the expected creditors' recovery rate and to alternative interpretations of our model.

Recent empirical evidence suggests that, contrary to traditional views, the US insolvency procedures are characterized by pervasive creditor control. Indeed, the measures of the quality of debt enforcement we use are based on recent surveys that capture this trend and as a consequence, the US ranks on top of most other countries. Moreover, given that the within country variation of the determinants of strategic default seems rather small, the use of an international cross-section of firms is important in identifying strategic default.

Appendix 1: Model

Debt Equity Swap

A firm with assets in place generates operating cash flows X that evolve according to a geometric Brownian motion with constant growth rate $\mu > 0$ and constant volatility σ,

$$dX_t = \mu X_t dt + \sigma X_t dB_t.$$

The firm generates instantaneous profit, $X_t - c$, where c is the coupon payment. No-arbitrage requires that after-tax cash flows $(1-\tau)(X_t - c)$ plus capital gains equal the riskless return. Thus, the value of equity $E(X)$ satisfies the following differential equation:

$$\frac{1}{2}\sigma^2 X^2 E_{XX} + \mu X E_X + (1-\tau)(X-c) = rE,$$

with boundary conditions:

$$\lim_{X\uparrow\infty} E(X)/X \leq \infty,$$
$$\lim_{X\downarrow X_B} E(X) = (1-q)\eta\alpha\frac{X_B}{r-\mu}(1-\tau),$$
$$\lim_{X\downarrow X_B} E_X(X) = (1-q)\eta\alpha\frac{1}{r-\mu}(1-\tau).$$

The general solution to this ordinary differential equation is

$$E(X) = AX^{\lambda_1} + BX^{\lambda} + (1-\tau)\left(\frac{X}{r-\mu} - \frac{c}{r}\right),$$

with A and B constant, determined by boundary conditions, and λ_1 and λ given by

$$\lambda_1 = \left(\frac{1}{2} - \frac{\mu}{\sigma^2}\right) + \sqrt{\left(\frac{1}{2} - \frac{\mu}{\sigma^2}\right)^2 + \frac{2r}{\sigma^2}} > 0.$$

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

From the first and second boundary condition we find that $A = 0$ and

$$B = \left[(1-q)\eta\alpha\frac{X_B}{r-\mu}(1-\tau) - (1-\tau)\left(\frac{X_B}{r-\mu} - \frac{c}{r}\right)\right]\left(\frac{1}{X_B}\right)^{\lambda}.$$

Moreover, using the fact that

$$\lim_{X\downarrow X_B} E(X) = \lim_{X\downarrow X_B} E_X(X)X,$$

the endogenous default threshold X_B can be written as

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

Finally, replacing X_B into $E(X)$, the value of equity simplifies to

$$E(X) = (1-\tau)\left[\left(\frac{X}{r-\mu}-\frac{c}{r}\right)+\left(\frac{c}{r}\frac{1}{1-\lambda}\right)\left(\frac{X}{X_B}\right)^{\lambda}\right].$$

Equity Beta

By applying Itô's Lemma to the value of equity, the equity beta is given by

$$\beta_E = \frac{\partial E}{\partial X}\frac{X}{E}\beta_X.$$

We normalize the beta of the firm's cash flow, β_X, to 1. Computing the derivatives, and rearranging, we get

$$\beta_E \equiv \frac{\partial E}{\partial X}\frac{X}{E} = \frac{(1-\lambda)X/(r-\mu)-\lambda c/r}{E/(1-\tau)}+\lambda,$$

Comparative Statics

Using the endogenous default threshold

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

the after-tax value of equity can be rewritten as,

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

Since $\lambda < 0$, it follows that

$$\frac{\partial E}{\partial \alpha} = \underbrace{\frac{c}{r}\frac{\lambda}{1-\lambda}}_{-}\underbrace{\left(\frac{Xr(\lambda-1)(1-(1-q)\eta\alpha}{(r-\mu)\lambda c}\right)^{\lambda}}_{+}\underbrace{\frac{(-(1-q)\eta)(r-\mu)\lambda c}{Xr(\lambda-1)(1-(1-q)\eta\alpha}}_{-} > 0$$

and

$$\lim_{q\to 1}\ \frac{\partial E}{\partial \alpha} = 0.$$

Also

$$\frac{\partial E}{\partial \eta} = \underbrace{\frac{c}{r}\frac{\lambda}{1-\lambda}}_{-}\underbrace{\left(\frac{Xr(\lambda-1)(1-(1-q)\eta\alpha}{(r-\mu)\lambda c}\right)^{\lambda}}_{+}\underbrace{\frac{(-(1-q)\alpha)(r-\mu)\lambda c}{Xr(\lambda-1)(1-(1-q)\eta\alpha}}_{-} > 0$$

and

$$\lim_{q\to 1} \frac{\partial E}{\partial \eta} = 0.$$

Finally

$$\frac{\partial E}{\partial q} = \underbrace{\frac{c}{r}\frac{\lambda}{1-\lambda}}_{-}\underbrace{\left(\frac{Xr(\lambda-1)(1-(1-q)\eta\alpha)}{(r-\mu)\lambda c}\right)^{\lambda}}_{+}\underbrace{\frac{\eta\alpha(r-\mu)\lambda c}{Xr(\lambda-1)(1-(1-q)\eta\alpha}}_{+} < 0$$

