Takeover Protections and Asset Prices*

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Abstract

We study the effects of takeover feasibility on asset prices and returns in a unified framework. We show theoretically that takeover protections increase equity risk, stock returns, and bond yields by removing a valuable put option to sell the firm, notably for firms approaching distress. We investigate these claims empirically and find that distressed firms experience a significant decrease in value and increase in returns and market betas after the passage of anti-takeover laws, in line with our predictions. At issue bond yields are also higher when an anti-takeover law is in effect. Consistent with the model, the effects of anti-takeover laws on stock returns, respectively bond yields, are greater when shareholders, respectively bondholders, have greater bargaining power.

Keywords: Equity risk, stock returns, bond yields, leverage, takeovers.

JEL Classification Numbers: G11, G12, G34.

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Decisions that affect the scope of firms are among the most important faced by management and among the most studied by academics. Takeovers are classic examples of such decisions. While research on takeovers has investigated a wide range of topics, we still know very little about the asset pricing implications of these major corporate events for potential targets. In this paper, we study the effects of takeover feasibility on stock returns and bond yields in a unified framework. We argue that takeovers provide a valuable put option for firms, notably those that are close to distress.[1] Takeover protections reduce the likelihood of a successful takeover and, therefore, lead to a decrease in shareholder wealth and to an increase in equity risk and expected stock returns. Similarly, as long as bondholders are able to extract a share of the takeover surplus, takeover protections reduce bond values and increase credit spreads. Using regulatory changes that have direct effects on acquisition markets, we present new evidence on the dynamics of equity prices, equity risk, and stock returns that is strongly supportive of the model predictions. We also show that changes in takeover statutes affect bond yields in accordance with the model predictions.

To demonstrate the effects of a shock to takeover feasibility on asset prices, we develop a stylized real options model in which a firm operates assets that generate uncertain cash flows and is financed with debt and equity. The firm faces the possibility of being taken over, which increases target shareholder value by providing a valuable exit option. Bondholders of the target firm may also be able to capture part of the takeover surplus, leading to a positive effect of takeovers on bond values and to a negative effect on credit spreads. Anti-takeover laws reduce the feasibility of takeovers. As a result, they reduce shareholder value and increase equity risk and expected stock returns. The model predicts that this is particularly true among distressed firms and firms in which shareholders have greater bargaining power, for which the exit option is more valuable. Anti-takeover laws also have a negative effect on bond values and a positive effect on bond yields and credit spreads. The

[1] Examples of a positive effect of takeovers on the values of distressed stocks abound. For instance, on June 21, 2011 Forbes reported that "Research In Motion shares staged an impressive rebound last week, aided in no small measure by reports that the company after its recent sharp slide could now be a takeover target."

model predicts that this is particularly true when the bargaining power of bondholders is high.

We test the model predictions using regulatory changes that have a direct effect on acquisition markets. Our primary set of tests focuses on the effects of U.S. state Business Combination (BC) laws on shareholder value, equity risk, stock returns, and bond yields.[2] In the Internet Appendix, we examine the effects of country-specific pro-takeover laws as well as the stringency of anti-competitive laws on the dynamics of equity risk and stock returns in an international sample of 43 countries.

We begin our empirical investigation by examining the effects of state anti-takeover laws in the U.S. on equity risk and stock returns. Our model predicts that takeover protections should affect equity betas. If one could measure betas perfectly, then looking solely at betas would suffice to test the model. There are, however, at least two potential issues with this approach. First, betas are time-varying and their estimates are subject to measurement error. Second, in the model, betas represent exposure to the priced risk in the firm's industry, and therefore might be different from market betas. Therefore, in our empirical tests, we follow the literature and examine the effect of anti-takeover laws on both returns (as well as factor model alphas) and betas.

We start by analyzing the returns and alphas from factor models in portfolios that contain stocks of companies incorporated in the U.S., in states either with or without a BC law. The portfolios are constructed on the full sample of stocks, and separately on the quintile of the most distressed stocks. Our tests demonstrate a large and statistically significant difference in returns for stocks of distressed companies incorporated in states that have passed a BC law versus distressed stocks in states that have not passed such a law, in line with the model predictions. We find no such effects on the full sample of firms.

[2]BC laws impose a moratorium on certain transactions (e.g., asset sales, mergers) between a large shareholder and the firm for a period ranging between three and five years after the shareholder's stake passes a pre-specified threshold, making hostile takeovers more difficult and often impossible (see e.g. Giroud and Mueller (2010)). Recent research by Karpoff and Wittry (2018) raises concerns about the use of anti-takeover laws for identification in the finance literature. We perform a large set of robustness checks to address these potential concerns. Furthermore, we note that we merely argue that any regulatory change that impedes the feasibility of takeovers affects stock returns and betas, particularly in distressed firms, as long as this change has not been fully anticipated by investors. Our approach is therefore less of a subject to endogeneity concerns.

Portfolio sorts provide a simple view of the relation between returns and factor loadings and the presence of anti-takeover laws in the state of incorporation. Another approach commonly used in the literature is Fama and MacBeth (1973) regressions. Using the passage of BC laws as a source of identifying variation, we examine if these laws have an effect on the returns of distressed firms. In these tests, the dependent variable is the excess stock return. The main independent variable is a dummy variable that equals one if the firm is incorporated in a state with a BC law and zero otherwise. In line with our model prediction, we find that the passage of BC laws has a significant positive effect on the returns of distressed stocks and that this effect is stronger when the bargaining power of the target shareholders is high. In addition, the relation between stock returns and the passage of BC laws in the state of incorporation is weaker for the full sample of firms.

Our model additionally predicts that anti-takeover laws should have a positive effect on equity betas, particularly among distressed firms. We test this prediction in two ways. First, we go back to portfolios of stocks incorporated in states with and without a BC law and examine the portfolio loadings from the CAPM and a six-factor model (the Fama-French (2015) five factors augmented with a momentum factor). Second, we estimate the effect of the enactment of a BC law in a state on market betas using a difference-in-differences regression. Both sets of tests provide strong support for our predictions. The first set of tests shows that the beta of the distress portfolio is larger in states with BC laws and the difference between betas in states with and without BC laws is highly statistically significant. The second set of tests reinforces our portfolio-based results and points towards a causal effect of anti-takeover laws on the betas of distressed firms.

In the Internet Appendix, we perform various robustness checks, including leaving out lobbying firms, using an alternative proxy for financial distress, investigating the effects of alternative second-generation anti-takeover laws (Fair Price and Control Share Acquisition laws), as well as excluding firms incorporated in Delaware. All these robustness tests show that the inferences do not change substantially when we include controls for these considerations.

To examine whether anti-takeover laws have an effect on stock prices as predicted by our model, we conduct an event study around the dates of the first newspaper reports on the BC laws as in Giroud and Mueller (2010). We find that the abnormal return over the two-day window surrounding the event for financially distressed stocks is -1.55% and highly statistically significant. While the corresponding abnormal return in the sample of all firms is also negative, it is much smaller in magnitude and lacks statistical significance, in line with our model prediction.

We next turn to investigating the effect of takeover legislation on bond yields. The evidence in the literature so far is inconclusive: Francis et al. (2010) find a negative effect of those laws on credit spreads, while Qiu and Yu (2009) document a positive effect. Our model predicts that at-issue bond yields should be positively affected by the presence of an anti-takeover law in the state of incorporation. Furthermore, this effect is expected to be stronger when bondholders' bargaining power is greater. To test these predictions, we collect a sample of bond issues from the Securities Data Corporation (SDC) New Issues database. To examine the effects of BC laws on bond yields, we follow Francis et al. (2010) and run panel regressions of at-issue bond spread-to-treasury on the dummy indicating the presence of a BC law in the state of incorporation and a set of bond-specific and firm-specific control variables. The results strongly corroborate the model prediction: Spreads-to-treasury on bonds issued by firms in states with a BC law in place are about 22 to 36 basis points higher than those on bonds issued by firms in states without a BC law.

In additional analysis, we test our second prediction about the effect of bondholders' bargaining power on the strength of the relation between shocks to takeover feasibility and bond yields. To this end, we augment our bond yield regressions with proxies for the bargaining power of bondholders and their interactions with the anti-takeover dummy. We use the four different proxies of Davydenko and Strebulaev (2007) for bonhdolders' bargaining power: The negative of the percentage of the firm's shares held by the CEO, the negative of CEO tenure, the presence of bond covenants, and institutional stock ownership. The results from these tests are generally consistent with the model:

With the exception of institutional ownership, all proxies for bondholders' bargaining power amplify the magnitude of the effect of BC laws on bond yields.

In the Internet Appendix we investigate the effect of takeover legislation on the riskiness of distressed stocks internationally. We perform several types of tests. First, we examine the effects of the passage of country-specific pro-takeover laws on the returns to distressed stocks by running cross-sectional firm-level Fama-MacBeth (1973) regressions. Second, we run difference-in-differences regressions of firm-level monthly market betas on a dummy variable that indicates the presence of a pro-takeover law in the firm's country of incorporation. Third, we take advantage of the merger control index developed by Bradford and Chilton (2018) for over 100 countries, with high values of the index indicating additional difficulties and regulatory hurdles that reduce the feasibility of a takeover. The results from these tests provide additional support for our model predictions: The passage of pro-takeover laws has a negative effect on market-adjusted returns of distressed stocks and their betas, while distressed stock returns tend to increase with the merger control index.

This paper continues a line of research using real options models to analyze mergers and acquisitions (M&As); see e.g. Lambrecht (2004), Morellec and Zhdanov (2005, 2008), Hackbarth and Morellec (2008), Margsiri, Mello, and Ruckes (2008), Bernile, Lyandres, and Zhdanov (2012), or Gorbenko and Malenko (2018).[3] Much of this literature analyzes the effects of M&As for bidding firms. A good example is Hackbarth and Morellec (2008), which characterizes the effects of M&As on the betas of bidding firms. We instead look at target firms with a focus on the relation between takeover protections and stock returns. We argue theoretically that takeover protections increase equity risk and stock returns in distressed firms and provide empirical support for these claims.

Our theory is based on the premise that takeovers create value and reduce risk for target shareholders. The most reliable evidence on whether control transactions create value for shareholders

[3]From a modeling perspective, our paper also relates to the literature that analyzes asset pricing implications of corporate investment decisions using real options models. See for example Carlson, Fisher, and Giammarino (2005, 2006), Garlappi, Shu, and Yan (2008), Gomes and Schmid (2010), Favara, Schroth, and Valta (2012), or Lambrecht, Pawlina, and Teixeira (2016).

draws on short-term event studies. Most event studies examine abnormal returns around merger announcement dates as an indicator of value creation (see Jensen and Ruback (1983), Jarrell, Brickley and Netter (1988), or Schwert (1996)). The evidence points to substantial gains for target shareholders in control transactions (see e.g. Andrade, Mitchell, and Stafford (2001)). There is a substantial literature connecting legislation deterring takeovers to shareholder value. Examining the second-generation of U.S. anti-takeover laws, Karpoff and Malatesta (1989) find abnormal returns of -0.29% in a two-day window starting on the day before the first announcement, or -0.47% for the subset of BC laws, although the abnormal returns are concentrated in firms with no pre-existing firm-level defenses. More recently, Giroud and Mueller (2010) conduct an event study around the dates of the first newspaper reports about the BC laws and find a significant cumulative abnormal return of -0.32%, with the effect being stronger in less competitive industries.

Our contribution with respect to this literature is to argue theoretically and show empirically that exogenous variation in takeover legislation has important effects on equity risk and stock returns, particularly among distressed firms, as well as on bond yields.

Our paper also relates to Cremers, Nair, and John (2009), which documents a positive relation between takeover likelihood and stock returns. The paper first estimates a logistic model to predict the probability that a firm becomes target in a takeover transaction and then examines returns to portfolios sorted on this probability. We take an alternative approach and try to identify exogenous shocks to takeover markets. Because the focus of our paper is on distressed stocks, it would be troublesome for us to follow Cremers, Nair, and John (2009) as many of the covariates used to estimate the takeover probability also have a direct effect on financial distress (e.g. leverage or return on assets) making it impossible to meaningfully interpret the results. Furthermore, many of these covariates directly predict stock returns, further complicating identification.

1 Model

We start our analysis with a model that illustrates the effects of takeovers on equity risk, expected stock returns, firm leverage, and credit spreads in the simplest possible setting. We follow Morellec and Zhdanov (2005, 2008) and consider an economy with two firms: a potential acquirer and a potential target. These roles are exogenously assigned and determined by firms' specific characteristics, not modelled in the paper. Each firm has rational expectations about the underlying uncertainty and the decision rules of the other firm. The target firm is levered and has assets that generate a continuous stream of cash flows $X_t dt$, where $(X_t)_{t\geq 0}$ is governed by:

$$dX_t = \mu X_t dt + \sigma X_t dW_t, \qquad X_0 = x, \tag{1}$$

where μ and $\sigma > 0$ are constant parameters and $(W_s)_{s\geq 0}$ is a standard Brownian motion. Because we want to derive predictions relating asset prices and returns to takeover protections, we consider in the following that there exists a traded asset with market beta β_X that is perfectly correlated with X, and a risk free bond with dynamics $dB_t = rB_t dt$. This allows us to construct a risk-neutral probability measure $\mathcal{Q}$ under which the drift rate of X is given by $r - \delta$ with $\delta > 0$.

Profits in the target firm are taxed at the constant rate $\tau > 0$. As a result, the target has an incentive to issue debt to reduce corporate taxes. As in, e.g., Leland (1994), Duffie and Lando (2001), or Morellec and Zhdanov (2008), we consider debt contracts that are characterized by a perpetual flow of coupon payments c. After debt has been issued, it may be optimal for target shareholders to default on the firm's debt obligations if conditions deteriorate sufficiently. As in, e.g., Leland (1994), a fraction α of asset value is lost as a frictional cost in default.

The bidder has a valuation $(1-\tau)V \geq \frac{c}{r}$ for the target firm,[4] i.e. its valuation of the target's

[4]We assume for simplicity that V is constant. Our results would be qualitatively unchanged if we assumed that V was positively related to X, with some restriction on the functional form of $V(X)$. For example $V(X)$ could be concave in X, which would also lead the bidding firm to initiate the takeover the first time that the target cash flows reach a lower threshold. Details are available upon request from the authors.

assets exceeds the risk-free value of the promised payments to debtholders in the target firm.[5] In addition, conditional on the bidder making an offer to the target, there is a probability $\lambda \geq 0$ that a takeover is successful. As we argue below, this probability depends on takeover laws so that the passage of an anti-takeover law should reduce λ. In case of a successful takeover, target shareholders and bondholders, respectively, extract a fraction $\eta \geq 0$ and $\varphi \geq 0$ of the takeover surplus where $\eta + \varphi \leq 1$. The expected gain to bidding shareholders conditional on an offer satisfies:

$$\mathcal{G}(X; c, \lambda) \equiv (1 - \eta - \varphi)\lambda \mathcal{S}(X; c) = (1 - \eta - \varphi)\lambda \left[(1 - \tau)V - V^S(X; c)\right]^+$$

where $\mathcal{S}(X; c)$ denotes the surplus generated by the takeover, $x^+ = \max\{0, x\}$, and $V^S(X; c)$ is the value of the target firm as a stand alone entity, given by (see the Internet Appendix for details)

$$V^S(X; c) = \underbrace{(1 - \tau)\frac{X}{\delta}}_{\text{Value of unlevered assets}} + \underbrace{\tau \frac{c}{r}\left[1 - \left(\frac{X}{X_D}\right)^{\xi}\right]}_{\text{Value of tax benefits}} - \underbrace{\alpha(1 - \tau)\frac{X_D}{\delta}\left(\frac{X}{X_D}\right)^{\xi}}_{\text{Value of default costs}}. \tag{2}$$

for all $X > X_D$, where X_D is the default threshold selected by target shareholders and $\xi < 0$ is the negative root of the equation $\frac{1}{2}\sigma^2 y(y-1) + (r - \delta)y - r = 0$. The timing of the takeover solves: $\max_{\theta_T} \mathbb{E}^{\mathcal{Q}}\left[e^{-r\theta_T}\mathcal{S}(X_{\theta_T}; c)\right]$, where θ_T is the endogenous time of the takeover. Because $V^S(X; c)$ is strictly increasing in the value of the cash flow shock X, the optimal policy for bidding shareholders is to initiate the takeover the first time that X reaches an endogenous lower threshold X_T, so that the time of the takeover is defined by $\theta_T \equiv \inf\{t \geq 0 : X_t = X_T\}$ and

$$\mathbb{E}^{\mathcal{Q}}\left[e^{-r\theta_T}\mathcal{S}(X_{\theta_T}; c)\right] = \left[(1 - \tau)V - V^S(X_T; c)\right]\left(\frac{X}{X_T}\right)^{\xi}.$$

[5] It could also be that fundamentals at the bidding firm change, making the acquisition more (or less) profitable from the bidder's perspective. We could assume for example as in Morellec and Zhdanov (2005) or Hackbarth and Morellec (2008) that the valuation of the target firm by the bidder follows a stochastic process so that the decision to take over the target is additionally driven by changes in this valuation. We do not explore this channel. Instead, the channel we have in mind in this paper is one in which the value of the target as a stand alone firm decreases, leading to larger benefits of an acquisition. This allows us to clearly identify a set of firms, i.e. distressed firms, that should be unambiguously affected by the passage of anti-takeover laws.

Solving for the value-maximizing takeover threshold yields

$$X_T = \frac{\xi}{\xi - 1}\delta\left[V - \frac{\tau c}{r(1-\tau)}\right]. \tag{3}$$

To determine the value of equity $E^T(X; c, \lambda, \eta)$ in the target firm, we conjecture (and later verify) that $X_T \geq X_D$. In addition, we assume that if the takeover attempt is unsuccessful at $X = X_T$, which occurs with probability $1 - \lambda$, the option of being taken over disappears. Target shareholders therefore get the cash flow stream $(1-\tau)(X-c)$ until the firm is taken over at $X = X_T$ with probability λ or defaults at $X = X_D$. Standard derivations show that for $X > X_T \geq X_D$:

$$E^T(X; c, \lambda, \eta) = \underbrace{(1-\tau)\left\{\frac{X}{\delta} - \frac{c}{r} + \left[\frac{c}{r} - \frac{X_D}{\delta}\right]\left(\frac{X}{X_D}\right)^{\xi}\right\}}_{\text{Stand-alone equity value } E^S(X;c)} + \underbrace{\lambda\eta\left[(1-\tau)V - V^S(X_T; c)\right]\left(\frac{X}{X_T}\right)^{\xi}}_{\text{Value (of the put option) of being taken over}}.$$

The first term on the right hand side of this equation is the sum of the unlimited liability value of equity and the value of the option to default (which is also equal to the stand alone value of equity). The second term captures the value of being taken over, which is the product of the probability of a successful takeover and the discounted gain from a takeover. The value of this option is zero if takeovers are not feasible ($\lambda = 0$) or if target shareholders have no bargaining power ($\eta = 0$).

Similarly, the value of debt in the target firm satisfies

$$D^T(X; c, \lambda, \varphi) = \underbrace{\frac{c}{r} + \left[(1-\tau)(1-\alpha)\frac{X_D}{\delta} - \frac{c}{r}\right]\left(\frac{X}{X_D}\right)^{\xi}}_{\text{Stand-alone debt value } D^S(X;c)} + \underbrace{\lambda\varphi\left[(1-\tau)V - V^S(X_T; c)\right]\left(\frac{X}{X_T}\right)^{\xi}}_{\text{PV of takeover surplus captured by debtholders}}.$$

where we assume (i) that the bidder buys back debt when acquiring the target firm and (ii) that debt covenants (restricting M&As) may allow debtholders in the target firm to capture part of the takeover surplus. The first two terms on the right hand side of this equation capture the stand-alone value of corporate debt, i.e. the present value of coupon payments and the recovery

in default. The last term captures the present value of the takeover surplus that debtholders can capture. According to this equation, debtholders receive the (fair) market value of their claim in case of a takeover plus part of the takeover premium if they have bargaining power. This expression shows that debt value increases with λ and φ so that the passage of anti-takeover laws should reduce the value of corporate debt and increase yield spreads.

