Distress Anomaly and Shareholder Risk: International Evidence

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ABSTRACT

Financially distressed stocks in the U.S. earn puzzlingly low returns giving rise to the distress risk anomaly. We provide evidence on the performance of distressed stocks in 34 different countries. The distress anomaly appears to exist in developed countries but not in emerging ones. Using cross-country analyses we explore several alternative potential drivers of returns to distressed stocks. The distress anomaly is stronger in countries with stronger takeover legislation, lower barriers to arbitrage, higher information transparency, and easier access to new loans. These findings suggest that various aspects of shareholders' risk play an important role in shaping distressed stocks returns.

Keywords: Distress anomaly; International finance

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1. Introduction

Since Fama and French (1992) suggested financial distress risk as a potential explanation for the value premium, several academic studies have examined the performance of financially distressed stocks (see, for example, Dichev (1998), Griffin and Lemmon (2002), and Campbell, Hilscher, and Szilagyi (2008), henceforth, CHS.) However, contrary to the general intuition, distressed equities are typically found to have lower returns, a finding inconsistent with a risk-based story. Furthermore, the excess returns to most distressed stocks are negative (see CHS, 2008.) We refer to this phenomenon as "distress risk puzzle." While a few potential explanations have been proposed, there is still no consensus in the literature about what drives this anomaly.

To the extent that distress risk represents a priced risk factor, CHS (2008) indeed find that financially distressed firms have high market betas and high loadings on SMB and HML factors. From a risk perspective it is hard to reconcile this finding with low returns to distressed equities. Garlappi, Shu, and Yan (2008) propose a model in which distressed stocks become safer as they approach the default boundary due to violations from the absolute priority rule. However, their model cannot account for negative excess returns to distressed equities (and appears to contradict the finding that distressed stocks usually have high loadings on risk factors).

The distress anomaly may result from unexpected developments during the sample period, as suggested by CHS (2008). In support of this view, Chava and Purnanandam (2010) argue that the association between distress risk and expected returns is actually positive, and the negative relation between distress risk and realized returns is due to a streak of surprisingly low realized returns on distressed stocks in the U.S. in the 1980s that have not been anticipated by investors. That is, the distress anomaly may be an in-sample phenomenon that is unlikely to continue in the future, and most likely U.S.-specific.

The distress anomaly might also have a misvaluation explanation. For example, investors may not have fully understood how to predict failure risk, and so may not have discounted the prices of distressed stocks enough to offset their failure probability. CHS (2008), however, cast doubt on this argument by showing that returns to distressed firms are not concentrated around earnings announcements.

Some alternative explanations have also been proposed. For example, CHS (2008) point out that investors may have preference for positively skewed returns and therefore are willing to hold distressed stocks (which are likely positively skewed) despite their low returns. It could also be that majority owners of distressed companies can extract private benefits, for example, by buying the company's output or assets at bargain prices.

In this paper we go beyond the limitations of the U.S. data and study the performance of distressed stocks around the globe. In doing so we pursue two goals. First, we examine whether the distress anomaly is specific to the U.S. or is present in other countries as well. This evidence can help us evaluate some of the potential explanations for this anomaly. For example, if the poor performance of distressed equities is caused by the divergence between expected and realized returns due to some specific events that occurred in the U.S., we are unlikely to observe a similar pattern in most other countries. Second, an international study allows us to relate returns to distressed stocks to various country-level characteristics (e.g. measures of shareholder protection or the friendliness of takeover legislation, among others). By doing so, and measuring which of these country-specific variables affect returns to distressed stocks, we can also better understand what drives the distress anomaly in the U.S.

We study returns to distressed companies in 34 countries over the period 1992-2010. Firm-specific data are taken from WorldScope, while country-level data are obtained both from

aggregation of firm-specific data and from sources used in prior international studies. Identifying financially distressed companies in different countries is challenging for several reasons. Econometric models of financial distress are typically based on a large set of accounting variables (see, for example, Altman (1968), Ohlson (1980), and CHS (2008)), which are missing for many international firms. Moreover, the parameters of most of these models were estimated using U.S. stocks and may not be suitable for other countries (see Altman (2005)). We therefore employ the distance-to-default derived from Merton's (1974) model (also employed by Moody's KMV) to measure the extent of a firm's financial distress (see also Vassalou and Xing (2004)). Unlike most alternative models, the distance-to-default measure uses only equity value, equity volatility, and the face value of debt, allowing us to implement it on a large cross-section of international firms.

We present two main findings. First, we show that the distress anomaly appears to exist only in developed countries (with magnitude comparable to that reported in the U.S.), but not in emerging markets. In developed countries, value-weighted portfolios of stocks in the bottom distress quintile underperform the portfolios of stocks in the top distress quintile by an average of 0.17% to 0.63% a month (measured by excess return and alphas from factor models).[1] In emerging markets, however, no such effect is found. In fact, in some specifications, results for emerging markets indicate that returns to distressed stocks are higher than those on solvent stocks. We verify this result by running firm level monthly Fama and MacBeth (1973) regressions of excess stock return on the extent of financial distress, separately for firms in developed and emerging countries. Therefore, while the distress puzzle is not U.S.-specific, it is more pronounced in developed markets than in emerging markets.

One reason for the divergence of results between developed and emerging markets may be

[1] The distress effect using the KMV measure is weaker than when using other distress models; see CHS (2008).

related to market capitalization. Indeed, prior evidence for the U.S. shows that the distress effect is stronger in smaller companies. Consistent with this, we also find that the distress puzzle is stronger in small-cap companies but non-existent in large-cap companies in developed markets. However, partitioning on market capitalization still reveals no evidence of distress puzzle in emerging markets.

To further investigate these differences as well as to better understand the source of the distress puzzle, we turn to individual country analysis. While classifying countries into developed and emerging markets is standard practice, this aggregation leaves a lot of heterogeneity across countries unexplored. We accordingly proceed to examining the relation between returns to distressed stocks and individual country characteristics.

We construct several country-specific variables to capture various risks inherent to distressed stocks, as well as room for misvaluation, and the features of distressed stocks that can make them particularly attractive to investors in certain countries. We assess the effect of each characteristic on distressed stock returns using both portfolio and regression approaches. We look at the average distress effect (the difference between the excess returns on the portfolios of the bottom and top distress quintiles) of countries with the lowest and highest values of the characteristic of interest (we replicate this analysis separately for developed and emerging markets for each characteristic). In addition, we run monthly cross-sectional Fama-MacBeth regressions of excess stock return on an interaction term between the country characteristic and a distress quintile dummy.

When constructing our country-level variables, we consider seven different categories of possible drivers of returns to distressed stocks. The first is the bargaining power of shareholders versus bondholders in financial distress, or debt enforcement risk. Some studies conjecture that

distressed stocks might be safer due to the possibility of renegotiation or deviations from the absolute priority rule (see, for example, Garlappi and Yan (2011) and Hackbarth, Haselmann, and Schoenherr (2012)). Even if distressed stocks are not safer on average vis-à-vis solvent ones, variations in shareholders' bargaining power should affect their risk and hence returns: in countries where shareholders have more bargaining power in renegotiation or where it is easier to renegotiate, distressed stocks are likely relatively safer and should therefore earn lower returns. We find, however, only weak support to this theory. Both portfolio and regression results show that in countries with higher insider ownership (as a proxy for shareholder bargaining power) distressed stocks indeed earn lower returns. However, other proxies for bargaining power (renegotiation failure, debt priority, creditors' recovery rate, and creditors' rights) do not yield such a relation.

The second explanation that we explore is the limits to arbitrage. Distressed stocks are harder to arbitrage (see, for example, CHS (2008) and Eisdorfer, Goyal, and Zhdanov (2013)). General market illiquidity exacerbates this effect, which makes distressed stocks more risky. We use two country-wide measures of illiquidity and institutional ownership to test this hypothesis and find mixed support for it. Depending on the specification and/or the markets that we consider, there is some positive association between returns to distressed stocks and limits to arbitrage.