Notice also that

$$\frac{\partial E}{\partial \alpha \partial q} = \underbrace{\frac{c}{r}\frac{1}{1-\lambda}\frac{\lambda^2(r-\mu)c}{rX(\lambda-1)}\left(\frac{Xr(\lambda-1)(1-(1-q)\eta\alpha}{(r-\mu)\lambda c}\right)^{\lambda}}_{-\quad +}\left\{\begin{array}{c}\underbrace{\frac{\eta\alpha(r-\mu)\lambda^2 c}{Xr(\lambda-1)(1-(1-q)\eta\alpha)}}_{-}\underbrace{\frac{-(1-q)\alpha}{1-(1-q)\eta\alpha}}_{-} \\ +\underbrace{\frac{\eta q\left(1-(1-q)\eta\alpha\right)+(1-q)\eta^2\alpha}{\left(1-(1-q)\eta\alpha\right)^2}}_{+}\end{array}\right\}$$

$$< 0$$

and

$$\frac{\partial E}{\partial \eta \partial q} = \underbrace{\frac{c}{r}\frac{1}{1-\lambda}\frac{\lambda^2(r-\mu)c}{rX(\lambda-1)}\left(\frac{Xr(\lambda-1)(1-(1-q)\eta\alpha}{(r-\mu)\lambda c}\right)^{\lambda}}_{-\quad +}\left\{\begin{array}{c}\underbrace{\frac{\eta\alpha(r-\mu)\lambda^2 c}{Xr(\lambda-1)(1-(1-q)\eta\alpha)}}_{-}\underbrace{\frac{-(1-q)\alpha}{1-(1-q)\eta\alpha}}_{-} \\ +\underbrace{\frac{\alpha q\left(1-(1-q)\eta\alpha\right)+(1-q)\alpha^2\eta}{\left(1-(1-q)\eta\alpha\right)^2}}_{+}\end{array}\right\}$$

$$< 0.$$

Using the fact that,

$$\beta_E = \frac{\Omega(1-\tau)}{E} + \lambda,$$

where

$$\Omega = X/\left(r-\mu\right) - \lambda(X/\left(r-\mu\right) - c/r) > 0,$$

we have

$$\frac{\partial \beta_E}{\partial \alpha} = \frac{\partial \beta_E}{\partial E}\frac{\partial E}{\partial \alpha} = \underbrace{-\frac{\Omega(1-\tau)}{E^2}}_{-}\underbrace{\frac{\partial E}{\partial \alpha}}_{+} < 0$$

$$\frac{\partial \beta_E}{\partial \eta} = \frac{\partial \beta_E}{\partial E}\frac{\partial E}{\partial \eta} = \underbrace{-\frac{\Omega(1-\tau)}{E^2}}_{-}\underbrace{\frac{\partial E}{\partial \eta}}_{+} < 0,$$

$$\frac{\partial \beta_E}{\partial q} = \frac{\partial \beta_E}{\partial E}\frac{\partial E}{\partial q} = \underbrace{-\frac{\Omega(1-\tau)}{E^2}}_{-}\underbrace{\frac{\partial E}{\partial q}}_{-} > 0,$$

Moreover,

$$\frac{\partial^2 \beta_E}{\partial \alpha \partial q} = \frac{\partial \beta_E}{\partial E}\frac{\partial E}{\partial \alpha \partial q} = \underbrace{-\frac{\Omega(1-\tau)}{E^2}}_{-}\underbrace{\frac{\partial E}{\partial \alpha \partial q}}_{-} > 0$$

$$\frac{\partial^2 \beta_E}{\partial \eta \partial q} = \frac{\partial \beta_E}{\partial E}\frac{\partial E}{\partial \eta \partial q} = \underbrace{-\frac{\Omega(1-\tau)}{E^2}}_{-}\underbrace{\frac{\partial E}{\partial \eta \partial q}}_{-} > 0.$$

and

$$\lim_{q\to 1} \frac{\partial \beta_E}{\partial \alpha} = \lim_{q\to 1} \frac{\partial \beta_E}{\partial E}\frac{\partial E}{\partial \alpha} = -\frac{\Omega(1-\tau)}{E^2}\frac{\partial E}{\partial \alpha} = 0,$$

$$\lim_{q\to 1} \frac{\partial \beta_E}{\partial \eta} = \lim_{q\to 1} \frac{\partial \beta_E}{\partial E}\frac{\partial E}{\partial \eta} = -\frac{\Omega(1-\tau)}{E^2}\frac{\partial E}{\partial \eta} = 0.$$

Summarizing, the beta of equity is decreasing in α or η, but the sensitivity to either decreases monotonically in q. In the limit as $q \to 1$, the equity beta is independent of α and η. Given that expected stock returns are linear in the equity beta,

$$\mathbb{E}(R) \equiv \frac{rE}{E} = r + \beta_E (r - \mu), \tag{8}$$

it follows that:

Lemma 1 *The expected returns are*

1. *increasing in q,*
2. *decreasing in α and η,*
3. *less sensitive (in absolute value) to α and η as q increases,*
4. *insensitive to α and η for $q = 1$.*

Strategic Debt Service

As discussed in Fan and Sundaresan (2000), an alternative to the equity-swap procedure is the strategic debt service, in which debt holders (at the endogenously determined trigger point) accept a reduced level of debt service but let the firm continue operation. This enables equity holders to get potential tax benefits in the future, and the present

value of such tax benefits are included in the bargaining process with debt holders. Following Fan and Sundaresan (2000), and using the same steps as above, the value of equity for $X > X_B$ can be written as

$$E(X) = (1-\tau)\left(\frac{X}{r-\mu} - \frac{c}{r}\right) + \left[\frac{(1-\tau)\,c}{(1-\lambda)\,r} - \eta(1-q)\frac{\lambda\,(1-\lambda_1)}{(\lambda_1-\lambda)\,(1-\lambda)}\frac{\tau c}{r}\right]\left(\frac{X}{X_B}\right)^{\lambda_1}$$

with

$$X_B = \frac{r-\mu}{1-\tau}\frac{\lambda}{\lambda-1}\frac{c}{r}\left(\frac{1-\tau+\tau\eta\,(1-q)}{1-\alpha\eta\,(1-q)}\right).$$

The equity beta is defined as before. The implications of this alternative specification of the model are identical to the one discussed in the main text. This is shown in Figure 2.