If shareholders cannot commit to a default policy (as in e.g. Leland (1994), Duffie and Lando (2001), or Morellec and Zhdanov (2008)) and the option of being taken over is lost for $X < X_T$, the default threshold satisfies:

$$X_D = \frac{\xi}{\xi - 1}\frac{c}{r}\delta \leq X_T. \tag{4}$$

Using the expressions for the default and takeover thresholds we get the following result:

Proposition 1. *Denote by $E^S(X;c)$ and $D^S(X;c)$ the stand-alone values of equity and debt. When $X > X_T$, the values of the target's equity and debt are respectively given by*

$$E^T(X;c,\lambda,\eta) = E^S(X;c) + \lambda\eta\mathcal{S}(X;c) \text{ and } D^T(X;c,\lambda,\varphi) = D^S(X;c) + \lambda\varphi\mathcal{S}(X;c), \tag{5}$$

where the present value of the takeover surplus conditional on takeover consummation satisfies

$$\mathcal{S}(X;c) = \frac{1-\tau}{1-\xi}\left(\frac{X(\xi-1)}{\xi\delta}\right)^{\xi}\left[\left(V - \frac{\tau c}{r(1-\tau)}\right)^{1-\xi} + \left(\frac{\tau(1-\xi)}{1-\tau} - \alpha\xi\right)\left(\frac{c}{r}\right)^{1-\xi}\right] > 0, \tag{6}$$

with $\frac{\partial\mathcal{S}(X;c)}{\partial X} = \frac{\xi}{X}\mathcal{S}(X;c) < 0$. The expected return on the target's equity satisfies $ER^T = r + \beta^T\rho$, where ρ denotes the market risk premium and the beta of the target's equity is given by

$$\beta^T(X;c,\lambda,\eta) = \underbrace{\beta_X\frac{\frac{(1-\tau)X}{\delta}}{E^T(X;c,\lambda,\eta)}}_{\substack{\text{Contribution of asset beta}\\ \text{to equity beta}}} + \underbrace{\xi\beta_X\frac{\frac{(1-\tau)}{1-\xi}\left(\frac{X(\xi-1)}{\xi\delta}\right)^{\xi}\left(\frac{c}{r}\right)^{1-\xi}}{E^T(X;c,\lambda,\eta)}}_{\substack{\text{Contribution of option to default}\\ \text{to equity beta}}} + \underbrace{\xi\beta_X\frac{\lambda\eta\mathcal{S}(X;c)}{E^T(X;c,\lambda,\eta)}}_{\substack{\text{Contribution of takeover}\\ \text{option to equity beta}}}. \tag{7}$$

Equation (7) in Proposition 1 shows that the beta of the target's equity is a weighted average of the beta of assets, given by β_X, the beta of the option to default, given by $\xi\beta_X$, and the beta of the option of being taken over, given by $\xi\beta_X$. Because $\xi < 0$, the option of being taken over contributes negatively to equity risk. In addition, since $\frac{\partial \mathcal{S}(X;c)}{\partial X} = \frac{\xi}{X}\mathcal{S}(X;c) < 0$, a drop in firm cash flows leads to an increase in the weight of the option of being taken over in equity beta.

In our model, firms move away from financial distress as the level of cash flow increases and get closer to financial distress as the level of cash flow decreases towards the takeover threshold X_T. (In effect, the takeover threshold and the default threshold coincide when $(1-\tau)V = \frac{c}{r}$.) We can thus investigate the effects of takeover laws on the values and expected returns of healthy and distressed firms, respectively, by looking at the change in equity value and in beta due to a change in λ when X tends to infinity or when it tends to X_T. Using Proposition 1, we get that:

Corollary 1 (Takeover protections, equity value, and equity beta)**.** *The following holds:*

1. *Equity beta and the expected return on equity decrease with the likelihood of a successful takeover and with the bargaining power of shareholders in that* $\frac{\partial \beta^T(X_T;c,\lambda,\eta)}{\partial \lambda} < 0$ *and, for any* $\lambda > 0$, $\frac{\partial \beta^T(X_T;c,\lambda,\eta)}{\partial \eta} < 0$. *The change in equity beta due to the passage of anti-takeover laws (i.e due to a decrease in* λ*) becomes smaller as the firm's prospects improve since the takeover surplus decreases with* X*, in that* $\frac{\partial \mathcal{S}(X;c)}{\partial X} = \frac{\xi}{X}\mathcal{S}(X;c) < 0$*, while equity value* $E^T(X_T;c,\lambda,\eta)$ *increases with* X*. Because betas decrease with* η*, the effect of takeovers protections on betas and expected returns is stronger when target shareholders have more bargaining power.*

2. *Equity value increases with the likelihood of a successful takeover in that* $\frac{\partial E^T(X_T;c,\lambda,\eta)}{\partial \lambda} = \eta\mathcal{S}(X;c) > 0$. *The change in equity value due to anti-takeover laws is negative and decreases in magnitude as firms move away from distress in that*

$$\frac{\partial^2 E^T(X_T;c,\lambda,\eta)}{\partial \lambda \partial X} = \eta\frac{\xi}{X}\mathcal{S}(X;c) < 0. \tag{8}$$

3. *Corporate debt value increases with the likelihood of a successful takeover. The effect of takeover laws on debt value is stronger when bondholders have more bargaining power in that*

$$\frac{\partial D^T(X;c,\lambda,\varphi)}{\partial \lambda} = \varphi \mathcal{S}(X;c) > 0 \text{ and } \frac{\partial^2 D^T(X;c,\lambda,\varphi)}{\partial \lambda \partial \varphi} = \mathcal{S}(X;c) > 0. \tag{9}$$

Credit spreads at issue, $\frac{c}{D^T(X;c,\lambda,\varphi)} - r$*, increase with takeover protections, with an effect that is larger when bondholders bargaining power* φ *is greater.*

Corollary 1 shows that anti-takeover laws increase the risk of target firms. In effect, takeovers provide a valuable put option for target shareholders. Because put options have negative betas, they reduce a firm's equity beta and equity returns. The magnitude of the effects of takeovers on valuations and returns increases with the likelihood of the takeover. It also increases as the firm approaches distress and the weight of the put option associated with the takeover in the value of equity increases. Figure 1 illustrates these findings. The left panel plots the change in equity beta due to the passage of anti-takeover laws as a function of the cash flow shock X for levered and unlevered firms. The figure shows that the effects of takeover laws on betas are particularly important when firms are levered and approach financial distress. This is due to the fact that, absent takeovers, the beta of a levered firm increases as distress approaches while the beta of the unlevered firm is constant, equal to the asset beta. The right panel shows that the change in beta in levered firms due to the passage of anti-takeover laws increases with the probability of default. The vertical bars on the right panel represent the probability cut-offs for the most distressed and the most healthy firms in the data: Firms in the most distressed quintile (based on the CHS measure, see Section 2.1 for details) have estimated one-year default probabilities above 2%, while firms in the most healthy quintile have default probabilities below 0.2%.

Insert Figure 1 Here

Corollary 1 also shows that the value of corporate debt should decrease and therefore credit spreads on corporate debt should increase after the passage of anti-takeover laws. This leads to the following novel empirical predictions.[6]

Prediction 1 *Takeover protections increase equity risk and returns, especially in distressed firms. The effect of takeover protections on equity risk and returns is stronger when target shareholders have more bargaining power.*

This first testable implication follows directly from Corollary 1 and relates to the effects of takeovers on equity risk and expected stock returns. This prediction states that takeover protections increase equity risk and returns for all firms. But because the option of being taken over is larger for distressed firms, the effect is expected to larger among these firms. Because this empirical prediction is entirely novel, much of the empirical analysis is dedicated to its testing.

Prediction 2: *Takeover protections decrease shareholder value, especially in distressed firms.*

This second prediction also directly follows from Corollary 1 and provides a novel view on the relation between takeover protections and shareholder value. According to our model, the relation should be negative, but most of the effect should come from distressed firms.

Prediction 3 *Takeover protections increase credit spreads on corporate debt. The effect of takeover protections on bond credit spreads is stronger when bondholders have more bargaining power.*

This third testable implication follows directly from Corollary 1 and relates to the effects of takeovers on credit spreads. This first part of this prediction is consistent with the findings in Qiu

[6]Our model focuses on levered firms and shows that the passage of anti-takeover laws should have particularly large effects among financially distressed firms. Of course, if we instead considered that c was a constant flow cost, we would similarly get that the effect of the passage of anti-takeover law would be stronger among economically distressed firms. In our tests below, we proxy distress with financial distress as the empirical literature has developed a set of measures of financial distress that are likely highly correlated with any measure of economic distress one could construct. For example, the distress measure of Campbell et al. (2008) used in this paper relies among other firm characteristics on profitability, which presumably also captures economic distress. The correlation between this financial distress measure and profitability is -51.5% in our sample; see Table IA.5 in the Internet Appendix. Other components of the CHS measure, except for financial leverage, can also be interpreted as proxies for economic distress. Thus, our predictions are applicable to both financially and economically distressed firms.

and Yu (2009), but goes against those in Francis et al. (2010). The second part of the prediction about the effects of the bargaining power of bondholders is novel.

Remark: Note that anti-takeover laws may have an effect on optimal financing. In the special case where $\xi = -1$ (corresponding to specific restrictions for r, δ, and σ), it is possible to solve for the coupon payment that maximizes shareholder value in closed-form as

$$c^*(\lambda, \eta, \varphi) = \frac{r\tau \left[1 - \frac{\delta V}{4X}\lambda(\eta + \varphi)\right]}{\frac{2\tau}{1-\tau} + \alpha - \lambda(\eta + \varphi)\left(\frac{2\tau}{1-\tau} + \alpha + \frac{\delta V}{4X}\frac{\tau^2}{1-\tau}\right)}, \text{ with } \frac{\partial c^*(\lambda, \eta, \varphi)}{\partial \lambda} > 0. \tag{10}$$

The model therefore predicts that the passage of anti-takeover laws should decrease optimal leverage. However, it also predicts that the quantitative effects should be small.[7] Indeed, we find in a calibrated version of the model that halving the probability λ that the takeover is successful (from 40% to 20%) reduces optimal leverage from 35.1% to 33.5% when target shareholders and debtholders can each extract 10% of the takeover surplus. While distressed firms are not at their optimal leverage, firms that issue debt in our empirical analysis of at-issue bond yields may be moving towards their optimal leverage. In this analysis we therefore control for leverage.

2 Anti-takeover laws, risk, and returns: Evidence from U.S. stocks

Our first empirical prediction relates the riskiness and returns of distressed firms' stocks to the market for mergers and acquisitions, and in particular, to the feasibility of takeovers. To test this prediction, we examine the risk and return dynamics of distressed stocks around the enactment of second-generation state anti-takeover laws in the U.S.. These laws have been implemented to reduce the threat of hostile takeovers and, therefore, present a natural setting to study how betas and stock returns react to a change in the likelihood of a takeover.

Our tests focus on state Business Combination (BC) laws and use other types of laws (Fair

[7] Consistent with this result, and in line with the evidence in Wald and Long (2007), we find no effect of takeover laws on leverage ratios in the data; see Tables 1 and IA.1.

Price and Control Share Acquisition laws) in robustness tests reported in the Internet Appendix. We focus on BC laws because they have been extensively studied. BC laws impose a moratorium on certain kinds of business combination transactions (e.g., asset sales, mergers, share exchanges) between a large shareholder and the firm for a period usually ranging between three and five years after the shareholder's stake passes a pre-specified (minority) threshold. Our main hypothesis is that distressed firms can benefit from a takeover as the acquiring firm can provide additional resources and potentially rescue the target from distress or alleviate its severity. BC laws pose significant challenges to conducting hostile takeovers and, hence, make this channel less feasible (see e.g. Giroud and Mueller (2010) or Gormley and Matsa (2016)). Table IA.2 in the Internet Appendix indeed shows that there is a strong *negative* effect of the enactment of BC laws on the probability that a distressed firm becomes a target in a takeover, thereby validating our use of BC laws to proxy for the likelihood of such acquisitions.[8]

Recent research by Karpoff and Wittry (2018) raises concerns about the use of anti-takeover laws for identification. As they argue, the inference can be muddled by other anti-takeover laws, firm-level takeover defenses, and important court decisions. In addition, some firms lobbied for state anti-takeover laws and therefore those laws are not exogenous to those firms. We perform a multitude of robustness checks to address these potential concerns in Table IA.3 of the Internet Appendix. Furthermore, we note that our goal is to study the asset pricing implications of takeover markets, not their effect on firms' decisions. Our approach is therefore less subject to endogeneity concerns. We merely argue that regulatory changes that impede the feasibility of hostile takeovers have a certain effect on equity prices and stock returns and betas, particularly those of distressed firms, as long as those changes have not been fully anticipated by investors long in advance.

[8]It is generally considered that anti-takeover laws further insulate the entrenched managers of potentially inefficiently run firms. We examine in Table IA.2 whether this mechanism is at play for financially distressed firms.

2.1 Data

Our main data source for U.S. companies is Compustat for accounting data and CRSP for stock prices and returns. Our tests in this section are targeted at the effects of state anti-takeover laws on equity prices, stock returns, and betas. We start our sample in 1988 to make sure that we have enough states with an anti-takeover law at any given point in time. This ensures that we have at least 15% of states that have an anti-takeover law in place in any given year.

Our main tests rely on the staggered enactments of BC laws in various states (we also examine the effect of alternative anti-takeover laws in robustness tests). Our sample is comprised of about 1.9 million firm-months, of which about 350 thousand firm-months belong to states with no BC law in effect, and the remaining firm-years are in states that passed a BC law. We follow Bertrand and Mullainathan (2003), Atanassov (2013), and Karpoff and Wittry (2018) in constructing a sample of state anti-takeover laws.[9] The dates of these laws are reported in Table IA.4. Out of the 50 states and the District of Columbia, 31 states passed a BC law. Most states passed BC laws in the late 1980s, with New York being the first state that passed a law (in 1985), and Iowa and Texas being the last, with both states passing anti-takeover laws in 1997. In 1988, when we start our sample, seven states have a BC law in place—Arizona, Indiana, Kentucky, Minnesota, Missouri, New Jersey, and New York. The large increase in the percentage of firms in states with a law in 1989 is due to the adoption of a BC law by Delaware, the state that hosts the majority of the firms in our sample (about 53%). In the Internet Appendix, we verify that our results are robust to the exclusion of Delaware.

Insert Table 1 Here

Our objective in this section is to examine the effects of the passage of BC laws on the risk and

[9] As Karpoff and Wittry (2018) argue, three of passage dates in Atanassov (2013) and Bertrand and Mullainathan (2003) are subject to errors, and three states with laws are not included (Oregon, Iowa, and Texas). In our analysis we update our set of laws accordingly.

returns of distressed firms' stocks, as classified by the financial distress measure from Campbell, Hilscher, and Szilagyi (2008), hereafter 'CHS'. As we argue above (see footnote 6), the CHS measure identifies both financially and economically distressed firms. We use the Merton/KMV measure in robustness tests in the Internet Appendix (Table IA.3), which also provides details on the construction of these measures of distress. In addition to our distress measure, Table 1 also reports the various control variables used in our regressions. We winsorize all variables at the 1st and 99th percentiles. For each variable, we first calculate the cross-sectional mean and median. We then report the time-series averages of these means and medians. The average firm in our sample exhibits characteristics that are similar to those reported in prior studies with a market capitalization of about $2.5 billion, a market-to-book ratio of 2.5, and a book leverage of 0.34. Interestingly, and as discussed in footnote 6, anti-takeover laws have no material effect on leverage ratios. Table IA.5 in the Internet Appendix presents the correlation matrix for our main variables. Consistent with the construction of the CHS distress measure, financially distressed stocks tend to be smaller and have lower market-to-book ratios, lower past returns, be less profitable and more highly levered and invest less. On the other hand, large firms tend to be more profitable, use more debt and exhibit lower distress levels. Naturally, size is positively correlated with past returns.

2.2 Portfolio tests

To study the effect of anti-takeover laws on the returns of distressed stocks, we sort all stocks into two portfolios each month, containing stocks of companies incorporated in states with and without an anti-takeover law (ATL) as of the year of portfolio formation. We exclude the year of the passage of the law to eliminate any potential anticipation effect prior to the formal enactment of a law. In addition, because our model predicts a differentiated effect of takeover feasibility on distressed versus solvent stocks, we perform these portfolios sorts for the full sample of stocks, and separately for the subsample of the most distressed stocks. For that purpose, each month we sort all stocks

into quintiles based on the CHS measure. We define stocks in the top quintile as most distressed ones. The portfolios are value-weighted and held for one month.

Our model predicts that takeover protections affect equity betas. Removing the option to be taken over leads to an increase in equity betas and, therefore, in stock returns. If one could measure true betas without error, examining their dynamics around enactments of state anti-takeover laws would constitute a direct test of our model. However, there are two potential issues with tests that rely exclusively on betas: Betas are subject to measurement errors; and the nature of risk that drive return dynamics can be industry specific and different from market betas. The empirical literature that examines the implications of real option models on equity risk and returns has focused on both returns and factor model alphas (e.g. Carlson, Fisher, and Giammarino (2005), Garlappi, Shu, and Yan (2008), Gomes and Schmid (2010), and Chaderina, Weiss, and Zechner (2022)) as well as betas (Hackbarth and Morellec (2008), Garlappi and Yan (2011), Favara, Schroth, and Valta (2012), and Choi (2013)). In our empirical tests, we follow the literature and examine the effect of anti-takeover laws on both mean excess returns and alphas from traditional asset pricing models. We also study the direct effect of these laws on CAPM betas in Sections 2.4 and 2.5.

Insert Table 2 Here

Panel A of Table 2 shows the portfolios' mean excess monthly returns (in excess of the risk-free rate) and alphas from factor models. The CAPM uses the market factor. The factors in the three-factor model are the Fama and French (1993) factors. The factors in the four-factor model are the Fama-French three factors augmented with the momentum factor. The factors in the five-factor model are the Fama and French (2015) factors. The factors in the six-factor model are the Fama-French five factors augmented with a momentum factor.

The results in Table 2 demonstrate a significant difference in returns to ATL (stocks of companies

incorporated in states that have passed a BC law) versus no-ATL (stocks in the states that have not passed such a law) portfolios for the subsample of distressed stocks, in line with the predictions of the model. The differences in monthly returns and portfolio alphas to ATL and no-ATL distress portfolios are economically large and highly statistically significant. In terms of mean excess returns, the ATL distress portfolio outperforms the no-ATL portfolio by 0.85% per month.[10] The differences in monthly alphas from factor models vary from 0.72% for the Fama-French three-factor model to 0.82% per month for the six-factor model. There is no evidence, however, that the ATL portfolio outperforms the no-ATL on the sample of all stocks. If anything, the opposite obtains. We show in Table 2 Panel B that this non-statistically significant effect is driven by very large firms that are most likely to be acquirers (not targets).[11] When we exclude large-cap stocks, classified as the top 5% by NYSE breakpoints, which is common in the literature, the ATL portfolio outperforms the no-ATL portfolio on the sample of all stocks but the effect is not statistically significant. This result is consistent with our model that predicts a stronger effect for distressed stocks.

2.3 Fama-MacBeth regressions

Portfolio sorts provide a simple view of the relation between returns and factor loadings and the presence of anti-takeover laws in the state of incorporation. An additional approach commonly used in the literature is Fama and MacBeth (1973) regressions. Beyond serving as an additional diagnostic check, these regressions offer the advantage of controlling for other well-known determinants of the cross-sectional patterns in returns (in the previous section we control for these determinants by relying on alphas from various factor models) and thus check for the marginal effect of the anti-takeover laws.

[10] While magnitudes might appear high, they are not surprising given the well-documented tendency of distressed stocks to generate returns that are substantially different from returns to healthy stocks. For example, Campbell, Hilscher, and Szilagyi (2008) document a three factor alpha of the portfolio long in most solvent stocks and short in most distressed stocks of 22.65% a year. This is referred to as a "distress risk puzzle"; see the Internet Appendix.

[11] Because large firms are more likely to be the acquirers of the (risky) distressed firms, we expect the returns and betas of these large firms to be negatively affected by the passage of anti-takeover laws. Results in Table 2 are consistent with this conjecture.