The third potential explanation is takeover legislation. Many distressed companies get saved by being acquired, so a possibility of acquisition makes them less risky. We, therefore, expect lower returns on distressed stocks in countries with more takeover-friendly legislation. We measure the friendliness of country-wide takeover legislation by a takeover index variable (Nenova (2006)), and a rule of law variable (assessment of the law and order tradition in the country; see La Porta, López-de-Silanes, and Shieifer (1998)). The results using both measures

support this explanation as distressed stocks indeed do earn much lower returns in countries with stronger takeover legislation.

We also examine the effect of information transparency on the distress anomaly. Low quality of accounting standards/disclosures makes it harder to assess the true probability of bankruptcy and therefore leaves more room for misvaluation of distressed securities. This represents an additional source of risk that investors in distressed stocks would have to bear and, thus, implies low returns on distressed stocks in countries with high information/accounting transparency. The results support strongly this hypothesis, showing that the distress effect is weaker among countries with better accounting standards and higher analyst coverage per firm (Chang, Khanna, and Palepu (2000)). Results using a third measure, the disclosure requirements in a country, are mixed.

Another country-wide variable that we look at is the ratio of private credit to GDP. When this ratio is high it is easier to get a new loan and refinance, reducing the risk of default; this makes distressed stocks less risky and should lead to lower returns. Our results indeed reveal a negative relation between returns to distressed stocks and the private credit/GDP ratio.

We also consider the effect of return skewness on the distress anomaly. Distressed stocks are similar to options/lotteries and may attract investors who seek positive skewness. Therefore, in countries where stock returns in general are more positively skewed, the demand for distressed stocks will be lower, resulting in higher returns on such stocks. The portfolio sort results strongly support this prediction; the distress effect in countries with high stock return skewness is significantly weaker than in countries with low skewness. The regression results however do not show a similar relation. Finally, we do not find that the distress effect is related to the legal origin of a country. Overall, our evidence suggests the magnitude of the distress puzzle is strongly related

to country-level proxies of various aspects of risks inherent to distressed stocks.

There are surprisingly very few studies of distress premium in ex-U.S. data. Agarwal and Taffler (2008) study the relation between momentum and distress in a sample of U.K. companies. Aretz, Florackis, and Kostakis (2013) explore distress risk in a sample of 14 developed countries. The paper most closely related to ours is a contemporaneous independent study by Gao, Parsons, and Shen (2013). Unlike us, these authors explore the impact of individualism across countries to explain the distress puzzle. On the other hand, we explore a richer set of cross-country differences. This allows us to explore many more determinants of risk in the distress risk puzzle.

2. Data and variables

2.1. International firm-level data

We obtain stock returns and accounting data for international firms from Datastream. Our sample consists of 34 countries: 20 developed and 14 emerging. The availability of data varies across countries and is very scarce before early 1990s, so we start our sample in 1992. To ensure that we have a reasonable number of stocks for our cross-sectional tests, we drop country-years with less than 100 firms with available data. We winsorize all variables at the 1st and 99th percentiles and convert all values to U.S. dollars. We follow standard filters in cleaning up the data (see, for example, Ince and Porter (2006) and Griffin, Kelly, and Nardari (2010)). Our final sample contains 2,526,041 firm-year observations representing data on 26,584 firms over the period 1992-2010. Data for U.S. firms are obtained from CRSP and Compustat. Table A1 provides descriptive statistics on the first year of sample and the total/average of companies for each country. Data for most of the developed countries is available from the early 1990s while the data coverage for most of emerging markets is more limited.

2.2. Estimating the probability of bankruptcy for international firms

There are multiple studies that use various accounting inputs to estimate a firm's probability of going bankrupt in the short run. Those different models are usually constructed using a multiple discriminant analysis (see, for example, Altman (1968) and Aziz, Emanuel, and Lawson (1988)), or multiple choice analysis, such as logit (see, for example, Ohlson (1980), Zavgren (1985), Shumway (2001), and CHS (2008)) or probit (see, for example, Zmijewski (1984)). They typically rely on various financial ratios that indicate proximity to financial distress (e.g., book leverage), as well as some measures of profitability (e.g., return on assets, profit margin), liquidity (e.g., the current ratio), efficiency (e.g., asset turnover), growth prospects (e.g., market-to-book ratio), and more.

Those models, however, are not appropriate for the purpose of our study for two reasons. First, the parameters in these models are estimated using data on U.S. companies and, therefore, are unlikely to be applicable to firms in other countries (Altman (2005)). Second, they require a large number of firm-specific accounting variables, many of which are missing in our international dataset. One cannot use a firm's credit rating for international firms either as it is only available for a small fraction of companies. We therefore use the Merton-KMV distance-to-default measure (see Crosbie and Bohn (2002) and Vassalou and Xing (2004)). This measure uses only market value of equity, equity volatility, and the face value of debt as inputs and, thus, can be implemented for the majority of firms in our sample.

The 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:

$$V_E = V_A N(d_1) - Fe^{-rT} N(d_2), \tag{1}$$

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, $d_1 = \left[\ln\left(V_A/F\right) + \left(r + \sigma_A^2/2\right)T\right] \Big/ \sigma_A\sqrt{T}$, $d_2 = d_1 - \sigma_A\sqrt{T}$, 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:

$$\sigma_E = \left[V_A N(d_1)\sigma_A\right] / V_E . \tag{2}$$

The unobservable variables V_A and σ_A are then calculated using observable inputs. V_E is the market capitalization, *F* is measured by the total book value of debt, the short-term risk-free rate *r* is proxied by the yield on one-year Treasuries, *T* is assumed to be one year for all firms (see, for example, Crosbie and Bohn (2002) and Hillegeist et al. (2004)), and σ_E is approximated by the annualized standard deviation of monthly returns in the past year.

Every month, 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.

Because our classification for distressed firms relies on the Merton's contingent claim approach, it is important to highlight the relation between default probability and equity returns derived by this approach, and its implications for our study. Friewald, Wagner, and Zechner (2014) argue that looking at the relation between equity returns and physical default probability is not

enough, as equity returns are related to both physical default probability and risk-neutral default probability. While their arguments could provide a rational theoretical ground for the negative relation between stock returns and default probability, they are unable to explain the empirical facts of distressed stocks' returns lower than the risk-free rate and negative alphas on returns of these stocks.

Table A1 shows the country level statistics on the distance-to-default. For ease of exposition, these are aggregated into regions in Table 1 that shows the summary statistics for the distance-to-default, probability of default, the percentage of firms with speculative grade (bond credit rating of BB+ and lower), as well as excess return (the stock's monthly raw return minus the risk-free rate), firm size (market value of equity), book-to-market ratio (book equity value divided by market equity value), and past return (past twelve-month returns skipping the most recent month). International firms are generally smaller with less growth opportunities (as proxied by book-to-market) than U.S. firms. Stock returns in emerging markets have been considerably higher in our sample period than in the developed ones (including the U.S.). The risk-neutral probability of default and distance-to-default are similar between international and U.S. firms, with firms in emerging economies facing a slightly higher likelihood of bankruptcy. There is a substantial difference in bond ratings: the percentage of firms with speculative grade rating in the U.S. is 52, while it is only 11.6 among international firms. This can be partly explained by different bond rating criteria across countries, but is most likely due to the small fraction of firms with credit rating data, which does not represent the entire population of firms, especially in the international sample. Only 1.2% of the international firm-year observations have credit rating data, compared to 8.8% of the U.S. firm-years. Comparison between firms in developed and emerging markets shows that the former are much larger, have more growth opportunities (however it is possible that

our international sample misses some small, low book-to-market firms in emerging markets), have realized lower stock returns in the past two decades, and have lower likelihood of going bankrupt.

3. Distress effect in international sample

3.1. Portfolio sort analysis

Using the distance-to-default measure, at the end of every calendar quarter we sort all stocks in each country into five equal-sized portfolios. Quintile one contains the most distressed stocks while quintile five consists of the least distressed stocks. We hold these portfolios for the subsequent quarter. We then compute value-weighted monthly returns for distress-risk sorted quintiles in each country.