Appendix 2: Data

We start with all countries from the paper by Djankov et al. (2007b) and check in Worldscope for the data availability on these countries. We match 55 countries, including the US. The sample contains all OECD, some Latin American, Middle Eastern and Asian countries. We then look into different sources for data. International firm level data come from Worldscope, international price data come from Datastream, US accounting and price data come from Compustat and CRSP, respectively, and institutional data come from Andrei Shleifer's webpage and the World Bank.

For each firm, we download a list of accounting and price variables and identifiers. Throughout, our main firm identifier is the ISIN (International Security Identification Number) code. We select all active and inactive firms and download yearly accounting data and monthly price data for the period 1989 to 2006. We restrict our focus to this time period because for many countries there are no accounting and price data available prior to 1989.

Firm level data

First, we download a comprehensive list of annual accounting variables for every firm in each country from Worldscope in USD. For US data, we download annual data from Compustat. When we merge data from different countries, we make sure that there are no duplicate observations in terms of ISIN and year. We also drop all observations for which no ISIN exist. Second, we download monthly price data for every firm in each country from Datastream in USD. For the US, we download price data from the monthly CRSP files. Third, we download for each country a representative market index. Where possible, we use the Datastream Market index in USD, and if this index is not available, we use the respective MSCI country index. For some countries the index already exists denominated in USD, and for other countries we convert the local currency prices within Datastream to USD. For the US we use the equally weighted CRSP index.

Institutional data

We match the firm level data with several institutional variables at country level. More specifically, we collect for every country in our sample variables related to insolvency proceedings and the recovery rate. These variables are not available for India, Pakistan,

and Zimbabwe. Moreover, we drop some countries for which we do not have enough data available. For instance, we require that we have at least 20 firms per country. This reduces the sample to 43 countries.

Listing of firms

An important concern arises regarding the exchange listing of firms. For instance, firms can list their shares in the US in order to have easier access to external financing or to subject themselves to more stringent regulation [see Karolyi (2006) for a recent review on the cross-listing literature]. Another reason why a firm cross-lists may be to "shop" foreign bankruptcy laws. Indeed, Qian and Strahan (2006) note that "many [...] loans are arranged and negotiated in either London or New York, and the loan contracts often include a choice of law clause that allows the law of the U.S. or the UK to supersede the laws in the borrower's country." It is, however, the case that the choice of law clause does *not* extend to bankruptcy or property, but only governs the credit or loan contract. The law that governs property relations and bankruptcy is determined by the borrower country's legal codes (i.e. where the assets are located) or by the local bankruptcy codes or insolvency laws (i.e. where the case is filed). It thus seems that the enforcement of security provisions in bankruptcy depends on the legal system in the country where the assets are located, and not on the legal codes of a country where a firm cross-lists. We are thus confident that our results are not biased by firms' cross-listings. Nevertheless, to minimize the bias arising from cross-listings of firms, we exclude all observations where the first two characters of the ISIN code do not match with the country of origin.

Other Data Screens

We follow the suggestions of Ince and Porter (2006) and remove all listings not equal to equity. For Datastream data we only keep listings where TYPE is equal to "EQ". For US data we only keep listings with sharecodes 10 or 11. By restricting ourselves to sharecodes 10 and 11, we automatically exclude ADRs. With this we want to make sure that no firm is recorded twice in the sample and that, for every firm, we only include observations from its home market.

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Table I: Description of Variables and Sources

This table describes the independent variables used in the analysis. The data come from Thomson-Reuters Datastream database, the University of Chicago's Center for Research in Security Prices database (CRSP), Thomson-Reuters Worldscope database, Standard & Poors' Compustat database and the database from the paper "Debt Enforcement around the World" by Djankov, Hart, McLiesh, and Shleifer (Djankov et al. (2007b)).

Variable name	Use	Variable description	Source
		Panel A: Variables related to strategic default	
Intangibility	Liquidation costs	1 - (cash+0.715*receivables+0.547*inventories+0.535*ppe) / total assets.	Worldscope, Compustat
Non-fixed assets	Liquidation costs	1 - Property, plant, and equipment / total assets.	Worldscope, Compustat
1-R&D ratio	Bargaining power	1 - Research and development expense / total assets.	Worldscope, Compustat
Efficiency	Quality of debt enforcement	An index of the efficiency of the debt enforcement procedure, defined as the present value of the terminal value of the firm after bankruptcy costs.	Djankov et al. (2007b)
Creditors' recovery	Strategic default costs	The recovery rate for secured creditors.	Djankov et al. (2007b)
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 month, skipping the most recent month.	Datastream, CRSP
Leverage	Control	Total assets minus book equity divided by the market value of the firm.	Datastream, Worldscope, Compustat, CRSP
Stock market turnover	Control	Stock market turnover ratio.	World Bank
Stock market cap to GDP	Control	Stock market capitalization / GDP.	World Bank

Table II: Firm Summary Statistics

This table summarizes firm-specific variables in the sample. The sample period goes from 1989 to 2006. The statistics are calculated by pooling across countries and time. Variables are defined in Table I. Monthly stock market data come from Datastream and CRSP, and annual financial statement data are from Worldscope and Compustat.