In this section, we use these cross-sectional regressions and report the results in Table 3. The dependent variable is the excess stock return while the main independent variable is a dummy variable that equals one if the firm is incorporated in a state with a BC law and zero otherwise.

To test the effect of shareholders' bargaining power in takeovers on the strength of the relationship between the presence of an ATL law and stock returns, we augment the regression specifications by a proxy of shareholders' bargaining power, $D\$CAR$, and its interaction with the ATL dummy. This proxy is based on the average relative dollar gain to target firms in the same 2-digit SIC industry in the prior year (see Phillips and Zhdanov (2013)). We follow Ahern (2012) and compute the relative dollar gain to the target firm as the difference between the dollar gains to the target and the acquirer firms in a three-day window surrounding the merger announcement date (dollar gain in each day equals the abnormal return on that day multiplied by the equity market value on the prior day), divided by the sum of the target's and acquirer's market equity values as of 50 trading days prior to the announcement date. Abnormal returns are estimated by the market model using the equally weighted market portfolio from 239 to 6 trading days prior to the announcement day.

Control variables include the logarithm of market capitalization, the logarithm of the market-to-book ratio, the past six-month return, profitability, and investment. We winsorize all independent variables at the 1% and 99% levels to reduce the impact of outliers. All reported coefficients are multiplied by 100 and we report Newey-West (1987) corrected (with twelve lags) t-statistics in parentheses. To isolate the effect of BC laws on distressed stocks, we run the cross-sectional Fama-MacBeth regressions on the full sample and separately for the subsample of the most distressed stocks (top CHS quintile).

Insert Table 3 Here

Results in Table 3 show that there is a significant positive effect of BC laws on the returns of distressed stocks (t-statistic of 2.47 in the specification with controls). The effect is also economically

large: After controlling for usual determinants of stock returns, distressed stocks earn about 0.36% a month more in the states with an anti-takeover law relative to those without a law. While the ATL also has a positive effect on returns in the sample of all stocks, the magnitude of this effect is three times smaller than in the sample of distressed stocks, consistent with Prediction 1. The coefficients on the control variables show the usual patterns: Returns are generally negatively related to size, market-to-book, and investment, and positively related to profitability and past return. Returns to distressed stocks also in general have a higher sensitivity to firm characteristics such as size, market-to-book, and investment, consistent with the finding in the literature that return anomalies are stronger in distressed firms' stocks (see, e.g. Avramov, Chordia, Jostova, and Philipov (2013)).

In line with Prediction 1, the effect of the ATL dummy on distressed stocks returns is stronger when target shareholders have greater bargaining power vis-à-vis those of the acquiring firm. When the bargaining power of target shareholders is high, they are likely able to extract a greater share of the takeover surplus, which magnifies the effect of takeovers on stock returns.

To summarize, the cross-sectional regressions of Table 3 and the portfolio sort results of Table 2 show the importance of the presence of an anti-takeover law in a state for the returns to stocks of firms incorporated in that state, and particularly distressed firms. As our model predicts, anti-takeover laws lead to higher returns for distressed stocks (and predicts a weaker effect for healthy stocks). Both portfolio sort results and regression-based evidence yield support for this prediction.

2.4 Factor model loadings

Our model generates specific predictions for the betas of distressed firms. A legislative act that makes it hard to conduct hostile takeovers should have a positive effect on the firm's risk and its equity beta and this effect is expected to be the strongest for distressed firms. To look more closely at the risk attributes of distressed stocks in relation to anti-takeover laws, we go back to portfolios of stocks incorporated in states with and without a business combination law, whose returns are

reported in Table 2. Table 4 reports the CAPM alphas as well as loadings from the Fama-French (2015) five-factor model, augmented with the momentum factor. As in Table 2, we report results for all stocks, and separately for the most distressed stocks (top CHS quintile).

The results in Table 4 show that, as predicted, the CAPM betas of distressed stocks are higher in ATL states than in no-ATL states. Not surprisingly, distressed stocks tend to have higher than average betas in general, both in ATL and no-ATL states. More importantly, and consistent with the model predictions, the beta of the ATL state distress portfolio is 1.83 while it is 1.65 for the no-ATL states. The difference between these betas of 0.18 is highly statistically significant. There is no such effect in the portfolios of all stocks: In the full sample there is virtually no difference in the betas of ATL state and no-ATL state portfolios, both betas being close to one.

Insert Table 4 Here

The results in Table 4 also show that distressed stocks tend to load positively on the SMB (size) and negatively on the RMW (profitability) and MOM (momentum) factors. These loadings are expected as distressed stocks are generally smaller, less profitable, and have low past returns. However, between the ATL and no-ATL portfolios of distressed stocks there are no significant differences in the loadings on return factors. Overall, the data exhibit the expected pattern: The riskiness of distressed firms (as measured by beta) is higher in states that have a BC law in place.

2.5 Difference-in-differences

Our portfolio results demonstrate that the betas of distressed stocks are higher in states with BC laws than in those without such laws, consistent with the prediction of the model that anti-takeover laws increase the riskiness of distressed firms. In addition to portfolio-based tests, we can also use a difference-in-differences methodology to study how distressed firm betas react to the passage of

BC laws in the states that enact such laws relative to those states that do not.[12] Because slightly less than half of all states never passed a BC law, we can measure the marginal change in betas around the enactment of the laws in treated states relative to a similar change in control states. A further advantage is that different states passed the laws at different times, which allows a given state to be both a treatment (if it has already passed a law) and a control (if it has not).

In this section we follow this path and, as before, divide all stocks into equal-sized quintiles according to the financial-distress measure from Campbell et al. (2008). For the full sample and for the subsample of distressed firms (top quintile), we construct state-wide portfolios. We then estimate the market beta of each state-wide portfolio in each month by regressing the value-weighted daily excess return of the portfolio on the market daily excess return during the month.[13] To capture the effect of anti-takeover laws on firm betas, we adopt a difference-in-differences methodology and define an ATL dummy that indicates whether or not the state has an anti-takeover law by year t. We set the ATL dummy to one in the years following the enactment of an anti-takeover law in a state and set it to zero in the years before the enactment year and in all years in the states with no anti-takeover law. We control for size and book-to-market, defined as the value-weighted means of the logarithm of the firms' market capitalization and of the book leverage in the state-wide portfolio. In addition, to check for any potential existence of trends in betas preceding the years in which anti-takeover laws had been enacted, we include two time dummies $Before^1$ and $Before^2$ that indicate years one and two prior to the enactment year. As standard in the difference-in-differences methodology, we include state fixed effects to account for determinants of state-portfolio betas as well as time fixed effects to absorb potential economy-wide shocks. For these tests, we start our sample in 1982, three years prior to the first enactment of a BC law (in New York state).

[12] This methodology has been used to study the effect of anti-takeover laws on corporate governance and managerial discipline (Bertrand and Mullainathan (2003)), on operating performance in relation to industry competitiveness (Giroud and Mueller (2010)), or on corporate innovation (Atanassov (2013)).

[13] We also provide a difference-in-differences analysis of firm-level betas in Table IA.7 of the Internet Appendix. The results are consistent with those reported in Table 5. We believe that our main portfolio level tests are more reliable due to potentially large estimation errors arising when estimating stock-level betas.

The results from these difference-in-differences regressions are presented in Table 5. The first two columns present the results for the full sample (with just the ATL dummy and with a full set of control variables) while the last two present the results for the subsample of the most distressed stocks. While there is no significant effect of the ATL dummy on the betas for the full sample of stocks, the effect is positive and statistically significant in the sample of the most distressed stocks. The effect is also economically large: An enactment of a business combination law increases distressed firm betas by about 0.13, on average, relative to the states that pass no law.[14] There is no evidence on any pre-trends in betas of distressed firms; the regression coefficients on the $Before^1_{i,t}$ and $Before^2_{i,t}$ dummies are statistically indistinguishable from zero.

Insert Table 5 Here

Overall, the evidence from the difference-in-differences tests reinforces our portfolio-based results and points toward a causal effect of anti-takeover laws on the betas of distressed firms. The model predicts a quantitatively small effect for healthy stocks that might be hard to measure due to the noise in the estimates of betas. This potentially explains the absence of a robust relation between ATL laws and stock betas in the sample of all firms.

3 Anti-takeover laws and shareholder value

We next turn to testing the second prediction of the model on the effect of takeover protections on shareholder value in distressed firms. Our main hypothesis is that anti-takeover laws reduce the likelihood of being acquired for distressed firms, leading to a drop in their equity value. We

[14] As we argue above, estimates of betas are subject to measurement errors. This problem is further exacerbated for financially distressed stocks, whose betas vary over time as the stocks move closer or further away from bankruptcy. Furthermore, distress stock returns can be sensitive to other sources of risk in addition to market risk. For example, a wave of bankruptcies in the energy sector in 2015 had been largely driven by historically low oil prices. Therefore, it is hard to draw precise quantitative parallels between our return-based and beta-based evidence. Rather, we interpret both pieces of evidence as supporting the predictions of our model

therefore expect ATL announcements to cause a drop in distressed equity values and hence to generate negative abnormal returns to distressed firms around ATL announcement dates.

We test this prediction by exploiting the staggered enactments of BC laws in various states, as described in Section 2.1. Specifically, we follow Giroud and Mueller (2010) and conduct an event study to examine the market reaction to the announcements of anti-takeover laws in various states. As Karpoff and Malatesta (1989) and Giroud and Mueller (2010) argue, the enactment date by itself is likely well anticipated and hence is unlikely to contain any new information and cause a significant reaction in equity values. Consistent with this conjecture, Karpoff and Malatesta (1989) find no significant abnormal returns when using the passage dates of the anti-takeover laws, but find significant stock price reaction when using the first date of a newspaper report as the event date. We therefore follow Giroud and Mueller (2010) and use the first dates of newspaper articles on an impending anti-takeover law as event dates. These dates are available for 19 states, representing close to 90% of all firms in our sample incorporated in the states with ATL laws.[15]

Our event study methodology closely follows Karpoff and Malatesta (1989) and Giroud and Mueller (2010). To address potential cross-sectional correlation of standard errors at the firm level, we form state portfolios and examine abnormal announcement returns at the state level. For each state portfolio j, we estimate the market model using CRSP daily equity returns from 241 to 41 trading days prior to the event date. That is, we estimate:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + e_{jt}, \tag{11}$$

where R_{jt} is the daily return of the equally weighted portfolio of all firms incorporated in state j and R_{mt} is the daily return of the equally weighted CRSP market portfolio. The abnormal return of the state portfolios is computed as the raw return less the fitted value from the market

[15] We are grateful to Xavier Giroud for providing the set of these event dates.

model: $AR_{jt} = R_{jt} - \hat{R}_{jt}$. The cumulative abnormal return (CAR) during a multiple-day window is obtained as the sum of the daily abnormal returns during the window.

Insert Table 6 Here

Table 6 reports cumulative abnormal returns for the same time intervals as Karpoff and Malatesta (1989) and Giroud and Mueller (2010): [-40,-2], [-30,-2], [-20,-2], [-10,-2], [-3,-2], [-1,0], [1,2], and [1,10], where day 0 is the event date. As in our main set of tests, we perform the event study on the full sample as well as on the subsample of financially distressed

The results in Table 6 are consistent with the prediction of the model on the negative effect of ATL enactments on the equity values of distressed stocks.[16] The abnormal return over the two-day window surrounding the event is -1.55% for financially distressed stocks and is highly statistically significant. While the corresponding abnormal return in the sample of all firms is also negative, it is much smaller in magnitude and lacks statistical significance. There is no evidence of any significant run-up in returns prior to the announcement dates, nor are there any post-event trends in returns. Thus, the evidence in Table 6 supports the prediction of our model on the effect of anti-takeover laws on firm values, and in particular those of distressed firms.

4 Anti-takeover laws and bond yields

In this section, we test our predictions about the effect of takeover feasibility on the at-issue bond yield spreads. The prediction that at-issue bond yields should be positively affected by the presence of an anti-takeover law in the state of incorporation is examined in section 4.2. The second prediction that the effect of anti-takeover laws on at-issue bond yields is greater when bondholders

[16] Our results for the full sample are qualitatively similar to those reported by Giroud and Mueller (2010). The difference in results is likely due to the updates that Compustat implements to their files over time. We get results that are quantitatively much closer to Giroud and Mueller (2010) when using Compustat legacy files as of 2006.

have greater bargaining power is in turn examined in section 4.3. Importantly, these predictions apply to all bonds, not just those issued by distressed firms.

4.1 Data and variables

Following Francis et al. (2010), we collect bond issue data from the Securities Data Corporation (SDC) New Issues database. For our analysis, we require the availability of data on the issue amount, yield, coupon rate, time to maturity, lead underwriter, leverage, profitability, takeover vulnerability, and state of incorporation. To keep our analysis consistent with Francis et al. (2010), we exclude regulated utilities and financials.

Our resulting sample contains 3,127 bond issues by U.S. corporations over the period 1990-2017. Table 7 presents the summary statistics for the main variables used in our analysis, where we report means and medians separately for firms incorporated in states with and without ATL. *Spread-to-treasury* is the issue's yield to maturity over that of the Treasury note with similar maturity. *Issue size* is the natural logarithm of the issue's proceeds scaled by the book value of total assets. *High yield* is a dummy variable set equal to one for non-investment grade bonds and set equal to zero for investment-grade ones. *Credit rating* is the firm's Moody's bond rating. We measure credit rating as in Klock, Mansi, and Maxwell (2005) and Francis et al. (2010) by assigning numerical values to Moody's ratings in a linear process, where higher values of the credit rating indicate lower probability of default as perceived by Moody's. *TTM* is the bond's maturity in years. *Senior* is a dummy variable set equal to one for senior bonds. *Call* is a dummy variable indicating callable bonds. *Multiple issuers* is a dummy variable set to one for firms issuing bonds more than once over the sample period. *PLUW* a dummy variable indicating if the issue is being written by a prestigious bond underwriter.[17] In addition to bond-specific variables, we collect firm-specific

[17]We determine lead underwriters' prestige based on the top-ten list in the *Financial Times* league tables. These include JP Morgan, Goldman Sachs, Bank of America Securities, Morgan Stanley, Citigroup, Barclays, Credit Suisse, Wells Fargo, Deutsche Bank, Evercore Partners, CITIC Securities, and BNP Paribas. Our results are robust to other classifications, including the eight underwriters used in Francis et al. (2010).

variables from Compustat. *ROA* is the return on assets, calculated as earnings before interest, tax, depreciation, and amortization divided by total assets. *Takeover vulnerability* is a measure ranging from 1 (least vulnerable) to 7 (most vulnerable), computed by 7 minus the Bebchuk, Cohen, and Ferrell (2009) entrenchment index (this index ranges from 0 to 6 based on the presence of six firm-level provisions: staggered boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, and supermajority requirements for mergers and charter amendments). Leverage is calculated as the ratio of long-term debt to total assets.

With a few exceptions, bonds and issuers in ATL and no-ATL states exhibit similar characteristics. The average issuance proceeds in our sample is $628 million. The average credit rating in ATL (no ATL) states is 9.86 (10.24), which is roughly equivalent to Baa. About 98% of bond issues are senior. The average bond issue is relatively long-term with about 11 years to maturity. As much as 98% of the firms in our sample issue at least two bonds. A notable difference between bond issues by firms incorporated in ATL and no-ATL states is the difference in spread-to-treasury: Bonds issued by firms in ATL states tend to have higher spreads (185.3 basis points versus 143.4 in no-ATL states, where the t-statistic of the difference is 6.50). This preliminary univariate evidence is consistent with the prediction of the model: Bonds in ATL states are riskier due to the lack of the put option and hence demand higher yields. Note, however, that bond issues in ATL versus no ATL differ along some other dimensions. For example, a higher percentage of ATL bonds are high yield bonds (about 18% of ATL bonds are high-yield, versus 7% in no-ATL states). Naturally, high yield bonds exhibit greater spread-to-treasury. These differences highlight the importance of controlling for various bond (and firm) characteristics when comparing yields of bonds in ATL and no-ATL states. We perform such an analysis below in Section 4.2.

In general, our sample of bond issues shares mostly similar characteristics with the sample in Francis et al. (2010). A notable difference is with respect to spread-to-treasury of bond issues in ATL versus no-ATL states. While in our sample bond issues by firms in ATL states have higher

yields at issuance (in excess of the yield on treasuries with a similar maturity), this relationship is reversed in Francis et al (2010). These differences are most likely due to different sample periods: Our sample period spans 28 years of data and ends in 2017, covering a total of 3,127 bond issues, while Francis et al. (2010) sample ends in 2000, covering a total of 938 bond issues.

4.2 The effect of ATL laws on bond yields

As in Francis et al. (2010), this section examines the effect of anti-takeover laws on bond at-issuance yields while controlling for additional issue and firm characteristics that are likely to affect bond yields. To this end, we run panel regressions of at-issue bond spread-to-treasury on the ATL dummy and a set of bond-specific and firm-specific control variables discussed above. To control for industry-specific determinants of credit spreads, we include industry dummies (using two-digit SIC codes). We also include year dummies to account for general time-varying shocks to credit markets. To further address potential correlation of residuals for firms with multiple bond issues, we cluster standard errors by firm. Because a large fraction of bond issues is made by firms incorporated in Delaware (69%), we also report results while excluding those firms, to make sure our results are not driven by this one state.

Most of our control variables are expected to have a direct effect on bond yields. In particular, we expect a negative relation between the size of the issue and bond yields, as large issues are more likely made by large firms which are presumed to be less risky. It is also conceivable that firms with multiple issues have well-established relationships with underwriters and therefore are viewed by the latter as more transparent and less risky, resulting in lower yields. On the contrary, riskier low credit rating bonds naturally demand additional compensation in the form of greater yields. Most important for our analysis are the coefficients on the ATL dummy. Our theory predicts positive coefficients as removing the valuable option to be taken over (akin to a put option) from the firm makes debt claims riskier and results in higher spreads on new issues. The results from the bond

yield regressions are reported in columns (1) to (3) of Table 8. As expected, firms with large issues and multiple issues tend to enjoy lower spreads. Issues by prestigious underwriters also tend to have lower yields. Not surprisingly, there is a strong negative association between credit rating and spread-to-treasury. Profitable firms are able to negotiate lower yields.

Insert Table 8 Here

We are particularly interested in the coefficients on the ATL dummies in Table 8. Those coefficients are positive and statistically significant in all specifications, indicating a positive association between the presence of a state anti-takeover law and bond yields. This evidence is consistent with the prediction of our model that reducing takeover feasibility should increase bond yields by removing an option to be acquired. As we show theoretically in Section 1, this effect prevails despite the reduction in optimal leverage due to the shock to takeover probability. As follows from Table 8, the effect of ATL on bond yield is economically large: After controlling for other determinants of bond yields, bonds issued by firms incorporated in states with an anti-takeover law exhibit yields of 22-35 basis points higher than the yields on bonds issued by firms in no-ATL states (the effect is even larger at 32-55 basis points when excluding Delaware firms).

Our results are consistent with the evidence in Qiu and Yu (2009), whose analysis relies on the University of Houston Fixed Income Database and whose sample period is 1976 to 1996. They are however different from those reported by Francis et al. (2010), who generally find a negative effect of anti-takeover laws on bond credit spreads. When we rerun our bond yield regressions on the sample that spans years 1990 to 2000 (as in Francis et al. (2010)), the coefficients on the ATL dummy indeed flip signs. Note however that our sample is more heavily populated towards the later period and the 1990-2000 accounts for only 11.3% of all bond issues. We therefore attribute the difference in our results to the specific sample period used by Francis et al. (2010).

4.3 The effect of bondholders' bargaining power

Our model predicts that the magnitude of the effect of anti-takeover laws on bond yields depends on the bargaining power of bondholders vis-à-vis equityholders. Greater bargaining power allows bondholders to extract a greater share of the takeover surplus. Therefore, anti-takeover laws are expected to have a stronger effect on bond yields when bondholders enjoy greater bargaining power.