We provide detailed country-by-country results in the appendix Table A2. However, to reduce clutter, we choose to present only aggregate results in the main text. We choose three different regional aggregations: all countries (International), all countries classified as developed by MSCI (Developed), and all countries classified as emerging by MSCI (Emerging). Aggregation also allows us to address power concerns as combining securities/portfolios across countries produces especially diversified portfolios. We aggregate results in three different ways. We equal- or value-weight portfolios across countries in a region (value-weighting is done using a country's aggregate market capitalization from the prior month). Value-weighting countries has obvious advantages, except in some circumstances where one or two large countries can dominate the overall portfolio; in those circumstances, equal-weighted portfolios provide additional information. Both these weighting schemes ensure that all countries are represented in the aggregate portfolio. This is the approach followed by Fama and French (1998). A third approach is to pool all securities within a region. The resulting long-short portfolio need not contain securities from all countries at a point in time but is still broadly diversified. This is the approach

used by Fama and French (2012), who combine 23 developed markets into four regions. All three approaches produce diversified portfolios, albeit in different ways.

In some of our tests, we also calculate factor-model alphas. There is, however, little agreement about the right asset pricing model. Fama and French (1998) demonstrate the failure of the international CAPM and propose a two-factor model that includes a value factor. Griffin (2002) asks whether these factors should be local or global. Hou, Karolyi, and Kho (2011) find that momentum and value factors capture much of the common variation in global stock returns. There is also little consensus about the right way to construct factors. Some of the variation in construction methods is undoubtedly due to views about market integration and/or the precise nature of the tests.

Unlike the above authors, we have no direct asset pricing purpose and therefore take a stripped down approach. We calculate 1-, 3-, and 4-factor alphas. In calculating these alphas, factors are built using Worldscope data in an analogous manner as the construction of portfolios. The CAPM one-factor model uses the market factor. The three factors in the 3-factor model are the Fama and French (1993) factors. The four factors in the 4-factor model are the Fama-French factors augmented with a momentum factor.

Table 2 reports the difference between the average monthly excess returns of the bottom (most distressed) and top (least distressed) quintiles for each region. We further report the alphas from factor models for the long-short portfolios that buy the bottom and short the top quintiles. All returns and alphas are in percent per month and numbers in parentheses denote the corresponding *t*-statistics. Note that a negative sign in Table 2 means that distressed stocks underperform solvent ones (either on a raw or risk-adjusted basis) and is consistent with the distress risk puzzle found in the U.S. On the contrary, a positive sign indicates superior returns to distressed stocks.

Table 2 reveals several interesting observations. First, the distress effect in the U.S. sample is weaker than reported in prior studies, when using the distance-to-default measure as a proxy for distress. In fact, it shows up only in the three- and four-factor alphas (−0.68% and −0.33% per month, respectively) and is not found in raw or market-adjusted returns.[2] Second, the distress anomaly appears to exist in developed countries with a similar magnitude to that in the U.S. For instance, the three-factor alpha for equal-weighted aggregate sample of developed countries is −0.63% with a *t*-statistic of −3.55. The effect is weaker considering value-weighted or pooled developed market portfolios. Interestingly, the distress effect gets diluted by the inclusion of the momentum factor. This is likely due to the fact that distressed stocks are often past losers and, therefore, load negatively on the momentum factor.

Third, the distress effect does not exist in emerging countries. On the contrary, distressed stocks in emerging markets on average generate higher returns than solvent stocks (although the difference is not always significant). The presence of the distress anomaly only in developed countries coupled with the variation in the distress effect across countries (reported in Table A2), points to the presence of country-specific characteristics that drive returns to distressed stocks and generate the distress effect. We explore the role of such characteristics in Section 4.

3.2. Fama-MacBeth regressions

We complement the evidence from portfolio sorts by running cross-sectional Fama-MacBeth (1973) regressions. Beyond serving as an additional diagnostic check, these regressions allow for multivariate analysis and let us control for other determinants of stock returns and thus

[2] CHS (2008) find similar results when comparing the distress anomaly using distance-to-default and other measures of financial distress. The KMV model yields a strong distress effect in a regressions analysis, both in CHS and in our study.

establish the marginal influence of distress on returns. We run cross-sectional regressions of excess stock returns on the lagged distance-to-default measures. To avoid extreme outliers, we use the quintile number of distance-to-default measure as our main independent variable. The control variables are (log) firm size, (log) market-to-book, and past twelve-month return. We run these regressions on the pooled sample of all international or developed or emerging countries' firms. All regressions include country-specific fixed effects. Second, we run the same regressions on samples of firms in each country separately, and report the mean coefficients across all countries in the geographic region. All reported coefficients are multiplied by 100 and their *t*-statistics (in parentheses) are corrected for autocorrelation using the Newey and West (1987) procedure for six-month lag. The results are reported in Table 3.

Univariate regressions with the distance-to-default quintile dummy do not provide strong evidence of distress effect. This is similar to the weak evidence of distress effect in excess returns in Table 2. However, since the default measure is correlated with size, book-to-market, and past returns, it is important to control for these additional characteristics. Successive inclusion of these controls shows that the regression results are consistent with the portfolio sort results and, sometimes, are even stronger. In the U.S. there is a significant negative effect of financial distress on returns, after controlling for size, book-to-market, and past return (the *t*-statistic of the distance-to-default coefficient is 2.09), consistent with the distress anomaly documented in the literature. The distress anomaly exists also in the international sample (*t*-statistic of 1.72 in the pooled regressions, and 4.96 in the country-specific regressions). More importantly, breaking the international sample reveals that the distress anomaly comes almost solely from developed countries (*t*-statistics of 1.93 and 6.25), and does not exist in emerging markets (*t*-statistic of 0.31 and 0.36).

We also analyze the distressed effect separately in large and small companies. We classify a company as large if its market capitalization in the top 75% of market capitalization within the country (the breakpoint for large corresponds to that used by MSCI). In untabulated results we find that the distressed effect is stronger for smaller firms than it is larger firms. For example, in pooled Fama-MacBeth regressions with control variables for developed countries, the coefficient on distance-to-default quintile is 0.049 (*t*-statistic of 0.79) for large firms but 0.095 (*t*-statistic of 2.47) for small firms. We continue to find no strong evidence of distress effect in emerging countries even for the subsample of small firms. Even though the coefficient on distance-to-default quintile is larger for smaller firms than it is for larger firms, both are statistically insignificant for emerging markets.

4. Distress effect and country characteristics

Financially distressed stocks differ from solvent ones on a number of dimensions. They might be subject to specific sources of risks, which are much less relevant for companies that do not face a significant probability of bankruptcy. For example, due to inherently high bankruptcy risk, distressed stocks and their returns are likely to be affected by bankruptcy laws and by the division of assets between claim holders in the event of liquidation. Likewise, they might depend on the relative bargaining power of equityholders versus bondholders in a debt workout or renegotiation. Many distressed stocks are acquired by other companies, making distressed equities subject to takeover risk.

On the other hand, distressed stocks might have return properties appealing to some investors. For example, returns to distressed stocks are positively skewed and will, therefore, be found attractive by investors seeking positive skewness. Distressed stocks also typically have higher betas and may be in demand by investors seeking to increase their portfolio betas but facing

borrowing constraints (Frazzini and Pedersen (2010)). Distressed stocks may also be subject to liquidity risk and limits to arbitrage. These and other specific factors and sources of risk are likely to play a role in shaping returns to distressed stocks and in driving the distress anomaly.

Because many of these factors are country-specific (e.g., bankruptcy legislation, takeover legislation, accessibility to new loans, market illiquidity, accounting standards), one cannot examine their role in a single country study (for example, by looking solely at returns to distressed stocks in the U.S.). Our international setting, therefore, offers a clear advantage. There are substantial differences in the potential sources of the distress anomaly across countries (reported below), as well as a large variation in returns to distressed stocks. This allows us to examine how the distress effect varies with country characteristics. In addition, looking at country characteristics eliminates the noise involved in estimating firm-specific characteristics.