Variable	Mean	Standard deviation	Min	First quartile	Median	Third quartile	Max	N
Return	0.84	14.17	−39.47	−6.85	0.00	6.95	66.67	2'910'332
Total assets ($ Million)	842.03	2318.64	1.40	41.88	141.21	510.70	24180.38	2'427'715
Level book to market	1.53	1.64	0.05	0.54	1.02	1.85	12.90	2'255'233
Momentum	1.27	4.93	−12.56	−1.56	0.85	3.56	23.28	2'883'759
Market leverage	25.91	24.43	0.00	3.75	19.43	42.66	91.94	2'278'089
Intangibility	44.64	12.63	7.06	37.72	44.17	50.98	85.71	2'359'885
Non-fixed assets	68.14	21.97	9.17	54.06	71.86	86.04	99.62	2'393'814
1-R&D Ratio	98.13	4.90	62.04	99.19	100.00	100.00	100.00	2'451'816

Table III: Country Summary Statistics

This table summarizes our country level data and average monthly stock returns by country. The sample period is from 1989 to 2006. Country level data are taken from the paper by Djankov et al. (2007b) and from Andrei Shleifer's website. Monthly stock market data come from Datastream and CRSP. Variables are defined in Table I.

Country	Number of firms	*Efficiency*	*Creditors' recovery rate*	*Stock return*
Argentina	61	0.36	0.31	0.74
Australia	1′409	0.88	0.85	0.97
Austria	73	0.78	0.77	0.81
Belgium	97	0.91	0.91	0.99
Brazil	241	0.13	0.08	1.82
Canada	1′417	0.93	0.93	0.90
Chile	143	0.41	0.22	1.26
China	1′488	0.44	0.42	0.61
Denmark	103	0.77	0.74	1.22
Egypt	36	0.29	0.23	1.42
Finland	116	0.92	0.92	1.44
France	714	0.54	0.47	1.10
Germany	768	0.57	0.56	0.25
Greece	246	0.54	0.39	0.82
Hong Kong	783	0.88	0.86	0.53
Hungary	21	0.47	0.39	0.99
Ireland	63	0.90	0.90	1.45
Israel	179	0.66	0.51	0.82
Italy	216	0.45	0.37	0.60
Japan	3′495	0.96	0.96	0.32
Malaysia	850	0.48	0.34	0.33
Mexico	107	0.73	0.51	1.34
Netherlands	152	0.95	0.94	1.09
New Zealand	82	0.91	0.80	1.50
Norway	145	0.92	0.92	1.74
Peru	60	0.42	0.31	1.21
Philippines	144	0.18	0.18	0.19
Poland	179	0.68	0.47	2.15
Portugal	51	0.82	0.61	0.59
Russia	89	0.39	0.33	3.50
Singapore	549	0.96	0.95	0.62
South Africa	234	0.40	0.39	1.46
South Korea	857	0.88	0.88	1.47
Spain	98	0.82	0.59	1.32
Sri Lanka	25	0.46	0.29	0.98

Table III: continued

Country	Number of firms	*Efficiency*	*Creditors' recovery rate*	*Stock return*
Sweden	267	0.86	0.81	1.22
Switzerland	179	0.60	0.60	1.11
Taiwan	1′134	0.94	0.71	0.81
Thailand	415	0.55	0.45	0.37
Turkey	182	0.07	0.07	2.01
UK	1′547	0.92	0.91	0.91
USA	9′483	0.86	0.86	1.02
Venezuela	20	0.13	0.13	0.73
Total	28′518			
Mean		0.64	0.58	1.09
Stdev		0.27	0.28	0.60
Median		0.68	0.56	0.99
Min		0.07	0.07	0.19
Max		0.96	0.96	3.50

Table IV: Stock Returns and Debt Enforcement Efficiency

This table shows Fama and MacBeth (1973) estimates of regressions of stock returns on proxies for liquidation costs (*Intangibles* and *Non-fixed assets*), shareholders' bargaining power (*1-R&D ratio*), and the efficiency of debt enforcement (*Efficiency*). The sample period is from 1989 to 2006. The dependent variable for each cross-sectional regression is a firm's monthly return in excess of the country's market return in the same month. The other variables are defined in Table I. Monthly stock market data come from Datastream and CRSP, and annual financial statement data are from Worldscope and Compustat. Standard errors adjusted for serial correlation (Newey-West) are in parentheses.

Panel A: Fama and MacBeth regression estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Size	0.033	0.046	0.040	0.040	0.032	0.044
	(0.035)	(0.033)	(0.034)	(0.034)	(0.035)	(0.035)
Book to market	0.349***	0.423***	0.408***	0.362***	0.346***	0.417***
	(0.089)	(0.076)	(0.075)	(0.087)	(0.086)	(0.076)
Momentum	0.062***	0.060***	0.061***	0.060***	0.063***	0.061***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
Efficiency	0.937**	0.854**	0.878**			
	(0.364)	(0.365)	(0.367)			
Intangibles		−0.519*		−2.456***		
		(0.304)		(0.775)		
1-R&D ratio		−4.942***	−5.082***			−5.627***
		(1.575)	(1.502)			(1.535)
Non-fixed assets			−0.170		−1.031**	
			(0.197)		(0.435)	
Intangibles ×				1.944**		
Efficiency				(0.772)		
Non-fixed assets ×					1.352**	
Efficiency					(0.528)	
1-R&D ratio ×						0.848**
Efficiency						(0.368)
Constant	−1.187***	3.910**	3.940***	−0.064	−0.467*	4.373***
	(0.338)	(1.649)	(1.520)	(0.284)	(0.258)	(1.542)
F statistic	10.768	17.842	15.923	15.763	11.875	19.650
Number of months	198	198	198	198	198	198
Average adjusted R^2	0.024	0.030	0.031	0.026	0.027	0.029

[a] Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively.