This section tests this model prediction by investigating the role of bondholders' bargaining power in the relation between bond yields and takeover likelihood. We follow Davydenko and Strebulaev (2007) and use several proxies of bondholders' bargaining power. Our first measure is based on the presence of bond covenants in that bonds protected by covenants improve bondholders' bargaining position. Second, we use the negative of the percentage of the firm's shares held by the CEO. Firms with larger CEO shareholdings exhibit greater shareholder bargaining power. For example, Betker (1995) finds that an increase in CEO shareholdings leads to sizable deviations from the absolute priority rule in Chapter 11. Bondholders are likely to have less negotiation power vis-à-vis strong CEOs. Our third proxy for bondholders' bargaining power is the negative of CEO tenure. As Davydenko and Strebulaev (2007) argue, entrenched CEOs with high firm-specific human capital as measured by their tenure are likely to hold a stronger position against the bondholers in negotiations. We collect the data on CEO sharehodlings and CEO tenure from Execucomp. Our final proxy is institutional equity ownership, given by the percentage of equity held by institutional investors. Institutional investors are more sophisticated and better coordinated and therefore are likely to exhibit stronger bargaining power. Note, however, that among the four proxies for bondholders' bargaining power that we employ in our analysis, the (negative) of the institutional equity ownership is conceivably the weakest one, as firms with large institutional stock ownership (and therefore greater shareholder bargaining power) are also likely to have greater institutional bond ownership (and therefore greater bondholder bargaining power).

To examine the effect of bondholders' bargaining power on the strength of the relation between the presence of a state anti-takeover law and bond yields, we add our proxies for bondholders' bargaining power as well as their interactions with the ATL dummies to our bond yield regressions from Section 4.2. In these tests, we employ the identical set of controls but only report coefficients on the bargaining power measures (as well as their interactions) to conserve space.

Insert Table 9 Here

The results from these tests are reported in Table 9. With the exception of the (negative) institutional equity ownership, coefficients on the interaction terms are positive and statistically significant, indicating a stronger effect of anti-takeover laws on bond yields when bondholders have higher bargaining power. This result is in line with the prediction of the model: Greater bargaining power allows bondholders to negotiate a greater share of the takeover surplus. Note, that as we discuss above, it might not be surprising to find no effect of institutional equity ownership as it is likely correlated with institutional bond ownership and hence it is harder to isolate the effect of bondholders' bargaining power using that measure.

5 Conclusion

We study the effects of takeover feasibility on asset prices and returns in a unified framework. We show theoretically that takeover protections increase equity risk, stock returns, and bond yields by removing a valuable put option to sell the firm when approaching financial (or economic) distress, while pro-takeover legislation changes should have the opposite effect. We empirically investigate these predictions by looking at the return dynamics in distressed firms around the enactment of anti-takeover laws in the US. We also examine how bond yields are affected by the presence of an anti-takeover law in the firm's state of incorporation.

Our approach is multi-faceted. We analyze the returns and factor loadings of portfolios that contain stocks of companies incorporated in states with or without anti-takeover laws. We also run Fama-MacBeth cross sectional regressions on a dummy indicating the presence of an anti-takeover law. We additionally study the riskiness (betas) of portfolios in states with or without anti-takeover laws as well as the effect of anti-takeover laws on betas in a difference-in-differences setting. To study the effect of anti-takeover statutes on bond yields, we run panel regressions of at-issue bonds' spread-to-treasury on the dummy indicating the presence of a BC law in the state of incorporation and a set of bond-specific and firm-specific control variables.

We obtain multiple results that are consistent with the predictions of the model. In particular, portfolios of distressed stocks in states with anti-takeover laws outperform similar portfolios in states without anti-takeover laws both in terms of returns and alphas obtained from traditional factor models. Consistent with the notion that anti-takeover laws increase equity risk in distressed firms, our analysis of factor loadings and the difference-in-differences tests show a positive relation between the betas of distressed firms and the enactment of anti-takeover laws. We also find that the passage of anti-takeover laws has larger effects on the returns of distressed stocks when the bargaining power of target shareholders is high, in line with our theoretical prediction. Furthermore, by using the publication dates of anti-takeover laws in the U.S., we find that distressed firms experience a significant abnormal stock price decline around the date of the first newspaper report on the BC law. The effect of anti-takeover laws on bond yields is also consistent with the model predictions: At-issue yields are higher in states with an antitakeover law in place, and the effect on yields is stronger when bondholders' bargaining power is high.

Our auxiliary international tests provide further support for the predictions of the model. In an international sample of 43 countries, we find that distress stock returns are negatively affected by the passage of pro-takeover laws. We also find a positive relation between returns to distressed stocks and the stringency of merger competition laws as proxied for by the merger control index.

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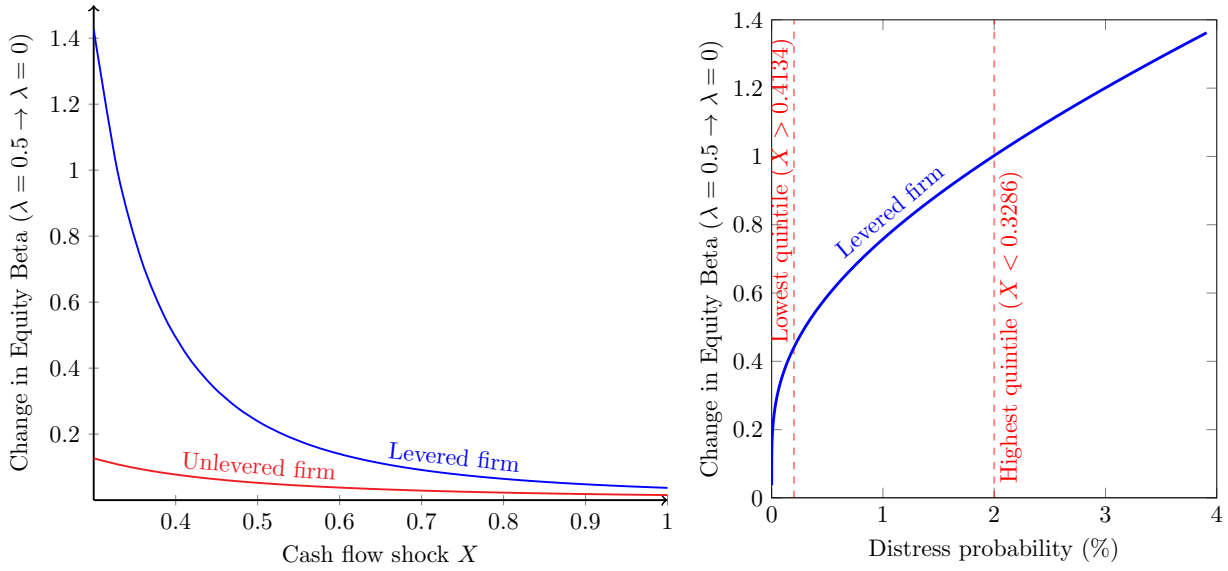


Figure 1: **Change in Beta Due to the Passage of Anti-Takeover Laws**: The left panel plots the change in equity beta due to the passage of anti-takeover laws as a function of the cash flow shock when the firm is levered (blue line) and when the firm is unlevered (red line). The right panel plots the change in equity beta due to the passage of anti-takeover laws as a function of the one-year default probability for a levered firm (using the same range of cash flow values). The vertical red dashed lines indicate the default probability cutoff levels for firms in the lowest quintile (probability of default lower than 0.2%) and for for firms in the highest quintile (probability of default greater than 2%). Input parameter values are set as follows: $r = 0.05$, $\mu = 0.02$, $\sigma = 0.3$, $\alpha = 0.5$, $\tau = 0.15$, $\eta = 0.2$ and $c = 0.6$ (value-maximizing coupon when $X = 1$).

Table 1: Summary Statistics

The table presents data for the full CRSP/Compustat firm population over the period 1988-2017, and separately for firms incorporated in states with and without anti-takeover Business Combination law (ATL). See Table A.1. for the dates of anti-takeover laws. All variables are winsorized at the 1st and 99th percentiles. For each variable, we first calculate the cross-sectional mean and median across stocks. We then report the time-series averages of these means/medians. Size is the equity value of the underlying stock (in billions of dollars). Market-to-book of the underlying stock is the ratio of current equity market value to equity book value as of the previous quarter. Past return of the underlying stock is the cumulative return over the past six months. Book leverage is the book value of debt divided by book value of assets. Profitability is the annual income before extraordinary items divided by the previous year's book equity value. Investment is the annual change in gross property, plant, and equipment, plus the change in inventories, scaled by lagged book value of assets. CHS is the distress measure from Campbell, Hilscher, and Szilagyi (2008).

		All states	No ATL	ATL
	# firm-months	1,935,322	352,373	1,582,949
Size	Mean	2.565	2.338	2.605
	Median	0.242	0.153	0.253
Market-to-book	Mean	2.522	2.274	2.544
	Median	1.715	1.588	1.734
Past stock return	Mean	0.053	0.046	0.054
	Median	0.024	0.016	0.025
Book leverage	Mean	0.340	0.333	0.341
	Median	0.312	0.313	0.313
Profitability	Mean	0.013	0.011	0.015
	Median	0.084	0.081	0.085
Investment	Mean	0.070	0.079	0.069
	Median	0.039	0.046	0.039
CHS distress level	Mean	-7.323	-7.201	-7.341
	Median	-7.654	-7.476	-7.677

Table 2: Returns of Portfolios of Stocks in States with and without Anti-Takeover Laws

Each month we divide all stocks into two portfolios, which contain stocks of companies incorporated in states with and without an anti-takeover law (ATL). The portfolios are value-weighted and held for one month. The table shows the portfolios' mean excess monthly stock returns (in excess of the risk-free rate) and alphas from factor models. The CAPM uses the market factor. The factors in the three-factor model are the Fama and French (1993) factors. The factors in the four-factor model are the Fama-French three factors augmented with a momentum factor. The factors in the five-factor model are the Fama and French (2015) factors. The factors in the six-factor model are the Fama-French five factors augmented with a momentum factor. The portfolios are applied to the full sample of firms, and to a subsample of financially distressed firms, classified by the top quintile based on the financial-distress measure from Campbell et al. (2008). The sample in Panel A includes all stocks, and the sample in Panel B excludes large-cap stocks, defined as the top 5% by NYSE breakpoints in each month. All returns and alphas are in percent per month and the corresponding t-statistics are in parentheses. The sample period is 1988-2017.

	Panel A. All-size stocks						Panel B. Excluding large-cap stocks					
	Full sample			Distressed firms			Full sample			Distressed firms		
	No ATL	ATL	Diff	No ATL	ATL	Diff	No ATL	ATL	Diff	No ATL	ATL	Diff
Mean excess return	0.80	0.67	-0.13	-0.89	-0.04	0.85	0.61	0.74	0.13	-0.95	-0.12	0.83
	(3.37)	(3.09)	(-1.21)	(-1.49)	(-0.07)	(2.41)	(2.46)	(2.73)	(1.70)	(-1.78)	(-0.23)	(2.89)
CAPM alpha	0.11	-0.02	-0.13	-2.04	-1.31	0.73	-0.08	-0.04	0.04	-2.03	-1.36	0.68
	(1.15)	(-1.03)	(-1.22)	(-4.25)	(-3.81)	(2.04)	(-0.71)	(-0.39)	(0.58)	(-4.95)	(-4.03)	(2.36)
3-factor alpha	0.14	-0.03	-0.17	-2.06	-1.34	0.72	-0.20	-0.12	0.08	-2.13	-1.43	0.69
	(1.42)	(-1.96)	(-1.59)	(-4.69)	(-4.49)	(2.01)	(-2.70)	(-2.59)	(1.16)	(-6.06)	(-5.57)	(2.40)
4-factor alpha	0.11	-0.02	-0.13	-1.54	-0.74	0.80	-0.14	-0.03	0.11	-1.71	-0.87	0.84
	(1.11)	(-1.31)	(-1.21)	(-3.65)	(-2.96)	(2.19)	(-1.94)	(-0.75)	(1.68)	(-5.07)	(-4.21)	(2.88)
5-factor alpha	0.10	-0.03	-0.13	-1.49	-0.71	0.77	-0.22	-0.13	0.09	-1.59	-0.83	0.76
	(0.98)	(-2.26)	(-1.21)	(-3.44)	(-2.60)	(2.07)	(-2.87)	(-2.67)	(1.27)	(-4.63)	(-3.60)	(2.52)
6-factor alpha	0.08	-0.03	-0.11	-1.12	-0.29	0.82	-0.17	-0.06	0.11	-1.30	-0.43	0.87
	(0.78)	(-1.78)	(-0.96)	(-2.71)	(-1.31)	(2.19)	(-2.34)	(-1.47)	(1.66)	(-3.96)	(-2.50)	(2.87)

Table 3: Fama-MacBeth Regressions on Anti-Takeover Law for Distressed Firms

We run cross-sectional Fama and MacBeth (1973) regressions each month of excess stock returns. The main independent variable is a dummy variable that equals one if the firm is incorporated in a state with anti-takeover law (ATL) and zero otherwise. D$CAR is a proxy for shareholders' bargaining power in takeovers. ATL×D$CAR is the interaction term of the shareholders' bargaining power and the ATL dummy. The control variables include the log market capitalization, log market-to-book ratio, past six-month return, profitability, and investment intensity. We run the regressions on the full sample and on a subsample of financially distressed firms, classified by the top quintile based on the financial-distress measure from Campbell et al. (2008). All coefficients are multiplied by 100 and Newey-West corrected t-statistics (with twelve lags) are in parentheses. The sample period is 1988-2017.

	Full sample			Distressed firms		
Cnst	-0.10	1.60	1.81	0.33	4.67	5.01
	(-0.35)	(2.33)	(2.41)	(0.67)	(5.34)	(5.06)
ATL dummy	0.31	0.12	0.07	0.23	0.36	0.16
	(3.16)	(2.23)	(0.75)	(1.28)	(2.47)	(0.60)
D$CAR			0.91			-6.42
			(0.57)			(-1.40)
ATL×D$CAR			0.85			9.37
			(0.64)			(2.05)
Log(size)		-0.04	-0.04		-0.41	-0.40
		(-0.87)	(-1.00)		(-5.46)	(-5.08)
Log(market-to-book)		-0.43	-0.49		-0.69	-0.76
		(-4.55)	(-4.86)		(-5.90)	(-6.29)
Past return		0.58	0.50		0.22	0.15
		(2.46)	(2.12)		(0.96)	(0.61)
Profitability		0.35	0.32		0.08	0.04
		(2.92)	(2.71)		(0.74)	(0.30)
Investment		-1.29	-1.55		-2.03	-2.14
		(-6.05)	(-6.54)		(-6.90)	(-5.70)

Table 4: CAPM Beta and Six-Factor Model Loadings

Each month we divide all stocks into two portfolios, which contain stocks of companies incorporated in states with and without anti-takeover law (ATL). The portfolios are value-weighted and held for one month. The table shows the portfolios' loadings from the CAPM and a six-factor model (the Fama-French (2015) five factors augmented with a momentum factor). The portfolios are applied to the full sample of firms and to a subsample of financially distressed firms, classified by the top quintile based on the financial-distress measure from Campbell et al. (2008). The t-statistics are in parentheses. The sample period is 1988-2017.

	Full sample			Distressed firms		
	No ATL	ATL	Diff	No ATL	ATL	Diff
CAPM Beta	0.98	0.99	0.00	1.65	1.83	0.18
	(41.90)	(258.80)	(0.20)	(14.55)	(22.41)	(2.08)
6-factor model						
EMKT	1.00	1.00	0.00	1.11	1.26	0.15
	(35.48)	(261.15)	(-0.04)	(9.94)	(20.84)	(1.46)
SMB	0.00	-0.03	-0.03	0.89	0.78	-0.11
	(0.12)	(-5.89)	(-0.86)	(6.18)	(9.99)	(-0.85)
HML	-0.10	0.03	0.13	-0.26	-0.15	0.11
	(-1.95)	(4.88)	(2.45)	(-1.31)	(-1.37)	(0.61)
RMW	0.06	0.02	-0.04	-1.16	-1.11	0.05
	(1.32)	(2.78)	(-0.88)	(-6.14)	(-10.85)	(0.30)
CMA	0.01	0.00	-0.02	0.41	0.16	-0.25
	(0.22)	(-0.38)	(-0.25)	(1.50)	(1.07)	(-1.00)
MOM	0.03	-0.01	-0.04	-0.59	-0.68	-0.08
	(1.41)	(-3.69)	(-1.79)	(-6.65)	(-14.01)	(-1.01)

Table 5: Difference-in-Differences for Market Beta

Each month we divide all stocks into equal-sized quintiles according to the financial-distress measure from Campbell et al. (2008). For the full sample and for a subsample of distressed firms (top quintile), we construct state-wide portfolios. We estimate the market beta of each state-wide portfolio in each month by regressing the value-weighted daily excess return of the portfolio on the market daily excess return during the month. We estimate the effect of passing the anti-takeover law (ATL) in a state on market beta using the difference-in-differences regression (IA.25). We report regression coefficients and t-statistics are in parentheses. The sample period is 1982-2017.

	Full sample		Distressed firms	
Cnst	1.40	1.11	1.09	-0.90
	(18.86)	(10.78)	(3.77)	(-2.94)
ATL dummy	-0.01	0.02	0.14	0.13
	(-0.89)	(0.98)	(2.42)	(2.04)
State-mean log(size)		0.03		0.20
		(7.58)		(20.28)
State-mean leverage ratio		-0.29		-0.27
		(-6.81)		(-3.44)
Before[1]		0.11		0.00
		(3.68)		(-0.04)
Before[2]		0.07		0.01
		(2.50)		(0.11)

Table 6: Event study results

The table shows average abnormal returns of state-wide portfolios around the announcement of the passage of antitakeover laws in the states. The announcement dates are provided by Giroud and Muller (2010) and include 19 states over the years 1985-1991. We first compute the equal-weighted average daily stock returns of all firms incorporated in each state. For each state-portfolio, we estimate the market model from 241 to 41 trading days prior to the event (announcement) date, using the equally weighted market portfolio. For each day around the event, the abnormal return is given by the portfolio return minus the fitted value from the market model. The windows around the event (day 0) cover the period from 40 days prior to the event to 10 days after the event, and are specified in the left column on the table. If the announcement was made on a non-trading day, we specify the next trading day as the event date. We conduct the event study on the full sample and on the subsample of the most financially distressed stocks, classified by the top quintile based on the financial-distress measure from Campbell et al. (2008). The numbers reported in the table are the cumulative abnormal returns of the 19 state-portfolios, where all returns are expressed in percentage points and t-statistics are reported in parentheses.

	Average abnormal return	
Window around the event	Full sample	Distressed firms
$[-40, -2]$	0.66	-0.94
	(0.89)	(-0.31)
$[-30, -2]$	0.33	-0.41
	(0.56)	(-0.15)
$[-20, -2]$	0.04	0.69
	(0.10)	(0.31)
$[-10, -2]$	0.24	0.77
	(0.90)	(0.68)
$[-3, -2]$	-0.11	0.29
	(-0.66)	(0.40)
$[-1, 0]$	-0.25	-1.55
	(-1.51)	(-2.83)
$[1, 2]$	0.05	-0.01
	(0.34)	(-0.01)
$[1, 10]$	0.06	-2.09
	(0.11)	(-0.94)

Table 7: Summary Statistics for the bond sample

The sample contains 3,127 bond issues of U.S. corporations over the period 1990-2017 obtained from the SDC Platinum database. The table presents variable means and medians separately for firms incorporated in states with and without anti-takeover Business Combination law (ATL). Spread-to-treasury is the issue's yield to maturity over that of the Treasury note with similar maturity (in basis points). Issue size is the (log of) the issue's proceeds over book value of total assets. High yield is a dummy variable that denotes non-investment grade. Credit rating is the firm's Moody's bond rating (higher values indicate higher rating). TTM is the bond's maturity in years. Senior is a dummy variable denoting bond seniority. Call is a dummy variable denoting bond callability. PLUW a dummy variable indicating if the issue is being written by a prestigious bond underwriter. Multiple issuers is a dummy variable denoting firms issuing bonds more than once over the sample period. ROA is the return on assets, estimated by earnings before interest, tax, depreciation, and amortization divided by total assets. Takeover vulnerability is a measure ranging from 1 (least vulnerable) to 7 (most vulnerable), computed by 7 minus the Bebchuk, Cohen, and Ferrell (2009) entrenchment index. Leverage is calculated as the ratio of long-term debt to total assets.