4.1. Country characteristics and hypotheses development

We divide potential drivers of returns to distressed stocks into two broad categories – the first one represents various types of risks that distressed stocks bear and the second one relates to demand for distressed stocks caused by specific investor preferences. On the risk front we identify six sub-categories of risk – debt enforcement risk, limits to arbitrage (liquidity) risk, takeover risk, information transparency risk, refinancing risk, and legal origin (the latter represents the general legislative environment risk). Investor preferences pertinent to distressed stocks are sub-divided into demand for beta and positive skewness. We combine these together into seven groups of country-specific measures (one measure proxies for two different drivers of returns) in our analysis. We obtain all country-wide variables from aggregation of firm-specific data and from databases used in prior international studies. Table 4 provides the descriptions and sources of all variables. The seven categories and corresponding variables are discussed below.

4.1.1. Debt enforcement risk

The tightness of debt enforcement procedures and potential deviations from the absolute priority rule in bankruptcy clearly affect the riskiness of distressed stocks and can, therefore, influence their returns. Prior studies have demonstrated theoretically that equity in distressed firms can become relatively safe if the shareholders have strong bargaining power against bondholders in bankruptcy situations, due to potential deviations from the absolute priority rule (see Garlappi, Shu, and Yan (2008) and Garlappi and Yan (2011)). The possibility of renegotiations and concessions and the extent to which bondholders can enforce the absolute priority rule in bankruptcy largely depend on the corporate law and corporate culture in a country. Therefore, in countries where shareholders have more bargaining power vis-à-vis bondholders, where it is easier to renegotiate, or where debt enforcement laws are less tight, distressed stocks are expected to be safer and, therefore, earn lower returns.

We use five proxies for debt enforcement risk in a country. The first is 'renegotiation failure,' a proxy for the probability that renegotiations between equityholders and bondholders fail. If this probability is high, distressed stocks become riskier and it is reasonable to expect them to earn higher returns. The second is 'debt priority.' If creditors are given higher priority by the law, distressed stocks become riskier and might again earn higher returns in result. The third and fourth are 'creditors recovery' and 'creditors rights.' By the same logic, when creditors' recovery rate is high and that of shareholders is low and when creditors have more rights, distressed stocks become more risky for shareholders which can be reflected in their returns. Finally, we use 'insider ownership,' given by the average shares of stocks held by insiders in a country, as a proxy for the bargaining power of shareholders – the higher the insider share, the less risky distressed stocks should be (and therefore have lower returns). We follow Djankov, Hart, McLiesh, and Shleifer

(2008) in constructing the measures of debt priority, creditors' recovery rates, and creditors' rights (we use data from Andrei Shleifer's website). We follow Favara, Scrhroth, and Valta (2012) in constructing the measure of renegotiation failure. We construct the insider ownership measure by averaging their holdings by country for firms with coverage in Datastream.

4.1.2. Limits to arbitrage

Arbitrage risk has been frequently suggested in the literature to explain anomalies (Shleifer and Vishny (1997)). Arbitrage risk can have a disproportionally strong effect on distressed stocks, because they are particularly difficult to arbitrage – they are small, illiquid, have low institutional ownership, scarce analyst coverage, and higher beta and idiosyncratic risk (see, for example, Eisdorfer, Goyal, and Zhdanov (2013)). We expect that in markets with greater barriers to arbitrage distressed stocks are more risky, and therefore earn higher returns. To measure this effect we use the cross-country variation in limits to arbitrage. We use three common proxies for the limits to arbitrage at the country level: 'institutional ownership,' 'market illiquidity,' and 'Amihud's (2002) illiquidity' (per firm). Institutional ownership is defined as the average institutional ownership within a country for firms with coverage on Datastream. Following Goyenko and Sarkissian (2008), we define market illiquidity as the percentage of zero daily returns in a month averaged across all firms within a country. Amihud's illiquidity is the average of absolute values of daily returns scaled by trading volume.

4.1.3. Takeover legislation

Distressed companies often provide acquisition opportunities to large companies. For example, Wruck (1990) reports that about 7% of companies that undergo a legal bankruptcy procedure in the U.S. get acquired by other companies. The possibility of an acquisition as a viable

exit reduces the risk that investors in distressed stocks bear. Therefore, our hypothesis is that distressed stocks earn lower returns in countries with more takeover-friendly legislation. Our proxies for the likelihood of a friendly takeover in a country are: 'takeover index,' 'takeover law,' and 'rule of law.' Takeover index is a proxy for the degree of takeover friendliness in the country and is obtained from Nenova (2006), who constructs it using multiple layers of takeover-related variables, such as mandatory offer disclosure, anti-takeover tactics, and others. Takeover law is a dummy variable that equals one if there is a takeover law in a country in a given year, and zero otherwise. We follow Lel and Miller (2011) in constructing this proxy. Rule of law represents an assessment of the law and order tradition in the country and is taken from Andrei Shleifer's website (see La Porta, López-de-Silanes, and Shleifer (1998) for details).

4.1.4. Information transparency

Assessing the probability that a firm will go bankrupt in the short term is a challenging task. As discussed in Section 2.2, most bankruptcy prediction models rely on a large set of accounting variables. Accuracy and reliability of such data is of key importance for investors who want to assess the likelihood of default. Hence, in countries where the quality of accounting standards/disclosures is low, it is even harder to estimate the true probability of bankruptcy and that represents an additional source of risk that investors in distressed stocks would have to bear in such countries. It is reasonable for investors to demand higher returns to distressed stocks in countries with low information/accounting transparency. We use three proxies for the degree of information transparency and quality of accounting standards: 'accounting standard index,' 'disclosure requirement index,' and 'number of analysts per firm'. The accounting standard is created by examining and rating companies' 1990 annual reports on 90 items covering general information, income statements, balance sheets, fund flow statements, accounting standards, and

stock data (please refer to La Porta, López-de-Silanes, and Shieifer (1998) for details). The disclosure requirement index is the arithmetic mean of six sub-indexes: prospectus, compensation, shareholders, inside ownership, contracts irregular, and transactions (see La Porta, López-de-Silanes, and Shieifer (2006)). Both accounting and disclosure requirement indexes are obtained from Andrei Shleifer's website.

4.1.5. Refinancing risk

The likelihood of a firm's default and the riskiness of equityholders' claims depend on the firm's ability to refinance its outstanding loans. In an environment where obtaining new loans is relatively easy, distressed firms will have more financial flexibility to maneuver out of distress and avoid bankruptcy. We proxy for the degree of refinancing risk in a country by the ratio of private credit to GDP. When this ratio is high, it is easier to obtain new credit and the refinancing risk is therefore low. We obtain this ratio from Andrei Shleifer's website (see Djankov et al. (2008)). If refinancing risk is an important factor in driving returns to distressed stocks, one should expect a negative relation between distressed stock returns and the private credit to GDP ratio.

4.1.6. Legal origin

Because the legal tradition in a country is likely to have a significant impact on bankruptcy laws, as well as on firm performance and ownership structure (see La Porta, López-de-Silanes, and Shleifer (1998, 2008)), we examine whether distressed stocks earn different returns under the four legal origins: English, French, German, and Nordic. See La Porta, López-de-Silanes, and Shleifer (1998) for a discussion of the differences among those legal regimes. We consider the legal origin as a control variable as we do not have a specific prediction for effect of the legal origin of the country on the distress anomaly.

We now turn our attention to the characteristics of distressed stocks that can generate demand from investors with specific preferences.

4.1.7. Demand for leverage

Investors who seek to increase the betas of their portfolios but at the same time face borrowing constraints may want to overweigh high-beta stocks, leading to low returns on such stocks (Frazzini and Pedersen (2010)). We proxy for the degree of borrowing constraints in a country by the ratio of private credit to GDP. When this ratio is high, it is easier to obtain additional leverage for investors looking to increase their portfolio betas, which reduces pressure on high-beta stocks from such investors, and leads to higher returns on high-beta stocks. Distressed stocks have high market betas (see, for example, Griffin and Lemmon (2002) for U.S.-based evidence). One then expects low returns on distressed stocks in countries with more financial/capital constraints. Note that this effect is the opposite from the one predicted by the refinancing risk hypothesis. In our empirical tests, therefore, we will not be able to rule out one effect in favor of the other, but rather see which one dominates in the data (if any).