Table IV: continued

Panel B: Further Tests of the Model's Implications

	(1)	(2)	(3)	(4)	(5)	(6)
$H_0 : \frac{\partial \mathbb{E}\left(r_t - r_t^M \mid Max.\ Efficiency\right)}{\partial\ Liquidation\ costs} = 0$						
Test statistic: $\hat{\phi}_0 + \hat{\phi}_1 \times$ *Max. Efficiency*				−0.588	0.269	−4.812
Standard error				(0.339)	(0.259)	(1.591)
P-value				0.083	0.298	0.003
$H_0 : \mathbb{E}\left(r_t - r_t^M \mid Max.\ Efficiency\right) - \mathbb{E}\left(r_t - r_t^M \mid Min.\ Efficiency\right) = 0$						
At sample median of *Liquidation costs*				1.064	1.160	1.059
Standard error				(0.304)	(0.336)	(0.330)
P-value				0.006	0.005	0.011

[a] Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively.

Table V: Stock Returns and Creditors' Recovery

This table shows Fama and MacBeth (1973) estimates of regressions of stock returns on proxies for liquidation costs (*Intangibles* and *Non-fixed assets*), shareholders' bargaining power (*1-R&D ratio*), and creditor's recovery rate (*Creditors' recovery*). The sample period is from 1989 to 2006. The dependent variable for each cross-sectional regression is a firm's monthly return in excess of the country's market return in the same month. The other variables are defined in Table I. Monthly stock market data come from Datastream and CRSP, and annual financial statement data are from Worldscope and Compustat. Standard errors adjusted for serial correlation (Newey-West) are in parentheses.

Panel A: Fama and MacBeth regression estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Size	0.089**	0.103***	0.093***	0.096***	0.085**	0.100***
	(0.037)	(0.034)	(0.035)	(0.035)	(0.036)	(0.035)
Book to market	0.426***	0.491***	0.471***	0.443***	0.417***	0.486***
	(0.093)	(0.077)	(0.075)	(0.090)	(0.088)	(0.077)
Momentum	0.063***	0.063***	0.063***	0.061***	0.064***	0.063***
	(0.016)	(0.015)	(0.015)	(0.016)	(0.015)	(0.015)
Creditors' recovery	0.653**	0.575*	0.608**			
	(0.299)	(0.304)	(0.305)			
Intangibles		−0.846***		−2.216***		
		(0.271)		(0.640)		
1-R&D ratio		−3.287**	−3.756***			−4.092***
		(1.456)	(1.377)			(1.446)
Non-fixed assets			−0.223		−0.768**	
			(0.207)		(0.388)	
Intangibles ×				1.325**		
Creditors' recovery				(0.637)		
Non-fixed assets ×					0.961**	
Creditors' recovery					(0.437)	
1-R&D ratio ×						0.566*
Creditors' recovery						(0.305)
Constant	−1.305***	2.293	2.546*	−0.291	−0.763***	2.722*
	(0.304)	(1.537)	(1.364)	(0.268)	(0.252)	(1.458)
F statistic	14.864	29.339	23.860	30.361	18.171	30.412
Number of months	198	198	198	198	198	198
Average adjusted R^2	0.021	0.027	0.028	0.023	0.024	0.025

[a] Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively.

Table V: continued

Panel B: Further Tests of the Model's Implications

	(1)	(2)	(3)	(4)	(5)	(6)
$H_0 : \frac{\partial \mathbb{E}\left(r_t - r_t^M \mid Max.\ Recovery\right)}{\partial\ Liquidation\ costs} = 0$						
Test statistic: $\hat{\phi}_0 + \hat{\phi}_1 \times$ *Max. Recovery*				-0.951	0.149	-3.551
Standard error				(0.330)	(0.270)	(1.488)
P-value				0.004	0.580	0.017
$H_0 : \mathbb{E}\left(r_t - r_t^M \mid Max.\ Recovery\right) - \mathbb{E}\left(r_t - r_t^M \mid Min.\ Recovery\right) = 0$						
At sample median of *Liquidation costs*				0.820	0.914	0.503
Standard error				(0.250)	(0.279)	(0.271)
P-value				0.019	0.014	0.233

[a] Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively.