		All states	No ATL	ATL
	# bond issues	3,127	165	2,962
Spread-to-treasury	Mean	183.1	143.4	185.3
	Median	135.0	125.0	138.0
Issue size	Mean	3.34	3.21	3.35
	Median	3.42	3.43	3.41
ROA	Mean	0.18	0.18	0.18
	Median	0.16	0.18	0.16
PLUW	Mean	0.90	0.82	0.91
	Median	1.00	1.00	1.00
High yield	Mean	0.18	0.07	0.18
	Median	0.00	0.00	0.00
Credit rating	Mean	9.88	10.24	9.86
	Median	10.00	10.00	10.00
TTM	Mean	11.56	11.07	11.59
	Median	10.14	10.11	10.14
Senior	Mean	0.98	0.99	0.98
	Median	1.00	1.00	1.00
Call	Mean	0.83	0.78	0.83
	Median	1.00	1.00	1.00
Multiple issuers	Mean	0.98	0.99	0.98
	Median	1.00	1.00	1.00
Takeover vulnerability	Mean	4.01	3.57	4.03
	Median	4.00	3.00	4.00
Leverage	Mean	0.26	0.27	0.26
	Median	0.24	0.26	0.24

Table 8: Regressions of New Issue Bond Spreads on Anti-Takeover Law Dummies

The sample contains 3,127 bond issues of U.S. corporations over the period 1990-2017 obtained from the SDC Platinum database. We run a pooled regression of the bond's yield, measured by spread-to-treasury, on the dummy variable that equals one if the issuing firm is incorporated in a state with anti-takeover law (ATL) and zero otherwise (with and without the state of Delaware). The control variables include the variables described in Table 7 plus year and industry dummies (not reported). All coefficients are multiplied by 100 and t-statistics are in parentheses, where the standard errors are clustered by firm. We run the regression on all bonds, not just those issued by distressed firms, in accordance with the model prediction.

	All States			Excluding Delaware		
Cnst	-28.27	233.16	237.73	195.65	242.21	213.14
	(-1.03)	(6.59)	(6.67)	(5.13)	(3.13)	(2.86)
ATL dummy	35.79	22.21	22.70	55.05	32.86	36.51
	(1.96)	(2.55)	(2.64)	(2.42)	(2.70)	(2.71)
Issue size	45.29	3.72	3.63	35.35	3.19	4.27
	(10.27)	(1.80)	(1.76)	(6.41)	(0.84)	(1.14)
ROA	-364.40	-105.16	-103.77	-380.98	-120.16	-116.04
	(-5.39)	(-3.39)	(-3.35)	(-4.78)	(-2.15)	(-2.18)
PLUW	-34.96	-13.90	-13.84	-54.92	-39.69	-40.65
	(-3.30)	(-1.81)	(-1.81)	(-3.33)	(-3.37)	(-3.42)
High yield		133.98	134.44		144.19	140.97
		(12.42)	(12.47)		(7.81)	(7.39)
Credit rating		-19.10	-19.37		-15.39	-13.91
		(-11.96)	(-11.70)		(-6.11)	(-5.54)
TTM		1.37	1.37		1.30	1.29
		(8.77)	(8.76)		(5.18)	(5.25)
Senior		35.72	35.38		68.22	65.53
		(2.33)	(2.31)		(1.49)	(1.40)
Call		12.69	12.20		8.93	10.81
		(2.06)	(1.95)		(0.77)	(0.96)
Multiple Issuers		-48.07	-46.36		-53.25	-63.55
		(-2.51)	(-2.42)		(-1.56)	(-1.88)
Takeover Vulnerability		2.07	2.08		1.43	1.60
		(0.86)	(0.87)		(0.36)	(0.41)
Leverage			-13.44			66.88
			(-0.57)			(1.46)

Table 9: Effect of Bondholder Bargaining Power

We add to the regression in Table 8 interaction terms between the ATL dummy variable and proxies for the bargaining power of the bondholders against shareholders. The proxies include a dummy variable that equals one if the bond issue includes covenants and zero otherwise, (minus of) the fraction of equity owned by the firm's CEO, (minus of) the CEO's tenure with the firm (in years), and (minus of) the fraction of equity held by institutional investors. For conciseness the table shows only the interaction terms variables. We run the regression on all bonds, not just those issued by distressed firms, in accordance with the model prediction.

	Bondholders bargaining power measure			
	Bond Covenants	(-)CEO Ownership	(-)CEO Tenure	(-)Institutional Ownership
ATL dummy	20.08	26.21	34.75	22.32
	(2.18)	(1.89)	(2.24)	(0.49)
Bond bargaining	-19.29	-55.03	-1.79	17.41
	(-1.95)	(-2.34)	(-2.33)	(0.27)
ATL*Bond bargaining	21.87	49.38	2.26	-0.13
	(2.03)	(2.12)	(2.42)	(0.00)

Internet Appendix to

"Takeover Protections and Asset Prices"

IA1 Model

We consider a model with two firms: a target and an acquirer. The target firm is levered and has assets that generate a continuous stream of cash flows $X_t dt$, where $(X_t)_{t\geq 0}$ is governed by:

$$dX_t = (r-\delta)X_t dt + \sigma X_t dW_t, \qquad X_0 = x, \tag{IA.1}$$

where $\delta < r$ and $\sigma > 0$ are constant parameters and $(W_s)_{s\geq 0}$ is a standard Brownian motion. The firm is taxed at the rate τ and has issued debt with promised coupon c to save on taxes. While debt provides tax benefits, it can also lead to default. In case of default, a fraction α of asset value is lost as a frictional cost.

IA1.1 Value of the stand-alone firm

Under these assumptions, the value of the firm's equity and debt if there is no possibility of takeover are given by

$$E^S(X;c) = \max_{\theta_D}\left\{\mathbb{E}^{\mathcal{Q}}\left[\int_0^{\theta_D} e^{-rt}(1-\tau)(X_t - c)dt\right]\right\}, \tag{IA.2}$$

and

$$D^S(X;c) = \mathbb{E}^{\mathcal{Q}}\left[\int_0^{\theta_D} e^{-rt}c dt + e^{-r\theta_D}(1-\alpha)(1-\tau)\frac{X_D}{\delta}\right], \tag{IA.3}$$

where $\theta_D \equiv \inf\{t \geq 0 : X_t = X_D\}$. Standard derivations show that:

$$E^S(X;c) = (1-\tau)\left\{\frac{X}{\delta} - \frac{c}{r} + \left[\frac{c}{r} - \frac{X_D}{\delta}\right]\left(\frac{X}{X_D}\right)^{\xi}\right\} \tag{IA.4}$$

and

$$D^T(X;c) = \frac{c}{r} + \left[(1-\tau)(1-\alpha)\frac{X_D}{\delta} - \frac{c}{r}\right]\left(\frac{X}{X_D}\right)^{\xi}. \tag{IA.5}$$

We also have that $V^S(X;c) = E^S(X;c) + D^S(X;c)$, which yields the value of the stand-alone firm as

$$V^S(X;c) = \underbrace{(1-\tau)\frac{X}{\delta}}_{\text{Value of unlevered assets}} + \underbrace{\tau\frac{c}{r}\left[1 - \left(\frac{X}{X_D}\right)^{\xi}\right]}_{\text{Value of tax benefits}} - \underbrace{\alpha(1-\tau)\frac{X_D}{\delta}\left(\frac{X}{X_D}\right)^{\xi}}_{\text{Value of default costs}}. \tag{IA.6}$$

IA1.2 Solving the model

The bidder has a valuation $(1-\tau)V \geq \frac{c}{r}$ for the target firm. Conditional on the bidder making an offer to the target, there is a probability $\lambda \geq 0$ that a takeover is successful. As we argue in the paper, this probability depends on takeover laws so that the passage of an anti-takeover law should reduce λ. In case of a successful takeover, target shareholders and bondholders respectively extract a fraction $\eta \geq 0$ and $\varphi \geq 0$ of the takeover surplus, where $\eta + \varphi \leq 1$.[18] The expected gain to bidding shareholders conditional on an offer satisfies:

$$\mathcal{G}(X;c,\lambda) \equiv (1-\eta-\varphi)\lambda\mathcal{S}(X;c,) = (1-\eta-\varphi)\lambda\left[(1-\tau)V - V^S(X;c)\right]^+$$

where $x^+ = \max\{0,x\}$, and $\mathcal{S}(X;c)$ denotes the surplus generated by the takeover. The timing of the takeover then solves:

$$\max_{\theta_T} \mathbb{E}^{\mathcal{Q}}\left[e^{-r\theta_T}\mathcal{S}(X_{\theta_T};c)\right], \tag{IA.7}$$

where θ_T is the endogenous time of the takeover. Because the value of the target firm is strictly increasing in the value of the cash flow shock X, the optimal policy for bidding shareholders is to initiate the takeover the first time that X reaches an endogenous lower threshold X_T, so that the time of the takeover is defined by $\theta_T \equiv \inf\{t \geq 0 : X_t = X_T\}$ and

$$\mathbb{E}^{\mathcal{Q}}\left[e^{-r\theta_T}\mathcal{S}(X_{\theta_T};c)\right] = \left[(1-\tau)V - V^S(X_T;c)\right]\left(\frac{X}{X_T}\right)^{\xi},$$

where $\xi < 0$ is the negative root of the quadratic equation $\frac{1}{2}\sigma^2 y(y-1) + (r-\delta)y - r = 0$. Solving for the value-maximizing takeover threshold yields

$$X_T = \frac{\xi}{\xi - 1}\delta\left[V - \frac{\tau c}{r(1-\tau)}\right]. \tag{IA.8}$$

Because target shareholders and debtholders respectively capture a fraction η and a fraction φ of the takeover surplus, the value of the surplus that gets impounded into the value of the target firm is

$$\underbrace{P^T(X;c,\lambda,\eta,\varphi)}_{\substack{\text{Value of the put option}\\ \text{to all claimholders}}} = \underbrace{\lambda(\eta+\varphi)\left[(1-\tau)V - V^S(X_T;c)\right]\left(\frac{X}{X_T}\right)^{\xi}}_{\text{PV of takeover surplus captured by shareholders and debtholders}}, \tag{IA.9}$$

where we have: $P^T(X;c,\lambda,\eta,\varphi) = P^T(X;c,\lambda,0,\varphi) + P^T(X;c,\lambda,\eta,0)$. Obviously. we have

$$\lim_{X\uparrow+\infty} P^T(X;c,\lambda,\eta,\varphi) = 0, \tag{IA.10}$$

$$\lim_{X\downarrow X_T} P^T(X;c,\lambda,\eta,\varphi) = \lambda(\eta+\varphi)\left[(1-\tau)V - V^S(X_T;c)\right] > 0. \tag{IA.11}$$

[18] This can be derived as the solution to a generalized Nash bargaining game. Assume that the bargaining power of bidding shareholders is $1-\eta-\varphi$. The fraction $1-s$ of the takeover surplus captured by bidding shareholders during the bidding stage solves: $\max_s\left\{\left(s\mathcal{S}(X;c,)^{\eta+\varphi}\right)\left((1-s)\mathcal{S}(X;c,)^{1-\eta-\varphi}\right)\right)$, the solution to which is given by $s = \eta+\varphi$.

To determine the value of equity in the target firm, we conjecture (and later verify) that $X_T \geq X_D$, where X_D is the default threshold selected by target shareholders. In addition, we assume that if the takeover attempt is unsuccessful at $X = X_T$, which occurs with probability $1-\lambda$, the option of being taken over disappears. Target shareholders therefore get the cash flow stream $(1-\tau)(X-c)$ until the firm is taken over at $X = X_T$ with probability λ or defaults at $X = X_D$. We can therefore write the value of equity in the target firm as

$$E^T(X;c,\lambda,\eta) = \max_{\theta_D} \left\{ \mathbb{E}^{\mathcal{Q}} \left[\int_0^{\theta_D} e^{-rt}(1-\tau)(X_t - c)dt + \lambda\eta e^{-r\theta_T} \mathcal{S}(X_{\theta_T};c) \right] \right\}, \tag{IA.12}$$

where $\theta_D \equiv \inf\{t \geq 0 : X_t = X_D\}$. Standard derivations show that:

$$E^T(X;c,\lambda,\eta) = \underbrace{(1-\tau)\left\{ \frac{X}{\delta} - \frac{c}{r} + \left[\frac{c}{r} - \frac{X_D}{\delta} \right] \left(\frac{X}{X_D} \right)^{\xi} \right\}}_{\text{Stand-alone equity value } E^S(X;c)} + \underbrace{\lambda\eta \left[(1-\tau)V - V^S(X_T;c) \right] \left(\frac{X}{X_T} \right)^{\xi}}_{\text{Value (of the put option) of being taken over}},$$

for $X > X_T \geq X_D$. The first term on the right hand side of this equation is the sum of the unlimited liability value of equity and the value of the option to default (which is also equal to the stand alone value of equity). The second term captures the value of being taken over, which is the product of the probability of a successful takeover and the discounted gain from a takeover to target shareholders. This equation can be rewritten as

$$E^T(X;c,\lambda,\eta) = \underbrace{E^S(X;c)}_{\text{Stand-alone value of equity}} + \underbrace{P^T(X;c,\lambda,\eta,0)}_{\text{Value (of the put option) of being taken over}} \tag{IA.13}$$

Similarly, the value of debt in the target firm satisfies

$$D^T(X;c,\lambda,\varphi) = \underbrace{\frac{c}{r} + \left[(1-\tau)(1-\alpha)\frac{X_D}{\delta} - \frac{c}{r} \right] \left(\frac{X}{X_D} \right)^{\xi}}_{\text{Stand-alone debt value } D^S(X;c)} + \underbrace{\lambda\varphi \left[(1-\tau)V - V^S(X_T;c) \right] \left(\frac{X}{X_T} \right)^{\xi}}_{\text{PV of takeover surplus captured by debtholders}}. \tag{IA.14}$$

where we assume (i) that the bidder buys back debt when acquiring the target firm and (ii) that debt covenants (restricting M&As) may allow debtholders in the target firm to capture part of the takeover surplus. The first two terms on the right hand side of equation (IA.14) capture the stand-alone value of corporate debt (i.e. the present value of coupon payments and the recovery in default). The last term captures the present value of the takeover surplus that debtholders can capture. According to this equation, debtholders receive the (fair) market value of their claim in case of a takeover plus a part of the takeover premium if they have bargaining power. This expression shows that debt value increases with λ and φ so that, holding leverage constant, the passage of anti-takeover laws should reduce the value of corporate debt and increase yield spreads.

Turning next to equity betas, we can use equation (IA.13) to write

$$\beta_{E^T} = \frac{E^S(X;c)}{E^T(X;c,\lambda,\eta)}\beta_{E^S} + \frac{P^T(X;c,\lambda,\eta,0)}{E^T(X;c,\lambda,\eta)}\beta_{P^T}, \tag{IA.15}$$

In equation (IA.15), we have that

$$\beta_{E^S} \equiv \frac{X}{E^S(X;c)}\frac{\partial E^S(X;c)}{\partial X}\beta_X = \frac{(1-\tau)\left\{\frac{X}{\delta} + \xi\left[\frac{c}{r} - \frac{X_D}{\delta}\right]\left(\frac{X}{X_D}\right)^{\xi}\right\}}{E^S(X;c)}\beta_X. \tag{IA.16}$$

In addition, we have that

$$\beta_{P^T} \equiv \frac{X}{P^T(X;c,\lambda,\eta,0)}\frac{\partial P^T(X;c,\lambda,\eta,0)}{\partial X}\beta_X = \xi\beta_X, \tag{IA.17}$$

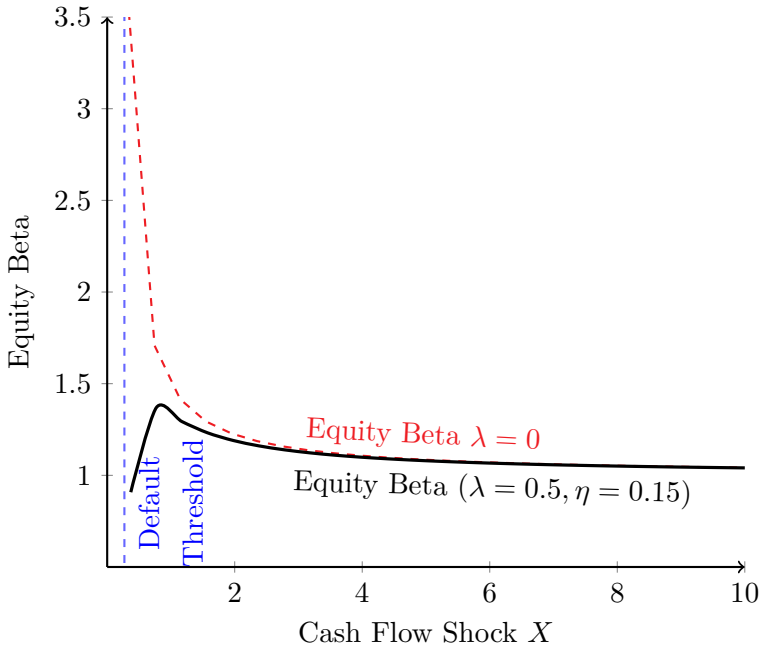
so that

$$\beta^T(X;c,\lambda,\eta) = \beta_X\frac{\frac{(1-\tau)X}{\delta} + \frac{(1-\tau)\xi}{1-\xi}\left(\frac{X(\xi-1)}{\xi\delta}\right)^{\xi}\left(\frac{c}{r}\right)^{1-\xi} + \xi P^T(X;c,\lambda,\eta,0)}{E^T(X;c,\lambda,\eta)}. \tag{IA.18}$$

Equation (IA.18) shows that the beta of the target's equity reflects three different components, which are weighted by their contribution to equity value. The first component is the contribution of the firm's assets to equity risk, which is captured by the first term in the numerator of equation (IA.18). The second component is the contribution of the value of the option to default, which is captured by the second term in the numerator of equation (IA.18). The third term is the (put option) value of being taken over, which is captured by the third term in the numerator of equation (IA.18). Because $\xi < 0$, the option to default and the option of being taken over contribute negatively to equity risk. Removing the option of being taken over therefore increases equity beta. The effect is larger when the value of the put option is larger, that is when firms approach distress as

$$\frac{\partial P^T(X;c,\lambda,\eta,0)}{\partial X} = \frac{\xi}{X}P^T(X;c,\lambda,\eta,0) < 0. \tag{IA.19}$$

The figure below plots equity beta when $\lambda = 0$ and when $\lambda = 0.5$, assuming that $r = 0.05$, $\mu = 0.02$, $\sigma = 0.3$, $\alpha = 0.5$, $\tau = 0.15$, $\eta = 0.15$, $\beta_X = 1$ and using the coupon payment that maximizes firm value when $X = 1$. As shown by the figure, the two betas converge to $\beta_X = 1$ when X grows as the value of the put option tends to zero. By contrast, the moneyness of the takeover option increases as X decreases implying that the betas diverge as firms approach financial distress. When there is no takeover option, equity betas and returns keep on increasing as financial distress approaches. When there is a takeover option, the relation between equity betas and returns and the likelihood of financial distress may be either upward sloping (low shareholder bargaining power) or humped and downward sloping (high shareholder barganining power), in line with the evidence in Garlappi, Shu, and Yan (2008).