4.1.8. Preference for positive skewness

The equity of a levered firm is analogous to a call option written on the assets of the firm. (see Merton (1974)). This view is particularly relevant for highly levered and financially distressed companies. Thus, distressed stocks, like financial call options provide investors with a highly positively skewed return distribution (see, for example, CHS (2008)). They are, thus, lottery-like investments and are likely to spur demand from investors seeking positive skewness. Investors' appetite for distressed stocks will, however, also depend on whether other (solvent) stocks also offer positive skewness. In particular, the demand for distressed stocks will decline if investors

can generate positive skewness by investing in less distressed or solvent stocks. One would then expect lower returns on distressed stocks in countries where returns in general are less positively skewed. In such countries investors seeking positive skewness have fewer options and will likely overweigh distressed stocks and drive down their returns. We base our measure of skewness on monthly stock returns in each country.

We summarize our hypotheses from this section below.

Hypotheses:

1. **(debt enforcement risk):** Returns to distressed stocks are likely to be higher in countries with higher probability of renegotiation failure, higher debt priority, greater creditor recovery, stronger creditor rights, and lower insider ownership.
2. **(limits to arbitrage risk):** Returns to distressed stocks are likely to be higher in countries with lower institutional ownership, higher market illiquidity, and higher Amihud's illiquidity.
3. **(takeover legislation risk):** Returns to distressed stocks are likely to be lower in countries with higher takeover index, takeover law, and rule of law.
4. **(informational transparency risk):** Returns to distressed stocks are likely to be higher in countries with greater information uncertainty and lower quality of accounting/ disclosure standards.
5. **(refinancing risk):** Returns to distressed stocks are likely to be lower in countries with greater availability of private credit.
6. **(investor preferences):** Returns to distressed stocks are likely to be higher in countries with greater average stock return skewness. Returns to distressed stocks are expected to be higher (due to demand for leverage) in countries with greater availability of private credit.

4.2. First look: Comparison of developed and emerging markets

Since the distress anomaly appears to exist in developed countries and not in emerging ones, we start by examining whether there are differences in the country-wide proxies between the developed and the emerging markets as groups. Table 5 provides descriptive statistics for our country-level variables.

First, debt enforcement risk is higher in developed countries than in emerging countries as indicated by four of the five proxies that we employ (except for the insider ownership). This is inconsistent with our first hypothesis as we find that distressed stocks earn higher returns in emerging countries. Second, and unsurprisingly, emerging markets are more illiquid than developed markets, and also have lower institutional ownership, both variables suggesting a higher level of arbitrage risk in emerging markets. This is consistent with our second hypothesis of a positive relation between returns to distressed stocks and limits to arbitrage. Third, all three proxies of takeover-friendliness are higher in developed countries. This is consistent with our third hypothesis of a negative relation between returns to distressed stocks and takeover legislation. Fourth, the data show that two proxies of information transparency (accounting standard and analyst coverage) are higher in developed countries; the third measure, disclosure requirement, is higher in emerging markets, which is somewhat surprising. This broad cut of the data, therefore, does not present clear evidence for or against our fourth hypothesis.

The ratio of private credit to GDP in developed countries is much higher than that in emerging markets. This is consistent with the refinancing-risk hypothesis but inconsistent with excess demand for leverage part of the sixth hypothesis. And lastly, firms in emerging countries exhibit more positively skewed return distributions than firms in developed markets; this is consistent with our hypothesis of relation between distressed stock returns and investor

preferences.

These differences in country-wide characteristics between developed and emerging countries, some of which are consistent with the extent of distress anomaly found in these two country-groups, provide a first indication of the ability of these characteristics to explain the distress anomaly.

In the next two subsections we analyze the effect of these characteristics on the distress stock returns in more detailed cross-country analyses. Garlappi and Yan (2011) and Favara, Schroth, and Valta (2012) test their theoretical models by examining the pattern of conditional betas. Instead, we focus directly on returns for two reasons. First, even from a strictly theoretical point of view, cross-sectional variation in betas is identical to that in returns for a one-factor model. Thus, focusing on betas is no more powerful than focusing on returns. Second, analysis of returns avoids over-reliance on factor models. Since the empirically documented distress anomaly is about the failure of factor models to explain the returns, we believe that it is more prudent to analyze our hypotheses in the context of returns directly.

4.3. Portfolio sorts

We construct distress risk portfolios as in Section 3.1. For each country, and in every calendar quarter we sort all stocks into five equal-sized quintiles based on the KMV distance-to-default measure, and we hold these portfolios for the subsequent quarter. We then calculate a hedge portfolio that is long in quintile one of most distressed stocks and short in quintile five of least distressed stocks.

Our interest in this section is to study the effect of country characteristics on the returns of this hedge portfolio. To do this, we sort all countries by the characteristic of interest, and compare the mean returns of the hedge portfolios in countries with low versus high values of the

characteristic. In particular, for the sample of all international countries, we construct two groups of five countries each with the lowest and the highest values of a characteristic. When we consider developed and emerging samples separately, we include only three countries in each lowest- and highest-value group. For each group of countries, we calculate the equal-weighted average of country hedge portfolios. Finally, we also calculate the differences of returns in these aggregate hedge portfolios across the two groups of countries.[3]

Table 6 presents the results. We list the predicted sign of the difference in returns in parenthesis next to the characteristic; a positive sign means that the country/region with higher value of that characteristic has higher predicted relative returns to distressed stocks than does a country/region with lower value of that same characteristic.

There is mixed evidence in favor of Hypothesis 1. The effect of insider ownership has the predicted sign and is robust to the pooled sample as well as subsamples of emerging and developed countries. Renegotiation failure proxy works in the predicted direction (higher returns to distressed stocks in countries with higher degree of renegotiation failure) in developed countries (*t*-statistic of 2.20), but is insignificant in emerging markets. The effect of creditors' recovery rate is positive though insignificant in developed countries, but negative in emerging markets and also in the pooled sample of international firms.

Hypothesis 2 is generally supported by the data; the evidence demonstrates the importance of arbitrage risk. Distressed stocks in countries with higher institutional ownership earn lower returns, although the effect is statistically insignificant. The effect of overall market illiquidity and also Amihud's illiquidity measure are significant and have positive signs for emerging countries.

[3] A few country characteristics that we use are dummies or indexes that take only a few values (e.g., 1 to 4). We are unable to divide countries into top five and bottom five by these characteristics. Therefore, we do not use these characteristics in portfolio sorts but use them in regressions in Section 4.4.

However, market illiquidity is insignificantly related to returns for the sample of developed countries.

The effects of our proxies of takeover friendliness are again consistent with Hypothesis 3 for emerging countries; distressed stocks earn lower returns in countries with higher takeover index (*t*-statistic of −4.34) and rule of law (*t*-statistic of −5.33). There is no such effect, however, in developed countries where the difference between the top and bottom three countries is insignificant for both measures.

From Hypothesis 4, we expect negative signs for all three measures of information transparency. Two of them (accounting standards and number of analysts) have the expected sign in the overall sample and are statistically significant. In the subsample of emerging countries, accounting standards and disclosure requirements work in the expected direction and are statistically significant with *t*-statistics of −3.10 and −2.47, respectively. The effect of all three measures in the developed countries, as well as the effect of the number of analyst in emerging countries, is not statistically significant.

Finally, there is a strong effect of overall return skewness on returns to distressed stocks consistent with Hypothesis 6 and the idea that investors seeking positive skewness inflate prices of distressed stocks. Higher private credit to GDP ratio implies lower returns to distressed stocks in emerging markets and the pooled sample, consistent with Hypothesis 5. When the availability of private credit is low, it becomes harder to refinance and makes bankruptcy more likely and thus distressed stocks more risky, inducing investors to demand higher returns on such stocks. This evidence is, however, inconsistent with the idea that investors facing difficulties obtaining leverage will inflate the prices of distressed stocks (which are inherently levered), as predicted by the second part of Hypothesis 6. While we cannot completely dismiss this effect, our evidence suggests that

(even if present) it is dominated by the refinancing risk effect.