Table VI: Market Beta and Strategic Default

This table shows estimates of regressions of individual firms' market betas on proxies for liquidation costs (*Intangibles* and *Non-fixed assets*), shareholders' bargaining power (*1-R&D ratio*), the efficiency of debt enforcement (*Efficiency*), and creditor's recovery rate (*Creditors' recovery*). The dependent variable (market beta) is estimated for every firm using at least 36 monthly observations against the local market index return over the period from 1989 to 2006 (market model). The other variables are defined in Table I. Monthly stock market data come from Datastream and CRSP, and annual financial statement data are from Worldscope and Compustat. Standard errors adjusted for clustering at firm level are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
Intangibles	−1.363***	−1.398***				
	(0.035)	(0.037)				
Intangibles ×	0.833***					
Creditors' recovery	(0.03)					
Intangibles ×		0.943***				
Efficiency		(0.032)				
Non-fixed assets			−0.042*	−0.172***		
			(0.022)	(0.023)		
Non-fixed assets ×			0.630***			
Creditors' recovery			(0.02)			
Non-fixed assets ×				0.704***		
Efficiency				(0.022)		
1-R&D ratio					−3.228***	−3.234***
					(0.058)	(0.067)
1-R&D ratio ×					0.330***	
Creditors' recovery					(0.013)	
1-R&D ratio ×						0.403***
Efficiency						(0.014)
Constant	1.151***	1.102***	0.523***	0.548***	3.741***	3.676***
	(0.013)	(0.013)	(0.010)	(0.010)	(0.058)	(0.066)
F statistic	757.158	744.299	1055.310	943.762	1792.656	1527.970
Number of obs.	21′446	18′525	21′554	18′609	21′904	18′911
Adjusted R^2	0.066	0.074	0.089	0.092	0.141	0.139

[a] Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively.

Table VII: Leverage and Strategic Default

This table shows Fama and MacBeth (1973) estimates of regressions of stock returns on proxies for liquidation costs (*Intangibles* and *Non-fixed assets*), shareholders' bargaining power (*1-R&D ratio*), and the efficiency of debt enforcement (*Efficiency*). For each country, we group firms into deciles. Panel A presents results for the high leverage firms (deciles 3 to 10), and Panel B presents the same regressions for low leverage firms (decile 1 and 2). The sample period is from 1989 to 2006. The dependent variable for each cross-sectional regression is a firm's monthly return in excess of the country's market return in the same month. The other variables are defined in Table I. Monthly stock market data come from Datastream and CRSP, and annual financial statement data are from Worldscope and Compustat. Standard errors adjusted for serial correlation (Newey-West) are in parentheses.

Panel A: High Leverage Firms

	(1)	(2)	(3)	(4)
Size	0.045	0.040	0.041	0.035
	(0.034)	(0.035)	(0.034)	(0.035)
Book to market	0.410***	0.407***	0.356***	0.352***
	(0.075)	(0.075)	(0.083)	(0.082)
Momentum	0.060***	0.061***	0.061***	0.063***
	(0.017)	(0.017)	(0.018)	(0.017)
Efficiency	0.891**	0.897**		
	(0.369)	(0.372)		
Intangibles	−0.301		−2.243***	
	(0.350)		(0.794)	
1-R&D ratio	−5.402***	−5.735***		
	(1.658)	(1.602)		
Non-fixed assets		−0.226		−1.148***
		(0.192)		(0.445)
Intangibles ×			2.000***	
Efficiency			(0.769)	
Non-fixed assets ×				1.395**
Efficiency				(0.547)
Constant	4.236**	4.585***	−0.195	−0.452*
	(1.729)	(1.631)	(0.307)	(0.251)
F statistic	15.209	13.784	13.334	10.640
Number of months	198	198	198	198
Average adjusted R^2	0.030	0.030	0.026	0.026

[a] Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively.

Table VII: continued

Panel B: Low Leverage Firms

	(1)	(2)	(3)	(4)
Size	0.080**	0.077*	0.062	0.053
	(0.040)	(0.040)	(0.041)	(0.041)
Book to market	0.561***	0.536***	0.477***	0.448***
	(0.094)	(0.090)	(0.111)	(0.106)
Momentum	0.057***	0.058***	0.056***	0.058***
	(0.019)	(0.019)	(0.020)	(0.019)
Efficiency	0.614	0.674*		
	(0.391)	(0.389)		
Intangibles	−1.141***		−2.745***	
	(0.276)		(0.823)	
1-R&D ratio	−4.175***	−4.106***		
	(1.563)	(1.452)		
Non-fixed assets		0.056		−0.406
		(0.281)		(0.492)
Intangibles ×			1.481	
Efficiency			(0.904)	
Non-fixed assets ×				1.004*
Efficiency				(0.521)
Constant	3.524**	2.948**	0.177	−0.680*
	(1.622)	(1.445)	(0.254)	(0.353)
F statistic	18.108	17.177	15.017	12.687
Number of months	198	198	198	198
Average adjusted R^2	0.041	0.042	0.033	0.034

[a] Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively.

Table VIII: Robustness to Additional Data Filters

This table shows Fama and MacBeth (1973) estimates of regressions of stock returns on proxies for liquidation costs (*Intangibles* and *Nonfixed assets*), shareholders' bargaining power (*1-R&D ratio*), the efficiency of debt enforcement (*Efficiency*), and creditors' recovery rate (*Creditors' recovery*). The sample period is from 1989 to 2006. The dependent variable for each cross-sectional regression is a firm's monthly return in excess of the country's market return in the same month. The other variables are defined in Table I. Monthly stock market data come from Datastream and CRSP, and annual financial statement data are from Worldscope and Compustat. Standard errors adjusted for serial correlation (Newey-West) are in parentheses.

	(1)	(2)	(3)	(4)
Size	0.010	−0.002	0.033	0.020
	(0.033)	(0.034)	(0.034)	(0.035)
Book to market	0.342***	0.328***	0.383***	0.364***
	(0.091)	(0.089)	(0.093)	(0.091)
Momentum	0.056***	0.060***	0.051***	0.055***
	(0.018)	(0.018)	(0.017)	(0.017)
Intangibles	−2.318***		−1.997***	
	(0.826)		(0.696)	
Intangibles ×	1.964**			
Efficiency	(0.814)			
Non-fixed assets		−1.070**		−0.794**
		(0.452)		(0.403)
Non-fixed assets ×		1.348**		
Efficiency		(0.547)		
Intangibles ×			1.408**	
Creditors' recovery			(0.674)	
Non-fixed assets ×				0.999**
Creditors' recovery				(0.455)
Constant	0.103	−0.184	0.017	−0.318
	(0.289)	(0.277)	(0.277)	(0.270)
F statistic	11.300	9.022	14.760	10.426
Number of months	197	197	197	197
Average adjusted R^2	0.028	0.029	0.025	0.027

[a] Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively.