IA2 Distress measures

A Campbell, Hilscher, and Szilagyi's (2008) model

We calculate the distress-risk measure from Campbell, Hilscher, and Szilagyi (2008, Table IV, Column 3), which combines most recent quarterly accounting data with current monthly and daily equity market data:

$$\begin{aligned}\mathrm{CHS}_t = &-9.164 - 20.264\,\mathrm{NIMTAAVG}_t + 1.416\,\mathrm{TLMTA}_t - 7.129\,\mathrm{EXRETAVG}_t \\ &+ 1.411\,\mathrm{SIGMA}_t - 0.045\,\mathrm{RSIZE}_t - 2.132\,\mathrm{CASHMTA}_t + 0.075\,\mathrm{MB}_t - 0.058\,\mathrm{PRICE}_t,\end{aligned} \tag{IA.20}$$

where NIMTA is the net income divided by the market value of total assets (the sum of market value of equity and book value of total liabilities), TLMTA is the book value of total liabilities divided by market value of total assets, EXRET is the log of the ratio of the gross returns on the firm's stock and on the S&P500 index, SIGMA is the standard deviation of the firm's daily stock return over the past three months, RSIZE is ratio of the log of firm's equity market capitalization to that of the S&P500 index, CASHMTA is the ratio of the firm's cash and short-term investments to the market value of total assets, MB is the market to-book ratio of the firm's equity, and PRICE is the log price per share. NIMTAAVG and EXRETAVG are moving averages of NIMTA and EXRET, respectively, constructed as (with $\phi = 2^{-1/3}$):

$$\mathrm{NIMTAAVG}_{t-1,t-12} = \frac{1-\phi^3}{1-\phi^{12}}(\mathrm{NIMTA}_{t-1,t-3} + \cdots + \phi^9 \mathrm{NIMTA}_{t-10,t-12}) \tag{IA.21}$$

and

$$\text{EXRETAVG}_{t-1,t-12} = \frac{1-\phi}{1-\phi^{12}}(\text{EXRET}_{t-1} + \cdots + \phi^{11}\text{EXRET}_{t-12}) \tag{IA.22}$$

Following Campbell et al. (2008), we winsorize all inputs at the 5th and 95th percentiles of their pooled distributions across all firm-months, where PRICE is truncated above at \$15. Further details on the data construction are provided by Campbell et al. (2008).

B Merton-KMV model

Merton-KMV approach to measuring a firm's distance-to-default is based on the two-equation contingent-claim method of Ronn and Verma (1986). The first equation, based on Merton (1974), expresses the value of the firm's equity as the value of a call option written on the firm's assets, using the Black and Scholes (1973) formula:

$$V_E = V_A N(d_1) - Fe^{-rT}N(d_2), \tag{IA.23}$$

where V_E is the equity value, V_A is the total asset value, $N(\cdot)$ is the cumulative function of a standard normal distribution, $d_1 = \frac{[ln(\frac{V_A}{F})+(r+\frac{\sigma_A^2}{2})T]}{\sigma_A\sqrt{T}}$, $d_2 = d_1 - \sigma_A\sqrt{T}$, σ_A is asset volatility, F is the face value of debt, r is the risk-free rate, and T is debt maturity. The second equation, which is derived from Ito's lemma, represents the relation between equity volatility, σ_E, and asset volatility, σ_A:

$$\sigma_E = \frac{V_A N(d_1)\sigma_A}{V_E} \tag{IA.24}$$

The unobservable variables V_A and σ_A are then calculated using observable inputs. In line with the literature (e.g., Bharath and Shumway (2008)), we assume a yearly framework (T=1), and measure F by short-term debt (debt maturing within a year) plus half of the long-term debt (debt maturing after one year). The short-term risk-free rate r is proxied by the yield on one-year Treasuries, and σ_E is approximated by the annualized standard deviation of monthly returns in the past year. We solve the two equations simultaneously for each firm in our sample. Because there are no closed-form solutions for V_A and σ_A, we use a numerical algorithm with $V_E + F$ and σ_E as initial values. The risk-neutral probability of bankruptcy is then defined as the probability that the face value of debt exceeds the asset value at maturity, and is given by $1 - N(d_2)$. The distance-to-default is thus defined by d_2.

IA3 Robustness tests

In a recent paper, Karpoff and Wittry (2018) raise several concerns about the use of regulatory and legal changes to identify exogenous variation in economic conditions and, in particular, the use of second-generation state anti-takeover laws in various corporate finance studies. They argue that the effect of anti-takeover laws can be muddled by confounding effects arising because of coverage by a first-generation state anti-takeover law or by other second-generation laws, preexisting firm-level

takeover defenses, and the legal regime as determined by important court decisions. Furthermore, there is evidence that corporate laws are affected by corporate lobbying and are therefore not exogenous to the lobbying firms. As Karpoff and Wittry argue, the results in some corporate finance studies disappear if one excludes these lobbying firms.

We believe that the asset pricing nature of our tests makes our paper less of a subject to endogeneity issues. Whether the second-generation state antitakeover laws, and BC laws in particular, are completely exogenous or whether some of them had been promoted by some lobbying firms is less of a concern for us. We merely posit that antitakeover laws impose some limitations on the feasibility of hostile takeovers. As long as the enactment of these laws has not been fully anticipated by investors years in advance, we expect to find a differential effect on returns to distressed stocks and their betas in states with and without an anti-takeover law, as our model implies.

Nevertheless, to address the important concerns raised by Karpoff and Wittry (2018), we perform a series of robustness tests. Karpoff and Wittry's first concern is that first-generation anti-takeover laws can interfere with any inference, especially in the studies that use pre-1982 data (in 1982 first-generation anti-takeover laws had been effectively invalidated by the court decision in the "Edgar versus MITE" case). To this concern, we note that we deliberately start our sample in 1988 in order to have a sufficiently populated ATL portfolios, and hence our sample does not include the times when first-generation laws were still in effect.

As further argued by Karpoff and Wittry, the constitutionality of BC laws was only established in a ruling by the U.S. Seventh Circuit Court of Appeals in *"Amanda Acquisition Corp. v. Universal Foods Corp."* on May 24, 1989. They also find that BC laws in and of themselves are not associated with meaningful changes in most outcome variables from previous corporate finance papers in the literature that rely on BC laws. To account for these concerns, we perform an additional test by starting our sample in 1990. By 1990, the constitutionality of BC laws had been fully established. We note that our main sample starts in 1988 so that we do not expect this concern to have a material effect on the results. The results are reported in Table IA.3, Panel A, where as in Table 2 we present results for the full sample of stocks as well as the most distressed (highest CHS score) quintile.[19] To conserve space, we only report mean excess returns and six-factor alphas of the ATL and no ATL portfolios as well as the difference in returns. Table IA.3 corroborates our conjecture. Both mean excess return of the ATL-No ATL long-short portfolio and its six-factor alpha remain virtually unchanged.

Insert Table IA.3 Here

Another concern voiced by Karpoff and Wittry is that, as argued by Werner and Coleman (2015), antitakeover laws are affected by corporate lobbying, therefore invalidating the exogeneity assumption for lobbying firms (see Table 3 in Karpoff and Wittry for the list of lobbying firms). We believe that this issue is less relevant for our asset pricing tests as our objective is not to study corporate decisions, but stock returns. As a result, whether the laws are exogenously imposed on

[19] Table IA.6 in the Internet Appendix replicates the results in Table IA.3 while excluding from the sample large-cap stocks, defined as the top 5% by NYSE breakpoints in each month.

managers or are passed partly due to their lobbying is less of a concern to us, as long as those legal changes are not perfectly anticipated by investors and fully impounded by them in firm valuations long in advance of the law enactment (which would be highly unlikely). Nevertheless, to further alleviate potential endogeneity concerns due to firm lobbying, we re-run our portfolio tests while excluding the firms identified in the literature as lobbying. The results are presented in Table IA.3, Panel A. The exclusion of motivating firms has essentially no effect on the returns of the ATL and no-ATL distress portfolios and their difference. While the monthly mean excess return and the six-factor alphas are 0.85% and 0.82% when including all firms, they change to 0.82% and 0.79%, respectively, when excluding motivating firms, and remain statistically significant.

About a half of all firms in our sample (53%) are incorporated in the state of Delaware. Delaware famously dominates the market for incorporations due to its attractive legal regime. To make sure that our results are not largely attributable to the effect of Delaware firms, we re-estimate portfolio returns while excluding firms incorporated in Delaware. The results are presented in Table IA.3, Panel A. Interestingly, excluding Delaware firms widens the return differential between ATL and no-ATL distress portfolios as both mean excess return and six-factor alpha rise to 1.08% and 1.10% monthly, respectively, while remaining highly significant statistically.

Finally, we use the CHS measure of financial distress in our U.S. tests while we use the Merton/KMV measure in our international tests, presented below, due to a lack of proper accounting data. Table IA.3, Panel A, shows that our results are largely unaffected by the choice of distress measure. In unreported tests, we also find using Fama McBeth regressions that there is a significant positive effect of BC laws on the returns of distressed stocks (t-statistic of 2.82 in the specification with controls). The effect is also economically large: After controlling for usual determinants of stock returns, distressed stocks earn about 0.35% a month more in the states with an anti-takeover law relative to those without a law.

Another concern is that BC laws—that are argued to be the strongest out of the second-generation anti-takeover laws and hence are used most often in the literature—represent just one type of anti-takeover laws and other anti-takeover laws were passed by various states. To address this issue, we examine returns of ATL and no-ATL portfolios formed on the basis of alternative anti-takeover laws: Fair Price and Control Share Acquisition laws. The passage dates of these laws are presented in Table IA.4. The evidence with respect to these alternative laws is presented in Table IA.3, Panel B. The results reveal the robustness of our portfolio tests. For the most distressed stocks, the difference in mean returns and six-factor alphas between ATL and no-ATL portfolios are slightly lower in magnitude when using alternative laws than in the case of business combination laws (Table 2), but still largely statistically significant and economically high. The six-factor alphas range from 0.58% a month for Control Share Acquisition to 0.76% for Fair Price laws, while mean excess returns are 0.51% monthly for Fair Price laws and 0.68% for Control Share Acquisition laws. In addition, the statistical significance of these effects is high, except for effect of Fair Price laws on the mean return, which is only marginally significant.

IA4 Anti-takeover laws and the distress risk puzzle

Financially distressed stocks tend to underperform healthy stocks in terms of average returns and alphas from various asset pricing models. This result, known as the "financial distress puzzle", represents a challenge to rational asset pricing. While Fama and French (1992) hypothesize financial distress to be the main reason behind the high expected returns of value stocks, other studies that sort stocks on distress proxies directly, such as Dichev (1998), Griffin and Lemmon (2002), and Campbell et al. (2008), find that returns of distressed stocks are significantly lower than those of healthy stocks. Deepening the puzzle, distressed firms have higher market betas than healthy firms. Hence, risk and return do not go hand in hand in the financial distress cross section.

Although various explanations have been proposed, there is still no consensus in the literature about what drives this anomaly. Garlappi et al. (2008) propose a model in which distressed stocks become safer as a result of violations of the absolute priority rule. George and Hwang (2010) argue that firms with high exposure to systematic distress costs will choose lower leverage levels while having higher expected returns. Chava and Purnanandam (2010) argue that the observed anomaly may actually be just an in-sample phenomenon, resulting from a streak of surprisingly low realized returns on distressed U.S. stocks in the 1980s. Eisdorfer and Misirli (2020) argue that the underperformance of distressed stocks occurs mostly in periods of bull markets. Gao, Parsons, and Shen (2018) and Eisdorfer, Goyal, and Zhdanov (2018) examine the performance of distressed stocks internationally. In a recent paper, Chen, Hackbarth, and Strebulaev (2022) demonstrate that the negative correlation between levered equity betas of distressed firms and the market risk premium is capable of explaining a large part of the conditional CAPM alphas of distressed firms.

While explaining the distress risk puzzle is outside of the scope of this paper, the evidence presented in Table 2 offers an interesting perspective on this issue. The six-factor alpha in the quintile of the most distressed stocks in ATL states (sorted into distress quintiles based on the measure from Campbell et al., 2008) is only negative 29 basis points and statistically indistinguishable from zero. This result is in striking contrast with the six-factor alpha of the no-ATL most distressed portfolio. Distressed stocks in the states that have not passed a BC law have a six-factor alpha of -1.12% per month, which is highly statistically significant. Thus, the underperformance of distressed stocks almost disappears in the states with a BC law, after controlling for well-accepted risk factors (in particular, profitability, investment, and momentum factors). However, in the states without a BC law, the underperformance still persists even after controlling for these risk factors. Alphas from alternative factor models are still negative and statistically significant in both ATL and no ATL states. However, the magnitude is reduced dramatically in ATL states.

To look deeper into the effect of anti-takeover laws on the distress risk puzzle, we closely follow the procedure in Campbell et al. (2008) and sort stocks into decile portfolios. Each month we sort all stocks into ten equal-sized portfolios based on their financial-distress measure. We construct a zero-investment value-weighted hedge portfolio that is long in the portfolio of the most healthy stocks and short in the portfolio of the most distressed stocks. We hold this zero-investment portfolio for one month. Figure IA.2 shows the monthly mean excess return and six-factor alpha

of the portfolio when including all firms, and separately when including firms operating in states with and without a BC law.

Insert Figure IA.2 Here

The results in Figure IA.2 reveal a pattern similar to that in Table 2: The returns and factor alphas of the long-short healthy-distressed portfolio are much higher in the states that have not passed an anti-takeover law. The difference in six-factor alphas is three-fold: 0.67% in the states with a BC law versus 1.96% in the states without a BC law. While the distress risk puzzle does not completely disappear in states with a BC law when using decile sorts as in Campbell et al. (2008), it does weaken significantly and the difference between ATL and no-ATL states is striking. Moreover, and as shown in Table 2, there is no evidence of the distress risk puzzle in the states that have passed a BC law in the quintile-sorted portfolios based on the six-factor model.

In summary, the evidence in Table 2 and Figure IA.2 suggests that the anti-takeover legislation plays a role in the formation of the distress risk puzzle. This evidence is consistent with the conjecture that investors overestimate the benefits of hostile takeovers for distressed stocks.

IA5 Additional US-based results

This section includes results from additional tests on the US sample of firms. Table IA.2 demonstrates that firms in the states with a business combination law in place are less likely to become targets in acquisition transactions. In that table, we report results separately for the full sample and for the subsample of distressed firms. Table IA.4 provides the details on the years of enactment of state antitakeover laws. The table reports the year in which second- and third-generation antitakeover laws known as Business Combination (BC), Fair Price (FP), and Control Share Acquisition (CSA) laws, have been passed in various U.S. states, as listed in Atanassov (2013) with the corrections made by Karpoff and Wittry (2018). Table IA.6 replicates the results in Table IA.3, while excluding from the sample large-cap stocks, defined as the top 5% by NYSE breakpoints in each month.

In Table IA.1 we run a difference-in-differences book leverage regression to see if the presence of anti-takeover laws has an effect on firms' leverage ratios. Our main variable of interest is the ATL dummy, set equal to one if a Business Combination law is in effect in a given year in the firm's state of incorporation and set equal to zero otherwise. We follow Frank and Goyal (2009) and Geelen, Hajda, Morellec, and Winegar (2022) and include size, market-to-book, tangibility, profitability, R&D, cash flow volatility, and firm age as control variables. We also include firm and time fixed effects, to account for firm-specific determinants of leverage as well as time-varying market-wide shocks. In addition, we cluster the standard errors by both firm and time to account for the correlation of residuals. The results in Table IA.1 reveal no statistically significant relation between a firm's leverage and the presence of anti-takeover law in its state of incorporation. This result is consistent with the evidence in Wald and Long (2007), who find no effect of anti-takeover laws on leverage ratios. This result is however inconsistent with Francis et al. (2010), who find

that "firms in takeover friendly states have significantly higher leverage than their counterparts in restrictive law states". However, they use an unusual definition of leverage, calculated as the ratio of long-term debt to total assets. We instead rely on the standard definition of book leverage (see, e.g. Frank and Goyal (2009)), calculated as the ratio of total debt to total assets. Furthermore, we rely on a larger sample: Our sample is 1982-2017, versus 1990-2000 in Francis et al. (2010).

In Table IA.7 we replicate our difference-in-differences tests for the effect of ATL on betas at the firm level (as opposed to portfolio level tests reported in Table 5). We estimate firm betas by regressing firms' daily excess stock returns on the daily excess market return. The control variables include the logarithm of the market capitalization and the book leverage ratio. The results are consistent with those reported in Table 5: In line with the model, ATL enactment has a positive effect of stock betas and the effect is much stronger for financially distressed stocks (coefficient on the ATL of 0.26 vs 0.06 in the specification with controls). We argue that our main portfolio level tests are more reliable due to potentially large estimation errors arising when estimating stock-level betas.

IA6 International Evidence

In this section we complement our U.S.-based tests by examining the relation between returns and the riskiness of financially distressed stocks and takeover feasibility in an international setting. We proceed in two steps. First, we take advantage of staggered enactments of country-level pro-takeover laws in 23 countries and examine whether these laws have an effect on the risk and returns of distressed firms. Second, we exploit the variation in competition laws that focus specifically on mergers by exploring the effect of the merger control index developed by Bradford and Chilton (2018) for over 100 countries for the period running from 1989 to 2010.

IA6.1 Pro-takeover laws and stock returns

We argue that the passage of a pro-takeover law in a country facilitates takeovers, thereby decreasing equity risk and expected returns. Our model shows that this effect is particularly strong for financially distressed firms as takeovers provide such firms with a means to avoid bankruptcy by "being saved" through a takeover. We therefore expect (1) lower returns to distressed stocks in countries that have passed a pro-takeover law and (2) that the passage of pro-takeover laws should decrease equity risk (beta) and returns.

In this first set of tests, we take advantage of staggered enactments of country pro-takeover legislation. Takeover acts are laws passed specifically to foster takeover activity by reducing barriers to M&A transactions and simplifying the acquisition process. Lel and Miller (2015) study the effects of takeover laws on managerial discipline and CEO turnover. As noted in their study, "They (country takeover laws) are aimed at reducing informational uncertainties regarding the legal framework applicable to M&A transactions, thus simplifying the application of various laws in connection with M&A transactions and streamlining M&A procedures."

The adoptions of country-level takeover laws provide a natural way to test the effect of an exogenous shock to the feasibility of takeovers on the returns and riskiness of distressed stocks. Our model predicts that both expected returns and riskiness of distressed stocks are negatively related to takeover probability as the possibility of a takeover essentially provides equityholders with a valuable put option. Importantly for our analysis, Lel and Miller (2015) find that the merger intensity increases after initiation of pro-takeover M&A laws. We test how this exogenous shock to the takeover probability affects the betas and returns of distressed stocks world-wide.

Insert Table IA.8 Here

Table IA.8 provides the list of countries that passed a pro-takeover law. While there are obviously differences in takeover legislation across countries, the common theme in pro-takeover laws is to simplify M&A transactions and promote more active acquisition markets. For example, the 2002 Merger and Acquisition Act in Taiwan provides some general amendments to the Company Act to simplify the M&A process, while introducing more types of mergers including cash-out mergers and cross-border mergers, as well as providing some tax incentives to neutralize the transaction costs associated with M&A deals. The Merger Act passed in 2004 in Switzerland regulates the civil law aspects of mergers in a broad comprehensive framework, significantly facilitating acquisition deals, which used to be governed by Swiss corporate law and had to be carried out through a series of complicated transactions, often triggering unfavorable tax consequences and formal liquidation procedures. In Germany, the 2002 Takeover Act introduces formal provisions governing acquisition of publicly traded companies. As Strelow and Wildberger (2002) argue, prior to the passage of the act, takeovers of public companies had not often been considered an option worth pursuing. Table IA.9 provides additional specific details about the features of takeover laws in our sample.

Insert Table IA.9 Here

Our international data is from Compustat Global and our sample spans the years from 1989 to 2017. In order to have a meaningful cross-section of financially distressed firms in each country, we only include countries with at least 50 firms in any given month. Furthermore, we discard all monthly returns higher than 500% and daily returns higher than 100%, all zero returns, and firms with equity market value below five million dollars. Our final dataset consists of 42,868 firms in 43 developed and emerging countries with a 5,106,895 combined firm-month observations.