To summarize, ten out of the 13 characteristics that we examine affect the extent of the distress anomaly significantly in the predicted direction in the pooled sample of all countries. Examining the effect of the same characteristics in emerging countries shows very similar results as in the entire sample, with only two differences, both representing information transparency: the effect of number of analysts is not significant in emerging markets, but the effect of disclosure requirement becomes significant and has the predicted sign.

The effect of our country characteristics in the sample of developed countries is weaker, with only four of the 13 characteristics being statistically significant and having predicted signs. A possible explanation for this could be that the variation in some characteristics in developed countries is much lower than that in emerging countries. Consider, for example, information transparency. When the quality of accounting standards is very low (which is more likely the case in emerging markets), any small improvement in this quality could significantly enhance the investors' ability to analyze a firm, and particularly to assess its probability to go bankrupt. However, when the quality of accounting standards is already high (as in most developed countries), and most important accounting variables are easily available and bias-free, any additional improvement in accounting quality might not make a big difference for investors. Therefore, these characteristics will matter more for emerging countries than developed countries in explaining the returns on distressed stocks.

4.4. Fama-MacBeth regressions

We further examine the effect of each of the country characteristics using Fama and MacBeth (1973) regressions. We run firm-level monthly cross-sectional regressions on the pooled sample of all countries. The dependent variable is excess stock return in the next month. The

independent variables are the country characteristics, distress dummy, and an interaction term between the country characteristic and the distress dummy. The distress dummy is equal to one for the most distressed firms (the ones that belong to the bottom distress quintile). All regressions also include the control variables (log) size, (log) book-to-market ratio, and past twelve-month return. We include only one characteristic at a time in these regressions. We repeat this procedure separately for the subsamples of firms in developed countries and in emerging countries.

Regressions offer a few advantages over portfolio sorts. First, we are able to include control variables such as past return in regressions. Second, the regressions use the entire cross-section of countries whereas the portfolio sorts look at only the extremes of country characteristics. Third, regressions give equal weight to all firms whereas portfolio sorts over-weight countries with fewer companies.

Table 7 reports only the coefficients and *t*-statistics on the interaction terms for each characteristic. We list the predicted sign of the difference in returns in parenthesis next to the characteristic; a positive sign means that the country/region with higher value of that characteristic has higher predicted relative returns to distressed stocks than does a country/region with lower value of that same characteristic.

As in portfolio sorts, in the sample of all countries, many characteristics affect the distress anomaly as predicted by hypotheses one to three. In particular, two proxies of limits to arbitrage, all three proxies of takeover legislation, and all three proxies of information transparency have the expected signs and are statistically significant at the 5% level. The evidence in favor of Hypothesis 1 is weaker with only one proxy (insider ownership) for debt enforcement risk out of five being significant and having the predicted sign. Unlike the portfolio sorts, skewness in stock returns has no significant effect on the distress anomaly. The distress effect does not seem to be related to the

legal origin of a country, at least not in a significant way. Higher private credit to GDP ratio implies lower returns to distressed stocks in emerging markets and the pooled sample, consistent with Hypothesis 5 but inconsistent with the second part of Hypothesis 6.

Unlike the portfolio sorts, the regression results for the developed countries sample are almost identical to those in all countries. The results for the emerging markets, however, are much weaker. While the signs of coefficients on many characteristics are the same as predicted, only two characteristics (Amihud's illiquidity and the ratio of private credit to GDP) have significant effects on the distress anomaly. The regression results thus supplement the portfolio sort results: most characteristics are associated with the difference between the stock returns of distressed and solvent firms. These effects are also partially present in the subsamples of developed countries but only in the extremes of emerging countries.

4.5. Summary

To summarize the results in this section, we find that the variation in the relative performance of distressed stocks is strongly related to the variation in many country characteristics. Debt enforcement risk, takeover risk, accounting standards and disclosure quality (and the associated risk of failing to assess the likelihood of bankruptcy correctly) all appear important. Second, there are clear differences in these characteristics between developed countries and emerging markets. The effect of the country-wide characteristic on the distress anomaly are somewhat captured by the differences between developed and emerging markets, but not entirely; i.e., the extent of the distress effect still vary with the country characteristics in samples of only developed and only emerging countries.

We also run Fama-MacBeth regressions separately for large and small firms as in Section 3.2. As before, we find in untabulated results that the effect of country characteristics on distress

risk comes mostly from small firms and does not exist for the sample of large firms.

5. Conclusion

In the U.S. distressed stocks earn puzzlingly low returns. We study this anomaly in 34 countries around the world. Portfolio sorts and regression analyses indicate that the distress anomaly is limited to developed countries and is not present in emerging countries; in emerging markets distressed stocks earn higher returns than the solvent companies' stocks. Second, the variation in the distress anomaly across all countries, and to some extent within the separate groups of developed and emerging countries, is explained by a set of country-wide characteristics that are proxies for various aspects of risk associated with holding distressed stocks. Distressed stocks earn relatively lower returns in countries with stronger takeover legislation, lower barriers to arbitrage, higher information transparency, and easier access to new loans. Thus, low returns on distressed stocks are associated with conditions that reduce the risk of the shareholders' claims when approaching bankruptcy. There is also limited evidence that investors' preference for positive skewness also affects returns to distressed stocks. These finding can help us advance our understanding of the puzzling return patterns of distressed stocks.

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Table 1. Descriptive statistics

The table presents descriptive statistics for a sample of U.S. firms, for a pooled sample of international firms from the 34 countries (see list in Table A1), and separately for developed and emerging countries. All variables are winsorized at the 1st and 99th percentiles. Excess return is the stock's monthly raw return minus the risk-free rate (in percent per month) where we use the yield on one year U.S. treasuries as the risk-free rate. Size is market equity value (in millions of dollars). Book-to-market is book equity value divided by market equity value. Past return is the cumulative stock return in the past twelve months (in percent). Distance-to-default and risk-neutral probability of default are derived from the Merton model (see Section 2.2 for details). Speculative grade is bond credit rating of BB+ and lower. The sample period is 1992-2010.

	U.S.		International		Developed countries		Emerging countries	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Excess return	0.841	−0.230	0.880	−0.157	0.641	−0.238	1.375	−0.012
Size	1,721	170	930	106	1,146	122	484	79
Book-to-market	0.752	0.543	0.957	0.690	0.835	0.645	1.213	0.817
Past return	13.945	4.439	14.820	2.709	11.546	2.160	21.584	4.173
Distance-to-default	10.831	6.752	9.341	5.684	10.082	6.379	7.810	4.314
Probability of default	0.019	0.000	0.017	0.000	0.010	0.000	0.032	0.000
% of speculative grade	0.520	1.000	0.116	0.000	0.092	0.000	0.289	0.000

Table 2. Returns and Alphas on Distress Sorted Portfolios

For each country, we sort all stocks each calendar quarter into five equal-sized quintiles (most distressed, D1, to least distressed, D5) based on the distance-to-default measure. We calculate value-weighted returns of each quintile and form zero-investment portfolio of buying D1 and shorting D5. Country-specific portfolios are then aggregated into regional portfolios for all international countries (Int.), all developed countries (Dev.), and all emerging countries (Emg.). 'ew' refers to equal-weighting of country returns; 'vw' refers to value-weighting (using total country market capitalization of last month) of country returns; and 'pool' refers to pooling all securities within a region. We show mean excess returns (in excess of the risk-free rate) and alphas from factor models. The CAPM one-factor model uses the market factor. The three factors in the 3-factor model are the Fama and French (1993) factors. The four factors in the 4-factor model are the Fama-French factors augmented with a momentum factor. Factors are constructed separately for each region analogous to the method of aggregation. All returns and alphas are in percent per month and the corresponding *t*-statistics are in parentheses. The sample period is 1992-2010.