Table IX: Robustness to Institutional Variables

This table shows Fama and MacBeth (1973) estimates of regressions of stock returns on proxies for liquidation costs (*Intangibles* and *Nonfixed assets*), shareholders' bargaining power (*1-R&D ratio*), the efficiency of debt enforcement (*Efficiency*), and creditors' recovery rate (*Creditors' recovery*). The sample period is from 1989 to 2006. The dependent variable for each cross-sectional regression is a firm's monthly return in excess of the country's market return in the same month. The other variables are defined in Table I. Monthly stock market data come from Datastream and CRSP, and annual financial statement data are from Worldscope and Compustat. Standard errors adjusted for serial correlation (Newey-West) are in parentheses.

	(1)	(2)	(3)	(4)
Stock market turnover	0.024	0.027	−0.019	−0.024
	(0.149)	(0.151)	(0.149)	(0.151)
Stock market cap to GDP	−0.102	−0.046	−0.023	0.041
	(0.166)	(0.169)	(0.175)	(0.178)
French	−0.178	−0.094	−0.074	0.037
	(0.180)	(0.179)	(0.188)	(0.185)
German	−0.432**	−0.380*	−0.293	−0.211
	(0.217)	(0.214)	(0.222)	(0.220)
Scandinavian	−0.276	−0.215	−0.094	−0.008
	(0.189)	(0.192)	(0.197)	(0.198)
Socialist	0.190	0.050	0.143	0.022
	(0.399)	(0.408)	(0.400)	(0.413)
Size	0.058	0.045	0.110***	0.093**
	(0.038)	(0.039)	(0.040)	(0.041)
Book to market	0.434***	0.406***	0.495***	0.454***
	(0.078)	(0.078)	(0.081)	(0.081)
Momentum	0.063***	0.066***	0.067***	0.070***
	(0.016)	(0.016)	(0.015)	(0.015)
Intangibles	−2.739***		−2.263***	
	(0.722)		(0.647)	
Intangibles ×	1.967**			
Efficiency	(0.806)			
Non-fixed assets		−1.105**		−0.796**
		(0.448)		(0.405)
Non-fixed assets ×		1.422***		
Efficiency		(0.524)		
Intangibles ×			1.216*	
Creditors' recovery			(0.71)	
Non-fixed assets ×				0.919**
Creditors' recovery				(0.468)
Constant	0.182	−0.391	−0.188	−0.750***
	(0.273)	(0.262)	(0.279)	(0.264)
F statistic	12.734	7.683	20.833	10.832
Number of months	198	198	198	198
Average adjusted R^2	0.045	0.046	0.039	0.040

[a] Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively.

Table X: Robustness to within-Firm and Serial Correlation

This table shows pooled OLS estimates of regressions of stock returns on proxies for liquidation costs (*Intangibles* and *Nonfixed assets*), shareholders' bargaining power (*1-R&D ratio*), the efficiency of debt enforcement (*Efficiency*), and creditors' recovery rate (*Creditors' recovery*). The sample period is from 1989 to 2006. The dependent variable for each cross-sectional regression is a firm's monthly return in excess of the country's market return in the same month. The other variables are defined in Table I. Monthly stock market data come from Datastream and CRSP, and annual financial statement data are from Worldscope and Compustat. Standard errors are computed by clustering across both firm and time and are reported in parentheses.

	(1)	(2)	(3)	(4)
Size	0.052	0.040	0.094***	0.078**
	(0.034)	(0.034)	(0.032)	(0.033)
Book to market	0.548***	0.521***	0.573***	0.539***
	(0.089)	(0.088)	(0.089)	(0.087)
Momentum	0.063***	0.064***	0.063***	0.064***
	(0.021)	(0.021)	(0.019)	(0.019)
Intangibles	−3.241***		−2.791***	
	(0.902)		(0.753)	
Intangibles ×	3.024***			
Efficiency	−0.978			
Non-fixed assets		−1.817***		−1.359***
		(0.536)		(0.452)
Non-fixed assets ×		2.021***		
Efficiency		−0.639		
Intangibles ×			2.174***	
Creditors' recovery			−0.798	
Non-fixed assets ×				1.479***
Creditors' recovery				−0.527
Constant	1.251***	1.049***	0.428*	0.089
	(0.238)	(0.238)	(0.223)	(0.215)
Monthly dummies	yes	yes	yes	yes
F statistic	131.741	127.664	117.622	113.175
Number of observations	1′820′969	1′840′467	2′077′894	2′103′115
Average adjusted R^2	0.016	0.016	0.013	0.012

[a] Estimates followed by ***, ** and * are statistically different from zero with 0.01, 0.05 and 0.1 significance levels, respectively.