The summary statistics for our international sample are presented in Table IA.10. We winsorize all variables at the 1st and 99th percentiles. For each variable, we first calculate the cross-sectional mean and median across stocks. We then report the time-series averages of these means and medians. Size is the equity value of the underlying stock (in billions of dollars). Market-to-book of the underlying stock is the ratio of current equity market value to equity book value as of the previous quarter. Past return of the underlying stock is the cumulative return over the past

six months. Book leverage is the book value of debt divided by book value of assets. In order to control for traditional determinants of returns, we also construct measures of profitability and investment. Following Haugen and Baker (1996), we define profitability as the annual income before extraordinary items divided by the previous year's book equity value. We measure investment by the annual change in gross property, plant, and equipment, plus the change in inventories, scaled by lagged book value of assets (see, e.g., Titman, Wei, and Xie (2004)). The default probability is derived from the Merton/KMV distance-to-default model.[20]

We report the statistics for the whole sample as well as for subsamples of firms in countries with and without a pro-takeover law (PTL). As shown in Table IA.10, firms have similar characteristics in PTL versus no-PTL countries. An average firm in our international sample has a market capitalization slightly in excess of 1 billion U.S. dollars, a market-to-book ratio of about 2.6, a book leverage of about 0.35, and a 2.4% probability of going bankrupt in the following year.

Insert Table IA.10 Here

We start our analysis by examining the relation between returns to distressed stocks and the presence of a pro-takeover law in a country. For this purpose, we run cross-sectional firm-level Fama-MacBeth (1973) regressions of market-adjusted stock returns on a dummy variable set to one if there is a pro-takeover law in the country in year t and to zero otherwise. Since there could be some anticipation effect prior to the formal enactment of a law, we exclude the year of the passage of the law. We market-adjust raw returns by subtracting the value-weighted market return in the country in order to control for exogenous country-level shocks to stock returns (the nature of our tests does not allow for the inclusion of country-level fixed effects as such effects would absorb any variation in returns due to pro-takeover laws). We additionally control for traditional determinants of stock returns, including size and market-to-book ratio as well as past return, profitability, and investment. To make sure that our results are not driven by a particular cut-off in defining distressed stocks, we report results for both the quintile and tercile of most distressed stocks based on the Merton/KMV model.[21] The results from the Fama-MacBeth regressions are presented in Table IA.11.

Insert Table IA.11 Here

Results in Table IA.11 support our hypothesis about the effect of pro-takeover laws on the stock returns of distressed firms. Regression coefficients on the PTL dummy are negative and significant in all specifications, consistent with our model (Prediction 1). The coefficients are also economically large. For example, in the regression specification with the full set of control variables,

[20] The limited availability of accounting data forces us to resort to the Merton/KMV model in our international tests as the model uses only equity value, equity return volatility, and the face value of short-term debt as inputs. In our US tests below we employ the more commonly used distress measure of Campbell, Hilscher, and Szilagyi (2008). We provide details on the construction of the financial distress measures in Section IA2.

[21] Because we use market-adjusted returns in our tests and pro-takeover laws affect all stocks in the country, we are not able to examine the effect of pro-takeover laws on returns in the sample of all stocks in the country.

the market-adjusted returns to distressed stocks are 31 (39) basis points a month lower in countries with a pro-takeover law in effect, in tercile (quintile) sorts on proximity to default.

IA6.2 Pro-takeover laws and equity risk

Our model additionally predicts that the betas of financially distressed stocks should decrease after the enactment of a pro-takeover law. To test this prediction, we estimate the beta of each firm in our sample by regressing the firm's daily excess stock return on the daily excess market return in the country. We then run difference-in-differences regressions of firm-level monthly market betas on a dummy variable that indicates the presence of a pro-takeover law in the firm's country of incorporation. Our empirical specification has the following form:

$$\beta_{i,t} = \alpha + \xi PTL_{i,t} + \delta_1 size_{i,t} + \delta_2 Leverage_{i,t} + \delta_3 Before^1_{i,t} + \delta_4 Before^2_{i,t} + v_t + \eta_i + \varepsilon_{i,t}, \quad \text{(IA.25)}$$

where $\beta_{i,t}$ is the estimated beta of firm i in month t, $PTL_{i,t}$ indicates whether a pro-takeover law has been passed in the country of firm i by month t, $Size$ and $Leverage$ are the logarithm of the firms' market capitalization and of book leverage. We include time fixed effects v_t to absorb a potential impact from global time-varying economic conditions. We also include firm fixed effects η_i to account for potential exogenous determinants of risk and betas at the firm level. Lastly, we follow Bertrand and Mullainathan (2003) and also include two time dummy variables, $Before^1_{i,t}$ and $Before^2_{i,t}$, that indicate years one and two prior to the enactment of pro-takeover laws to control for any time trends in the riskiness of firms in pre-law years.

The results from these regressions are presented in Table IA.12.

Insert Table IA.12 Here

The evidence in Table IA.12 demonstrates that the betas of distressed stocks are affected by the passage of pro-takeover laws in ways consistent with our theory. The coefficients on the PTL dummy for the most financially distressed stocks are negative and statistically significant, indicating that the betas of distressed stocks in the treated countries decrease relative to the betas of distressed stocks in the countries that do not pass a pro-takeover law. Note that the staggered nature of PTL enactments across countries allows the same countries to act as a treatment (when it adopts a pro-takeover law) as well as a control country (when there is no change in pro-takeover legislation). The effect of pro-takeover laws on the betas of distressed stocks is also economically meaningful: For quintile sorts the betas of distressed stocks decrease by 0.13 on average.

To summarize, the evidence from the staggered adoption of pro-takeover laws in our international data set is consistent with the predictions of the model for the effects of takeover markets on the returns to financially distressed stocks in that both their (market adjusted) returns and betas are negatively affected by pro-takeover law enactments.

IA6.3 Merger Competition Laws

In this section, we provide additional evidence in favor of our hypotheses by taking advantage of the competition law index (CLI) recently developed by Bradford and Chilton (2018) for over 100 countries. This index measures the stringency of competition regulation around the world. The CLI quantifies the key elements of the competition laws and regulations that are in force in each country in each year. These elements are aggregated into an index that can be used to measure the intensity of competition regulation. The CLI is based on analyzing and coding competition law statues in general competition laws and sectoral regulations containing competition provisions or other laws such as constitutions or criminal laws to the extent they regulate competition or provide sanctions for anti-competitive behavior. It is constructed for the years from 1889 to 2010 and spans 126 countries. It is available for all 43 countries in our international dataset.

The competition law index combines different categories: Merger control, abuse of dominance, and anti-competitive agreements. Out of the three categories, merger control is most relevant as it is directly related to the feasibility of conducting takeovers. In the following, we therefore focus on the "merger control" sub-index. This sub-index incorporates the effects of the mandatory or voluntary merger notification systems, the degree of powers that the law grants to the authority in reviewing mergers, as well as the presence of various defenses in the competition statute. In particular, the merger control index is increased if there is mandatory merger control and if the firms are obligated to notify the authority pre-merger (as opposed to post-merger). The merger control index is further increased in jurisdictions that restrict mergers on grounds that they lessen competition or create or strengthen dominance and in jurisdictions that additionally restrict mergers on grounds of some "public interest." The index is reduced if "efficiency defense" is present and the merging parties can escape prohibition by showing that the efficiencies that the merger generates outweigh the potential anti-competitive effect. Likewise, the "failing firm" defense (that allows a firm on a verge of bankruptcy to be acquired) and the "public interest" defense (that allows a merger if it results in certain public benefits) further reduce the merger control index.

In general, higher values of the merger control index indicate additional difficulties and regulatory hurdles that reduce the feasibility of a takeover. Therefore, we expect the returns to distressed stocks are expected to be positively related to the merger control index. To test this prediction, we run cross-sectional Fama-Macbeth return regressions on the merger control index as well as a set of control variables, in a similar fashion to our return regressions in Section IA6.1. Like in Section IA6.1, we market adjust raw returns by subtracting the country-level value weighted market return from raw returns. Table IA.13 reports the results from these regressions.

Insert Table IA.13 Here

The results in Table IA.13 support our hypothesis of a positive relation between merger control and returns to distressed stocks. The coefficients on the merger control index are positive and

statistically significant in all regression specifications (marginally significant in the specification with tercile sorts and the full set of control variables). The economic effect of the merger control index is also large. For example, in the quintile regression and the full set of controls, the market adjusted returns to distressed stocks in countries with most stringent merger control (merger control index equals one) exceed returns in countries with the most lenient merger control (merger control index equals zero) by 89 basis points a month. Overall, using both staggered enactments of specific pro-takeover laws in various countries and the index of merger control legislation derived from the law statutes reveals a negative relation between returns to distressed stocks and takeover feasibility, consistent with our model predictions.

Table IA.1: Leverage regressions

The table reports results from a difference-in-differences regression of book leverage on the anti-takeover law dummy and a set of control variables. Book leverage is the book value of debt divided by book value of assets. ATL dummy equals one if the firm is incorporated in a state with anti-takeover law (ATL) and zero otherwise. Size is the market value of equity. Market-to-book is the ratio of current equity market value to equity book value as of the previous quarter. Profitability is operating income over total assets. Tangibility is the ratio of property, plant, an equipment to total assets. R&D is the ratio of research and development expenditures to sales. Cash flow volatility is the moving three-year standard deviation of profitability. Firm age is number of years since listing, which is defined as the first appearance of firm i in CRSP. $Before^1$ and $Before^2$ are dummy variables that indicate years one and two prior to the enactment year. Firm and time fixed effects are included, and the standard errors are double-clustered by firm and time. We report regression coefficients and t-statistics are in parentheses.The sample period is 1982-2017.

	Book Leverage
ATL dummy	0.022
	(1.59)
Log(size)	-0.086***
	(-34.12)
Log(market-to-book)	0.112***
	(45.89)
Tangibility	0.146***
	(7.60)
Profitability	-0.068***
	(-7.94)
R&D	-0.001***
	(-2.55)
CF volatility	-0.451***
	(-6.45)
Firm age	0.000
	(0.00)
Before^1	0.006
	(0.66)
Before^2	0.007
	(1.02)

Table IA.2: Effect of Anti-Takeover Law on Acquisition Likelihood

At the end of each calendar year over 1988-2017, we sort all stocks into five equal-sized quintiles based on the financial distress measure of Campbell et al. (2008). For the full sample and for most distressed firms (top quintile), we assign to each firm a dummy variable ('merger target') that equals one if the firm was announced as a merger target during the following year. The merger announcement dates are obtained from the SDC Platinum database and include only completed transactions. We run a logit regression of 'merger target' on a dummy variable ('ATL') that indicates the presence of anti-takeover law in the firm's state of incorporation. The control variables are from Billet and Xue (2007). *ROAIA* is operating income before depreciation divided by book value of total assets, minus the median ratio for all firms within the same two-digit SIC code. *Log(size)* is the natural log of the market value of equity. *LEVBIA* is the book value of total debt divided by book value of assets, minus the median ratio for all firms within the same two-digit SIC code. *MKBK* is the ratio of market value of equity to the book value of equity. *SALEGR* is the natural log of the ratio of sales over the sales of the previous year. *NPPE* is net plant, property, and equipment scaled by total assets. *ITODUM* equals one if at least one firm in the same industry (same four-digit SIC code) is a takeover target in the previous year, and zero otherwise. All independent variables are measured at the end of the fiscal year prior to takeover. State fixed effects are included. Standard errors are clustered by firm and year, and p-values are reported in parentheses. The 'odds ratio' is the ratio of the probabilities of a firm to be acquired with and without ATL in its state.

	Full sample	Distressed firms
ATL	-0.506	-0.576
P-value	(<.001)	(0.042)
ROAIA	0.414	0.488
P-value	(<.001)	(<.001)
Log(size)	-0.043	0.076
P-value	(<.001)	(<.001)
LEVBIA	0.228	0.114
P-value	(<.001)	(0.368)
MKBK	-0.005	0.000
P-value	(0.049)	(0.973)
SALEGR	0.055	-0.003
P-value	(0.112)	(0.958)
NPPE	0.100	0.615
P-value	(0.051)	(<.001)
ITODUM	0.321	0.128
P-value	(<.001)	(0.042)
Odds Ratio = Prob(Target|ATL)/Prob(Target|No ATL)	0.603	0.562

Table IA.3: Sensitivity Checks and Alternative Types of Anti-Takeover Laws

In Panel A we replicate the portfolio sort results of Table 3 with four modifications: assuming that all BC laws were not enforced prior to 1989, excluding 25 firms that were motivating/lobbying for the law (see Karpoff and Wittry (2018)), excluding firms incorporated in the state of Delaware, and using the Merton/KMV model as the distress measure. In Panel B we replicate the results using two alternative types of antitakeover laws to Business Combination laws (see Atanassov (2013) and Karpoff and Wittry (2018)). Fair Price laws require shareholders acquiring a percentage of stocks beyond a threshold level to pay all shareholders the highest price paid during a specified period of time before the start of a tender offer. Control Share Acquisition laws give non-interested shareholders the right to decide whether a newly qualified large shareholder has any voting right.

Panel A. Sensitivity checks						
Post-1989 BC Law						
	Full sample			Distressed firms		
	No ATL	ATL	Diff	No ATL	ATL	Diff
Mean excess return	0.78	0.64	-0.13	-0.90	-0.02	0.88
	(3.09)	(2.81)	(-1.20)	(-1.42)	(-0.04)	(2.35)
6-factor alpha	0.08	-0.02	-0.10	-1.11	-0.25	0.86
	(0.76)	(-1.79)	(-0.88)	(-2.54)	(-1.08)	(2.15)
Excluding Motivating or Lobbying Firms						
	Full sample			Distressed firms		
	No ATL	ATL	Diff	No ATL	ATL	Diff
Mean excess return	0.80	0.67	-0.13	-0.89	-0.06	0.82
	(3.24)	(3.08)	(-1.16)	(-1.49)	(-0.12)	(2.32)
6-factor alpha	0.12	-0.01	-0.13	-1.12	-0.33	0.79
	(1.00)	(-0.89)	(-1.07)	(-2.71)	(-1.48)	(2.09)
Excluding Delaware						
	Full sample			Distressed firms		
	No ATL	ATL	Diff	No ATL	ATL	Diff
Mean excess return	0.80	0.68	-0.12	-0.89	0.19	1.08
	(3.37)	(3.49)	(-1.00)	(-1.49)	(0.37)	(2.70)
6-factor alpha	0.08	-0.03	-0.11	-1.12	-0.02	1.10
	(0.78)	(-0.85)	(-0.96)	(-2.71)	(-0.06)	(2.58)
Merton/KMV distress measure						
	Full sample			Distressed firms		
	No ATL	ATL	Diff	No ATL	ATL	Diff
Mean excess return	0.80	0.67	-0.13	0.11	0.66	0.55
	(3.37)	(3.09)	(-1.21)	(0.27)	(1.54)	(1.88)
6-factor alpha	0.08	-0.03	-0.11	-0.76	-0.03	0.73
	(0.78)	(-1.78)	(-0.96)	(-2.74)	(-0.19)	(2.55)

Table IA.3: Sensitivity Checks and Alternative Types of Anti-Takeover Laws – Continued

Panel B. Alternative Anti-Takeover Laws						
	Fair Price Law					
	Full sample			Distressed firms		
	No ATL	ATL	Diff	No ATL	ATL	Diff
Mean excess return	0.69	0.69	0.01	-0.15	0.36	0.51
	(2.94)	(3.66)	(0.08)	(-0.29)	(0.67)	(1.73)
6-factor alpha	-0.01	-0.03	-0.03	-0.46	0.30	0.76
	(-0.28)	(-0.72)	(-0.41)	(-2.05)	(1.01)	(2.46)
	Control Share Acquisition Law					
	Full sample			Distressed firms		
	No ATL	ATL	Diff	No ATL	ATL	Diff
Mean excess return	0.69	0.70	0.02	-0.13	0.55	0.68
	(3.10)	(3.54)	(0.21)	(-0.24)	(1.06)	(2.40)
6-factor alpha	-0.01	-0.07	-0.06	-0.38	0.20	0.58
	(-0.59)	(-1.28)	(-1.01)	(-1.72)	(0.63)	(1.98)

Table IA.4: State Antitakeover Legislation

The table reports the year in which second- and third-generation antitakeover laws known as Business Combination (BC), Fair Price (FP), and Control Share Acquisition (CSA) laws, have been passed in various U.S. states, as listed in Atanassov (2013) with the corrections made by Karpoff and Wittry (2018).

State	BC	FP	CSA
Arizona	1987	1987	1987
Connecticut	1988	1984	.
Delaware	1988	.	.
Georgia	1988	1985	.
Hawaii	.	.	1985
Idaho	1988	1988	1988
Illinois	1989	1984	.
Indiana	1986	1986	1986
Iowa	1997	.	.
Kansas	1989	1989	1988
Kentucky	1986	1989	.
Louisiana	.	1985	1987
Maine	1988	.	.
Maryland	1989	1983	1988
Massachusetts	1989	.	1987
Michigan	1989	1985	1988
Minnesota	1987	.	1984
Mississippi	.	1985	1991
Missouri	1986	1986	1984
Nebraska	1988	.	1988
Nevada	1991	.	1987
New Jersey	1986	1986	.
New York	1985	1985	.
North Carolina	.	1987	1987
Ohio	1990	1990	.
Oklahoma	1991	.	1987
Oregon	1991	.	1987
Pennsylvania	1988	1989	1989
Rhode Island	1990	.	.
South Carolina	1988	1988	1988
South Dakota	1990	1990	1990
Tennessee	1988	1988	1988
Texas	1997	.	.
Utah	.	.	1987
Virginia	1988	1985	1988
Washington	1987	1990	.
Wisconsin	1987	1985	1991
Wyoming	1989	.	1990

Table IA.5: Correlations

The table presents correlations among the main variables. See Table 1 for variable definitions. The sample period is 1988-2017.

	Size	Market-to-book	Past stock return	Book leverage	Profitability	Investment	CHS distress level
Size	1.000						
Market-to-book	0.110	1.000					
Past stock return	0.019	0.233	1.000				
Book leverage	0.037	-0.074	-0.025	1.000			
Profitability	0.094	-0.062	0.043	-0.025	1.000		
Investment	-0.012	0.040	-0.046	0.073	0.101	1.000	
CHS distress level	-0.126	-0.106	-0.300	0.230	-0.515	-0.042	1.000

Table IA.6: Sensitivity Checks and Alternative Types of Anti-Takeover Laws excluding Large-Cap stocks

We replicate the results in Table 9 while excluding from the sample large-cap stocks, defined as the top 5% by NYSE breakpoints in each month.