	Excess return	CAPM alpha	3-factor alpha	4-factor alpha
U.S.	0.17	−0.06	−0.68	−0.33
	(0.45)	(−0.18)	(−2.47)	(−1.39)
Int. (ew)	0.05	−0.38	−0.55	−0.14
	(0.20)	(−2.45)	(−3.30)	(−0.99)
Int. (vw)	−0.03	−0.14	−0.18	0.15
	(−0.12)	(−0.77)	(−0.88)	(0.87)
Int. (pool)	−0.07	−0.23	−0.45	−0.02
	(−0.18)	(−0.69)	(−1.33)	(−0.06)
Dev. (ew)	−0.20	−0.53	−0.63	−0.16
	(−0.80)	(−3.06)	(−3.55)	(−1.01)
Dev. (vw)	−0.17	−0.27	−0.30	0.07
	(−0.62)	(−1.29)	(−1.38)	(0.38)
Dev. (pool)	−0.48	−0.59	−0.46	0.01
	(−1.35)	(−2.03)	(−1.51)	(0.05)
Emg. (ew)	0.58	0.08	0.00	0.23
	(1.89)	(0.32)	(−0.01)	(0.86)
Emg. (vw)	0.68	0.50	0.53	0.59
	(2.40)	(2.02)	(1.99)	(2.23)
Emg. (pool)	0.50	0.16	−0.08	0.12
	(0.90)	(0.32)	(−0.17)	(0.28)

Table 3. Fama-MacBeth regressions of excess return on distance-to-default

The table shows the results of a monthly cross-sectional firm-level Fama and MacBeth (1973) regression. The dependent variable is excess stock return. The main independent variable is the quintile number corresponding to distant-to-default measure (1 is most distressed and 5 is least distressed). The control variables are (log) size, (log) book-to-market ratio (measured by equity book value divided by equity market value), and past twelve-month return (we skip one month in calculating the past returns). We run these regressions on four different samples: U.S. firms; all international firms (the 34 countries listed in Table A1), developed countries firms, and emerging countries firms. Regressions reported in columns three to five include country-fixed effects. All coefficients are multiplied by 100 and Newey-West *t*-statistics using six lags are reported in parentheses. The sample period is 1992 to 2010.

		Pooled Fama-MacBeth regressions with country-fixed effects			Means of country-specific Fama-MacBeth regressions		
	U.S.	International countries	Developed countries	Emerging countries	International Countries	Developed countries	Emerging countries
Intercept	1.163	0.092	0.009	1.940	1.009	0.605	1.586
	(2.07)	(0.15)	(0.02)	(1.70)	(5.59)	(3.18)	(4.86)
Distance-to-default	−0.096	0.012	0.054	−0.126	−0.029	0.062	−0.159
	(−1.28)	(0.24)	(1.07)	(−1.67)	(0.34)	(3.44)	(−3.43)
Intercept	3.131	0.613	0.215	4.218	1.550	0.655	2.828
	(2.32)	(0.69)	(0.22)	(3.11)	(3.80)	(1.00)	(4.64)
Distance-to-default	0.071	0.061	0.078	−0.000	0.032	0.101	−0.066
	(1.48)	(1.28)	(1.63)	(0.00)	(3.43)	(5.30)	(−0.88)
Log(Size)	0.526	−0.039	−0.012	−0.196	−0.046	0.005	−0.120
	(3.04)	(−1.23)	(−0.32)	(−3.16)	(−0.07)	(2.39)	(−2.86)
Log(BM)	−0.172	0.433	0.374	0.560	0.418	0.397	0.448
	(−2.04)	(5.02)	(3.55)	(6.93)	(14.46)	(11.10)	(9.26)
Intercept	3.065	0.998	0.724	4.160	1.490	0.944	2.272
	(2.36)	(1.23)	(0.81)	(3.21)	(4.60)	(2.60)	(4.03)
Distance-to-default	0.099	0.072	0.080	0.021	0.063	0.107	−0.001
	(2.09)	(1.72)	(1.93)	(0.31)	(4.96)	(6.25)	(0.36)
Log(Size)	−0.184	−0.078	−0.060	−0.213	−0.085	−0.051	−0.133
	(−2.22)	(−2.51)	(−1.62)	(−3.41)	(−3.45)	(−1.58)	(−3.44)
Log(BM)	0.605	0.399	0.327	0.548	0.393	0.346	0.459
	(3.85)	(5.09)	(3.55)	(6.85)	(14.47)	(10.79)	(9.62)
Past return	0.217	0.550	0.779	0.048	0.280	0.801	−0.465
	(0.68)	(1.98)	(2.51)	(0.17)	(6.01)	(8.44)	(−0.56)

Table 4. Country variables

The table provides the description and sources of the country proxies divided into seven categories. An * on a variable indicates that this variable is available in time-series dimension, absence of an * indicates that this variable is fixed over time.

Variable	Description	Source
Debt enforcement risk		
Renegotiation failure	An index that summarizes a number of characteristics of debt enforcement procedures that protect creditors from shareholders strategic default.	Favara, Schroth, and Valta (2012)
Debt priority	An index that ranges from one to four and equals four in countries where creditors are ranked first in the distribution of proceeds during the insolvency procedure (see Djankov et al. (2008)).	Andrei Shleifer's website
Creditors' recovery rate	An inverse measure of the shareholders benefits to engage in strategic default (see Djankov et al. (2008)).	Andrei Shleifer's website
Creditors' rights*	An index aggregating creditors' rights (see Djankov et al. (2008)).	Andrei Shleifer's website
Insider ownership*	The average proportions of shares held by the firm's employees.	Datastream
Limits to arbitrage		
Institutional ownership*	The average proportion of institutional ownership.	Datastream
Market illiquidity	Average proportion of zero daily returns in a month over 1977-2006.	Goyenko and Sarkissian (2008)
Amihud's illiquidity	The absolute value of stock return divided by dollar trading volume on a given trading day (firm average).	Ng et al. (2011)
Takeover legislation		
Takeover index	An index that measures the friendliness of takeover laws to investors.	Nenova (2006)
Takeover law*	A dummy variable that equals one for country-year with a takeover law, and zero otherwise.	Lel and Miller (2011)
Rule of law	Assessment of the law and order tradition in the country (see La Porta, Lopez-de-Silanes, and Shieifer et al. (1998)).	Andrei Shleifer's website
Information transparency		
Accounting standard index	Index created by examining and rating companies' 1990 annual reports on 90 items covering general	Andrei Shleifer's website

	information, income statements, balance sheets, fund flow statements, accounting standards, stock data (see La Porta, Lopez-de-Silanes, and Shieifer (1998)).	
Disclosure requirement index	The arithmetic mean of six sub-indexes: prospectus; compensation; shareholders; inside ownership; contracts irregular; and transactions (see La Porta, Lopez-de-Silanes, and Shieifer (2006)).	Andrei Shleifer's website
Number of analysts	The number of analysts providing an annual earnings forecast per firm.	Chang, Khanna, and Palepu (2000)
Legal origin		
Legal origin dummies (English, French, German, Nordic)	Four dummy variables that identify the legal origin of the bankruptcy law of each country (see La Porta, Lopez-de-Silanes, and Shieifer (1998)).	Andrei Shleifer's website
Beta/leverage		
Private credit to GDP	Ratio of credit from deposit taking financial institutions to the private sector relative to the GDP (see Djankov et al. (2008)).	Andrei Shleifer's website
Skewness		
Stock return skewness*	The skewness in monthly stock returns in a country.	Datastream

Table 5. Descriptive statistics of country characteristics

The table presents descriptive statistics of the country variables described in Table 4. We present pooled means, medians, and standard deviations separately for all countries, developed countries, and emerging countries. The predicted sign of the difference in returns is listed in parenthesis next to the characteristic; a positive sign means that the country/region with higher value of that characteristic has higher relative returns to distressed stocks than does a country/region with lower value of that same characteristic.