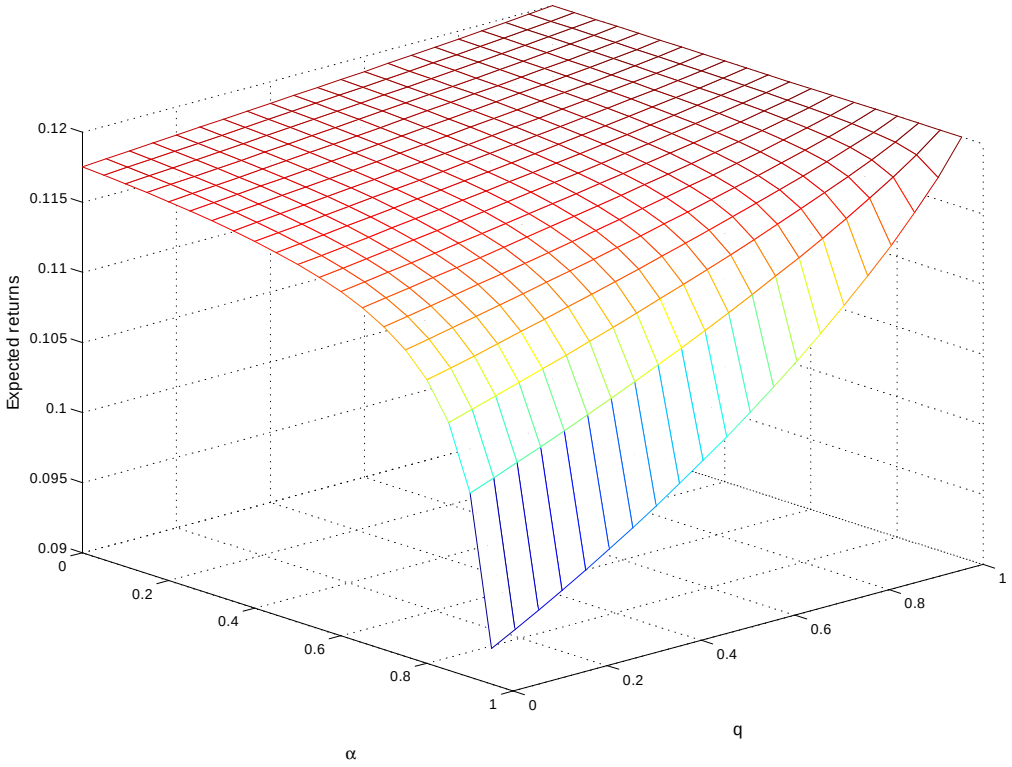

FIGURE 1: This figure shows the model's simulated expected returns as a function of the liquidation costs, α, and the probability of renegotiation failure, q in the model with debt-equity swap. The model's parameters have been set to $\tau = 0.35, X = 10, c = 5, r = 0.06, \mu = 0.02, \sigma = 0.3, \eta = 0.5$.

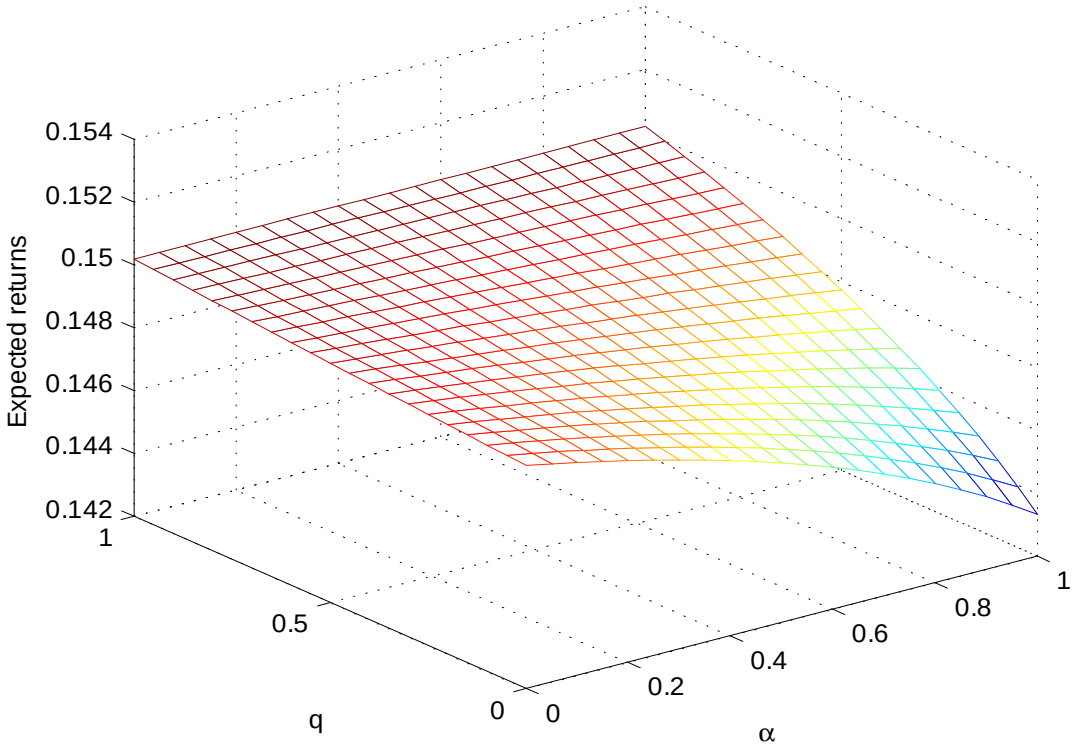

FIGURE 2: This figure shows the model's simulated expected returns as a function of the liquidation costs, α, and the probability of renegotiation failure, q in the model with strategic debt service. The model's parameters have been set to $\tau = 0.35, X = 10, c = 5, r = 0.06, \mu = 0.02, \sigma = 0.3, \eta = 0.5$.