Panel A. Sensitivity checks						
Post-1989 BC Law						
	Full sample			Distressed firms		
	No ATL	ATL	Diff	No ATL	ATL	Diff
Mean excess return	0.58	0.72	0.15	-0.95	-0.05	0.90
	(2.19)	(2.52)	(1.83)	(-1.68)	(-0.10)	(2.95)
6-factor alpha	-0.19	-0.06	0.13	-1.29	-0.36	0.92
	(-2.38)	(-1.46)	(1.74)	(-3.73)	(-2.08)	(2.90)
Excluding Motivating or Lobbying Firms						
	Full sample			Distressed firms		
	No ATL	ATL	Diff	No ATL	ATL	Diff
Mean excess return	0.61	0.74	0.13	-0.95	-0.09	0.85
	(2.46)	(2.72)	(1.67)	(-1.78)	(-0.18)	(2.97)
6-factor alpha	-0.17	-0.06	0.12	-1.30	-0.41	0.89
	(-2.34)	(-1.46)	(1.67)	(-3.96)	(-2.39)	(2.96)
Excluding Delaware						
	Full sample			Distressed firms		
	No ATL	ATL	Diff	No ATL	ATL	Diff
Mean excess return	0.61	0.75	0.14	-0.95	0.00	0.95
	(2.46)	(3.33)	(2.05)	(-1.78)	(0.00)	(3.04)
6-factor alpha	-0.17	-0.05	0.12	-1.30	-0.35	0.95
	(-2.34)	(-1.18)	(1.75)	(-3.96)	(-1.55)	(2.87)
Merton/KMV distress measure						
	Full sample			Distressed firms		
	No ATL	ATL	Diff	No ATL	ATL	Diff
Mean excess return	0.61	0.74	0.13	-0.12	0.60	0.73
	(2.46)	(2.73)	(1.70)	(-0.29)	(1.34)	(2.81)
6-factor alpha	-0.17	-0.06	0.11	-0.86	-0.15	0.71
	(-2.34)	(-1.47)	(1.66)	(-3.48)	(-1.08)	(2.77)

Table IA.6: Sensitivity Checks and Alternative Types of Anti-Takeover Laws excluding Large-Cap stocks – Continued

Panel B. Alternative Anti-Takeover Laws						
	Fair Price Law					
	Full sample			Distressed firms		
	No ATL	ATL	Diff	No ATL	ATL	Diff
Mean excess return	0.72	0.78	0.06	-0.19	0.21	0.39
	(2.50)	(3.51)	(0.60)	(-0.37)	(0.40)	(1.72)
6-factor alpha	-0.08	-0.04	0.03	-0.52	-0.11	0.41
	(-1.81)	(-0.90)	(0.69)	(-3.03)	(-0.45)	(1.69)
	Control Share Acquisition Law					
	Full sample			Distressed firms		
	No ATL	ATL	Diff	No ATL	ATL	Diff
Mean excess return	0.73	0.75	0.02	-0.20	0.28	0.48
	(2.55)	(3.37)	(0.23)	(-0.38)	(0.57)	(2.03)
6-factor alpha	-0.08	-0.04	0.04	-0.51	-0.13	0.38
	(-1.87)	(-0.79)	(0.83)	(-2.97)	(-0.53)	(1.59)

Table IA.7: Difference-in-Differences for Market Beta: Firm level

This Table presents the results from difference-in-difference regressions of firm-level monthly market betas on a dummy variable that equals one if the firm is incorporated in a state with anti-takeover law (ATL) and zero otherwise. The firm's market beta for each month is estimated by regressing the firm's daily excess stock return on the daily excess market return. The control variables include the log market capitalization and the book leverage ratio. The regressions also include two time-dummy variables, $Before^1$ and $Before^2$, that indicate years one and two prior to the enactment of anti-takeover laws, as well as firm and time fixed effects. We run the regressions on the full sample and on a subsample of financially distressed firms, classified by the top quintile based on the financial-distress measure from Campbell et al. (2008). We report regression coefficients and t-statistics are in parentheses. The sample period is 1982-2017.

	Full sample		Distressed firms	
ATL dummy	0.05	0.06	0.12	0.26
	(4.48)	(4.27)	(1.10)	(1.80)
Log(size)		0.13		0.23
		(92.31)		(40.69)
Leverage ratio		-0.00		-0.04
		(-0.14)		(-1.60)
$Before^1$		0.01		0.21
		(0.88)		(1.46)
$Before^2$		0.03		0.13
		(2.02)		(1.09)

Table IA.8: Countries with pro-takeover laws

This table reports the list of countries in our sample of developed and emerging countries that passed a takeover law.

Country	Year of takeover law
Australia	1975
Austria	1998
Belgium	1989
Chile	2000
Finland	1989
Germany	2002
Hong Kong	1975
India	1997
Indonesia	1998
Ireland	1997
Italy	1992
Malaysia	1998
Netherlands	1970
New Zealand	2001
Pakistan	2000
Philippines	1998
Singapore	1974
South Africa	1991
Spain	1991
Sweden	1991
Switzerland	2004
Taiwan	2002
United Kingdom	1968

Table IA.9: Details on country takeover laws

Country	Year	Name of the law	Source	Details
Australia	1975	Foreign Acquisitions and Takeovers Act	Lel and Miller (2015), www.takeovers.gov.au, www.comlaw.gov.au	Simplifies the process of acquiring interests in securities, assets, or Australian land
Austria	1998	Takeover Act	Lel and Miller (2015)	Introduces for the first time formal rules for acquiring a majority interest in a company. Also intended to make Austria takeover legislation more transparent and consistent with that of other major European Countries. Explicit rules regarding purchase offers involving acquisitions of a controlling participation in a company. For further details, see, for example, Poch (1998).
Belgium	1989	Royal Decree of 11/8/1989 and the law of March 3/2/1989	Lel and Miller (2015), Nenova (2006)	Specific rules about takeover bids, mandatory offers, and disclosure of shareholder information. Formal provisions for governing mergers and acquisitions.
Germany	2002	Takeover Act	Lel and Miller (2015), Strelow and Wildberger (2002), Baum (2006)	Formal provisions for governing acquisitions of publicly traded companies. Under the Act, a bidder who has obtained control over a target must make an offer for all of the target outstanding shares, including any preference shares ("mandatory offer"). As per Strelow and Wildberger (2002), prior to the passage of the takeover act, takeovers of public companies had not often been considered worth pursuing.
Hong Kong	1975	Code on Takeovers and Mergers	Lel and Miller (2015), Nenova (2006), www.charltonslaw.com/ hong-kong-law	Operates to ensure fair and equal treatment of all shareholders in relation to takeovers.
Finland	1989	Securities Markets Act of 1989	Lel and Miller (2015)	Relates to the issuance of securities to the public, the transfer and clearing of securities issued to the public as well as to the arrangement of trading in securities. Sections 6 and 8 regulate takeover bids, including publication and communication of the bid, time allowed for acceptance of the bid, and treatment of competing bids. Section 10 regulates mandatory bids.
India	1997	Substantial Acquisition of Shares and Takeovers	Government of India, Ministry of Finance: http://dipam.gov.in/, Lel and Miller (2015)	Regulates disclosures of shareholding and control in a listed company as well as acquisition of shares or voting rights, acquisition of control over a listed company and bail out takeovers.
Indonesia	1998	M&A regulations (Gorvernment regulation No 27/1998), Presidential Decree No. 96 and No. 118	Lel and Miller (2015)	Is intended to guard the interests of the target company, its shareholders, and employees. Introduces formal requirements for transactions involving acquisition of controlling interest in the target company.
Ireland	1997	Takeover Panel Act	Lel and Miller (2015), http://irishtakeoverpanel.ie/	Provides an orderly framework within which takeovers are conducted.

Table IA.9: Details on country takeover laws – continued

Country	Year	Name of the law	Source	Details
Italy	1992	Public Tender Offer, Law 149/1992	Nenova (2006), Lel and Miller (2015), Rossi (2012)	Regulates public tender offers and the transfer of corporate control by giving powers to the Commissione Nazionale per le Societa e la Borsa.
Malaysia	1998	Code on Takeovers and Mergers	Nenova (2006), Lel and Miller (2015)	Regulates mandatory offers, voluntary offers, advisers, acquisition of additional voting shares, etc. For further details see https://www.sc.com.my/the-malaysian-code-on-take-overs-and-mergers-1998-the-code/.
Netherlands	1970	Merger Code of the Social Economic Council		
New Zealand	2001	Takeover Code	Lel and Miller (2015)	Ensures that all shareholders have the opportunity to participate in changes of control and that all parties to the transaction have a level playing field. The rules of the Takeovers Code are intended to ensure that shareholders will have all of the information they need and plenty of time to make their decision about the control-change transaction. See also http://www.takeovers.govt.nz/assets/Assets-2/Takeovers-Directors-booklet-linked2a.pdf.
Pakistan	2000	Ordinance on Substantial Acquisition of Shares and Takeovers of Listed Companies	Nenova (2006), Lel and Miller (2015), Khan (2008)	Establishes fair treatment to all shareholders; equal and timely access to information to all; orderly process for substantial acquisition; and a methodology of offer to all shareholders as in UK.
Philippines	1998	Tender Offer Rules	Lel and Miller (2015)	
Singapore	1974	Code on Takeovers and Mergers	Lel and Miller (2015)	Provides guidance on the principles of good business practice to be observed in takeover and merger transactions. Modelled after the City Code on Takeovers and Mergers of the UK. See also https://eoasis.rajahtann.com/eoasis/lu/pdf/2016-03_Rev-SG-Code-Takeovers-Mergers.pdf
South Africa	1991	Code on Takeovers and Mergers	Nenova (2006), Lel and Miller (2015)	The Takeover Regulations are largely based on older versions of the UK City Code on Takeovers and Mergers. The Takeover Regulations are statutory and are enforced by the courts rather than through self-regulation.
Spain	1991	Public Takeover Offerings (Royal Decree 1197/1991)	Lel and Miller (2015)	Regulates disclosure of significant shareholdings in listed companies and acquisitions of shares owned by them.
Sweden	1991	Industry and Commerce Stock Exchange Committee Takeover Standard, Financial Instruments Trading Act	Nenova (2006), Lel and Miller (2015)	Regulates disclosure of changes in shareholdings. The disclosure obligation is triggered if a holding reaches, exceeds or falls below certain thresholds of the votes or the number of shares in a company. A company's acquisition and transfer of its own shares shall also be reported if the transaction implies that the holding reaches, exceeds or falls below any of the thresholds.

Table IA.9: Details on country takeover laws – continued

Country	Year	Name of the law	Source	Details
Switzerland	2004	The Merger Act	Lel and Miller (2015)	Regulates the civil law aspects of mergers in a broad comprehensive framework, significantly facilitating acquisition deals, which used to be governed by under Swiss corporate law and had to be carried out through a series of complicated transactions, often triggering unfavorable tax consequences and formal liquidation procedures.
South Africa	1991	Code on Takeovers and Mergers	Nenova (2006), Lel and Miller (2015)	The Takeover Regulations are largely based on older versions of the UK City Code on Takeovers and Mergers. The Takeover Regulations are statutory and are enforced by the courts rather than through self-regulation.
Taiwan	2002	Business Mergers and Acquisitions Act	Lel and Miller (2015)	Provides some general amendments to the Company Act to simplify the M&A process, introduces more types of mergers including cash-out mergers and cross-border mergers, as well as provides some tax incentives to neutralize the transaction costs associated with M&A deals.
United Kingdom	1968	City Code on Takeovers and Mergers Act	Lel and Miller (2015), www.thetakeoverpanel.org.uk	Established the Panel on Takeover and Mergers, whose central objective is to ensure fair treatment for all shareholders in takeover bids.

Table IA.10: Summary Statistics: International Sample

This table presents data for a pooled sample of publicly traded firms from 43 developed and emerging countries appearing in Compustat Global over the period 1989-2017, and separately for firms from countries with and without pro-takeover laws (PTL). These laws have been passed by 23 countries: in 10 countries prior to the beginning of sample period, and in 13 countries during the sample period, between 1997 and 2004. The specifics of the laws are described in Table IA.2. All variables are winsorized at the 1st and 99th percentiles. For each variable, we first calculate the cross-sectional mean and median across stocks. We then report the time-series averages of these means and medians. *Size* is the equity value of the underlying stock (in billions of dollars). *Market-to-book* is the ratio of current equity market value to equity book value of the recent annual statement. *Past stock return* is the cumulative return over the past six months. *Book leverage* is the book value of debt divided by book value of assets. *Profitability* is the annual income before extraordinary items divided by the previous year's book equity value. *Investment* is the annual change in gross property, plant, and equipment, plus the change in inventories, scaled by lagged book value of assets. *Default probability* is a one year probability of default derived from the Merton/KMV model.

		All countries	No PTL	PTL
	# firm-months	5,106,895	3,982,019	1,124,876
Size	Mean	1.042	1.046	1.052
	Median	0.178	0.203	0.163
Market-to-book	Mean	2.646	2.609	2.525
	Median	1.561	1.547	1.414
Past stock return	Mean	0.067	0.058	0.083
	Median	0.006	-0.004	0.028
Book leverage	Mean	0.347	0.369	0.307
	Median	0.321	0.350	0.275
Profitability	Mean	0.055	0.054	0.064
	Median	0.067	0.061	0.087
Investment	Mean	0.032	0.036	0.031
	Median	0.030	0.034	0.023
Default probability	Mean	0.024	0.023	0.025
	Median	0.000	0.000	0.000

Table IA.11: Fama-MacBeth Regressions on Pro-Takeover Law Dummies for Financially Distressed Stocks: International Evidence

The table presents the results of monthly cross-sectional firm-level Fama and MacBeth (1973) regressions of market-adjusted stock returns (raw returns minus value-weighted market returns) on a dummy variable that indicates the presence of a pro-takeover law (PTL) in the firm's country of incorporation. The control variables include the log market capitalization, log market-to-book ratio, past six-month return, profitability, and investment. We run the regressions on subsamples of financially distressed firms, classified by the top tercile and quintile based on the Merton/KMV distance-to-default model. All coefficients are multiplied by 100 and Newey-West corrected t-statistics (with twelve lags) are in parentheses. The sample period is 1989-2017.

	Distressed firms			
	Top tercile		Top quintile	
Cnst	-0.10	0.00	-0.34	-0.14
	(-0.61)	(0.01)	(-1.91)	(-0.35)
PTL dummy	-0.44	-0.31	-0.50	-0.39
	(-2.81)	(-2.09)	(-2.83)	(-2.22)
Log(size)		0.00		-0.02
		(-0.09)		(-0.35)
Log(market-to-book)		-0.25		-0.21
		(-3.52)		(-2.89)
Past return		-1.62		-1.97
		(-4.27)		(-4.99)
Profitability		0.67		0.74
		(2.83)		(2.32)
Investment		-0.67		-0.68
		(-2.61)		(-2.58)

Table IA.12: Difference-in-Differences for Market Beta: International Evidence

The table presents the results of difference-in-difference regressions of firm-level monthly market beta on a dummy variable that indicates the presence of a pro-takeover law (PTL) in the firm's country of incorporation. The firm's market beta for each month is estimated by regressing the firm's daily excess stock return on the daily excess market return in the country. The control variables include the log market capitalization and the book leverage ratio. The regressions also include two time dummy variables, $Before^1$ and $Before^2$, that indicate years one and two prior to the enactment of pro-takeover laws, as well as country and time fixed effects. We run the regressions on subsamples of financially distressed firms, classified by the top tercile and quintile based on the Merton/KMV distance-to-default model. We report regression coefficients and t-statistics are in parentheses. The sample period is 1989-2017.

	Distressed firms			
	Top tercile		Top quintile	
PTL dummy	-0.06	-0.08	-0.11	-0.13
	(-3.45)	(-4.60)	(-4.07)	(-4.17)
Log(size)		0.07		0.07
		(21.18)		(14.32)
Book leverage		-0.03		-0.04
		(-4.20)		(-4.09)
Before^1		-0.03		0.01
		(-1.03)		(0.20)
Before^2		0.01		0.04
		(0.42)		(0.95)

Table IA.13: Fama-MacBeth Regressions on the Merger Control Index for Distressed Stocks

The table presents the results of monthly cross-sectional firm-level Fama and MacBeth (1973) regressions of market-adjusted stock returns (raw returns minus value-weighted market returns) on a a merger control index (obtained from Bradford and Chilton (2018)), which is a proxy for the difficulty of exercising M&A transactions in a country. The control variables include the log market capitalization, log market-to-book ratio, past six-month return, profitability, and investment. We run the regressions on subsamples of financially distressed firms, classified by the top tercile and quintile based on the Merton/KMV distance-to-default model. All coefficients are multiplied by 100 and Newey-West corrected t-statistics (with twelve lags) are in parentheses. The sample period is 1989-2010.

	Distressed firms			
	Top tercile		Top quintile	
Cnst	-0.98	-0.65	-1.42	-0.92
	(-3.51)	(-1.13)	(-4.38)	(-1.72)
Merger control index	1.01	0.71	1.27	0.89
	(2.76)	(1.92)	(2.84)	(2.02)
Log(size)		0.00		-0.02
		(0.00)		(-0.37)
Log(market-to-book)		-0.24		-0.17
		(-2.54)		(-1.78)
Past return		-2.27		-2.67
		(-5.16)		(-5.95)
Profitability		0.31		0.29
		(1.27)		(0.82)
Investment		-0.76		-0.73
		(-2.81)		(-2.59)

Figure IA.1: Anti-Takeover Law Proportions

The upper figure shows the numbers of firms with and without anti-takeover law (ATL) over the period 1986-2017. The lower figure shows the proportions of firms that are incorporated in states with and without anti-takeover law over the sample period.

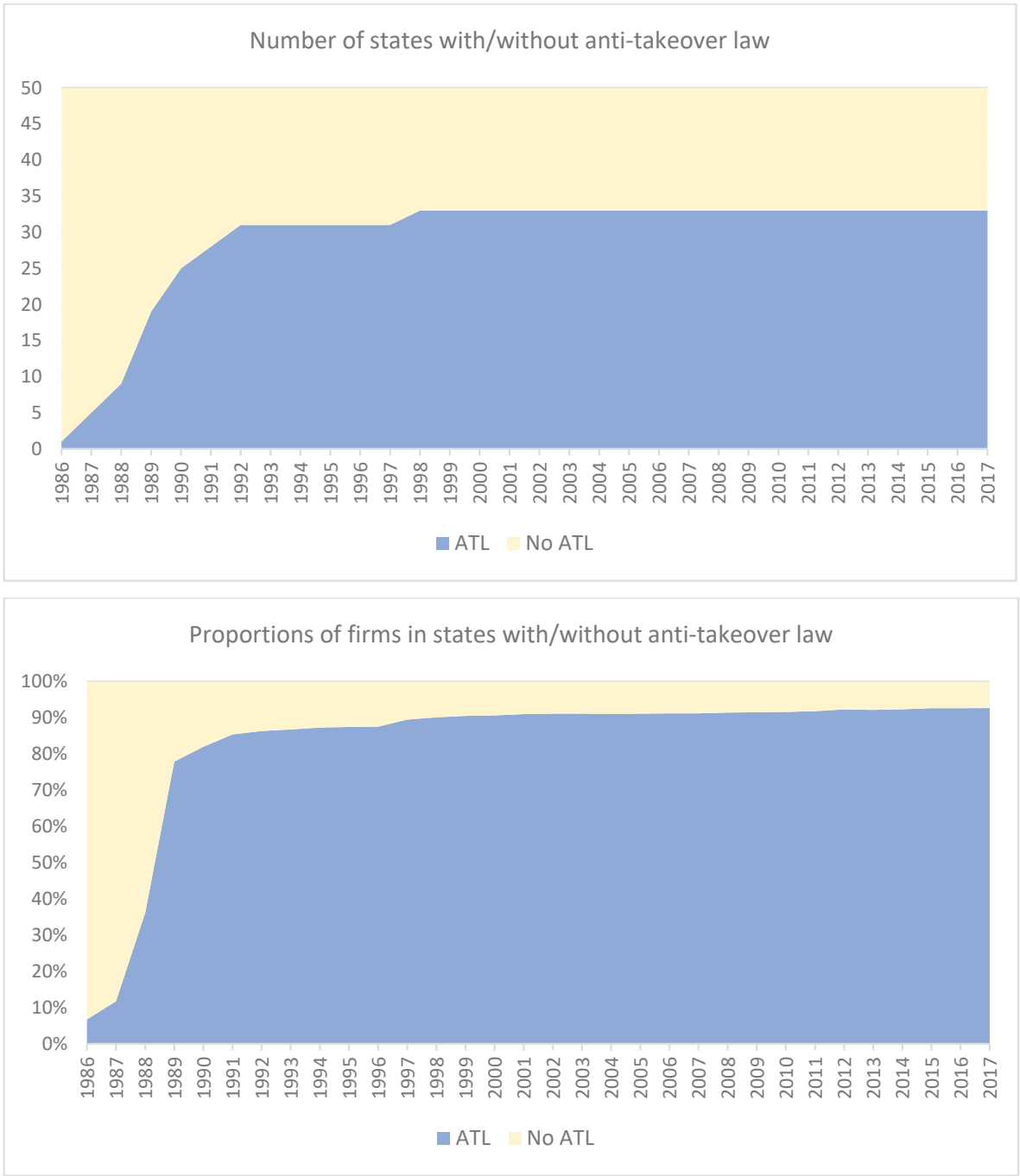


Figure IA.2: The Effect of Anti-Takeover Law on the Distress Anomaly

Each month we sort all stocks into ten equal-sized portfolios based on the financial-distress measure from Campbell et al. (2008). We construct a zero-investment value-weighted hedge portfolio of buying the most healthy stocks portfolio and selling the most distressed stocks portfolio, and we hold this portfolio for one month. The figure shows the monthly mean excess return and six-factor alpha (the Fama-French (2015) five factors augmented with a momentum factor) of the portfolio when including all firms, and separately when including firms operating in states with and without antitakeover law. The sample period is 1986-2017.