	International			Developed countries			Emerging countries		
	Mean	Med	SDev	Mean	Med	SDev	Mean	Med	SDev
Debt enforcement risk									
Renegotiation failure (+)	0.537	0.540	0.270	0.611	0.550	0.267	0.414	0.495	0.237
Debt priority (+)	3.406	4.000	0.911	3.700	4.000	0.657	2.917	3.000	1.084
Creditors' recovery rate (+)	0.624	0.595	0.265	0.750	0.830	0.203	0.414	0.405	0.222
Creditors' rights (+)	2.292	2.130	1.025	2.424	2.478	1.082	2.090	2.000	0.936
Insider ownership (−)	0.097	0.050	0.101	0.122	0.108	0.112	0.066	0.033	0.079
Limits to arbitrage									
Institutional ownership (−)	0.126	0.103	0.091	0.150	0.115	0.100	0.084	0.088	0.052
Market illiquidity (+)	0.261	0.259	0.089	0.254	0.249	0.090	0.270	0.278	0.090
Amihud's illiquidity (+)	−0.915	−0.974	1.766	−1.216	−1.101	1.385	−0.451	0.004	2.213
Takeover legislation									
Takeover index (−)	0.607	0.590	0.191	0.676	0.620	0.191	0.508	0.540	0.146
Takeover law (−)	0.456	0.516	0.383	0.597	0.645	0.395	0.238	0.290	0.244
Rule of law (−)	7.803	8.542	2.264	8.984	9.617	1.421	5.440	5.267	1.719
Information transparency									
Accounting standard (−)	66.690	65.000	8.014	68.700	68.500	7.277	62.222	64.000	8.151
Disclosure requirement (−)	0.680	0.667	0.178	0.650	0.667	0.181	0.735	0.750	0.166
Number of analysts (−)	14.844	12.870	7.219	17.708	18.435	7.366	10.438	9.770	4.287
Legal origin									
Legal origin English (?)	0.367	0.000	0.490	0.350	0.000	0.489	0.400	0.000	0.516
Legal origin French (?)	0.367	0.000	0.490	0.300	0.000	0.470	0.500	0.500	0.527
Legal origin German (?)	0.133	0.000	0.346	0.150	0.000	0.366	0.100	0.000	0.316
Legal origin Nordic (?)	0.133	0.000	0.346	0.200	0.000	0.410	0.000	0.000	0.000
Beta/leverage									
Private credit to GDP (−/+)	0.865	0.875	0.405	1.030	0.975	0.304	0.592	0.510	0.414
Skewness									
Stock return skewness (+)	0.688	0.701	0.170	0.620	0.601	0.167	0.783	0.772	0.125

Table 6. Distress effect by country characteristics: Portfolio sorts

We sort all stocks, separately for each of our 34 countries, each calendar quarter into five equal-sized quintiles (most distressed, D1, to least distressed, D5) based on the distance-to-default measure. We then calculate the returns to the long-short portfolio that goes long in D1 and short in D5. We also sort countries into two groups, Lo and Hi, with the lowest and highest values of a set of characteristics described in Table 4. These two groups consist of five countries each for the international sample and three countries each for the developed/emerging sample. We finally calculate the equal-weighted average of country long-short portfolios for each group and present statistics on these aggregate portfolios. For each group of countries, we also report the difference in average returns and its *t*-statistic. The predicted sign of the difference in returns is listed in parenthesis next to the characteristic; a positive sign means that the country/region with higher value of that characteristic has higher relative returns to distressed stocks than does a country/region with lower value of that same characteristic. All returns in percent per month. The sample period is 1992-2010.

	International			Developed countries			Emerging countries		
	Lo	Hi	Difference	Lo	Hi	Difference	Lo	Hi	Difference
Debt enforcement risk									
Renegotiation failure (+)	0.02	−0.05	−0.07 (−0.54)	−0.38	−0.06	0.32 (2.20)	0.83	0.85	0.03 (0.14)
Creditors' recovery rate (+)	0.50	−0.18	−0.68 (−5.80)	−0.33	−0.17	0.17 (1.19)	1.29	0.61	−0.68 (−3.32)
Insider ownership (−)	0.51	0.20	−0.31 (−1.88)	0.35	0.00	−0.35 (−1.67)	0.74	0.30	−0.44 (−2.56)
Limits to arbitrage									
Institutional ownership (−)	0.41	0.32	−0.10 (−0.59)	0.21	0.09	−0.12 (−0.55)	0.35	0.68	0.33 (1.85)
Market illiquidity (+)	−0.10	0.36	0.45 (3.90)	−0.23	−0.36	−0.13 (−1.05)	0.01	1.02	1.01 (5.51)
Amihud's illiquidity (+)	−0.19	0.62	0.80 (7.36)	−0.35	0.02	0.37 (3.19)	0.08	0.83	0.75 (4.03)
Takeover legislation									
Takeover index (−)	0.48	0.08	−0.40 (−3.35)	−0.19	−0.01	0.18 (1.52)	0.70	−0.09	−0.80 (−4.34)
Rule of law (−)	0.66	−0.20	−0.86 (−7.63)	−0.25	−0.21	0.05 (0.35)	1.23	0.18	−1.05 (−5.33)
Information transparency									
Accounting standard (−)	0.22	−0.05	−0.27 (−2.30)	−0.27	−0.11	0.16 (1.20)	1.18	0.56	−0.62 (−3.10)
Disclosure requirement (−)	−0.18	0.14	0.32 (2.39)	−0.10	0.12	0.22 (1.50)	0.70	0.26	−0.44 (−2.47)
Number of analysts (−)	0.21	−0.19	−0.41 (−3.29)	−0.22	−0.07	0.15 (1.02)	0.34	0.51	0.17 (1.07)
Beta/leverage									
Private credit to GDP (−/+)	0.83	−0.11	−0.94 (−6.82)	−0.34	−0.16	0.18 (1.06)	1.19	0.12	−1.07 (−5.04)
Skewness									
Stock return skewness (+)	−0.94	0.75	1.69 (14.12)	−0.98	0.07	1.05 (7.77)	−0.30	0.96	1.26 (7.51)

Table 7. Fama-MacBeth regressions of excess return on the interaction between country characteristics and distress

The table shows the results of monthly cross-sectional Fama and MacBeth (1973) regressions. The dependent variable is excess stock return. The independent variables are (log) size, (log) book-to-market ratio (measured by equity book value divided by equity market value), past twelve-month return (we skip one month in calculating the past returns), a country characteristic (described in Table 4), distress dummy (D), and an interaction term between the country characteristic and the distress dummy. The distress dummy is equal to one for the most distressed firms (the ones that belong to the bottom distress quintile). The table reports only the interaction term coefficients (multiplied by 100) and Newey-West corrected *t*-statistics with six lags in parenthesis. The results are presented for a pooled sample of international firms and separately for developed and emerging countries. The predicted sign of the difference in returns is listed in parenthesis next to the characteristic; a positive sign means that the country/region with higher value of that characteristic has higher relative returns to distressed stocks than does a country/region with lower value of that same characteristic. The sample period is 1992-2010.

	International	Developed	Emerging
Debt enforcement risk			
D×Renegotiation failure (+)	−0.463 (−2.34)	−0.341 (−1.75)	−0.530 (−1.71)
D×Debt priority (+)	−0.084 (−2.50)	−0.073 (−2.03)	−0.036 (−0.65)
D×Creditors' recovery rate (+)	−0.403 (−2.49)	−0.304 (−1.85)	−0.449 (−1.27)
D×Creditors' rights (+)	−0.118 (−1.87)	−0.102 (−1.56)	−0.069 (−0.77)
D×Insider ownership (−)	−0.027 (−2.45)	−0.021 (−2.01)	−0.021 (−1.33)
Limits to arbitrage			
D×Institutional ownership (−)	−0.065 (−2.57)	−0.055 (−2.32)	−0.016 (−0.22)
D×Market illiquidity (+)	−0.953 (−2.15)	−0.837 (−1.90)	−0.466 (−0.75)
D×Amihud's illiquidity (+)	0.095 (2.08)	0.073 (1.13)	0.236 (2.72)
Takeover legislation			
D×Takeover index (−)	−0.411 (−2.32)	−0.331 (−1.87)	−0.231 (−0.80)
D×Takeover law (−)	−0.283 (−1.87)	−0.319 (−2.08)	0.099 (0.57)
D×Rule of law (−)	−0.036 (−2.25)	−0.031 (−2.09)	−0.011 (−0.39)
Information transparency			
D×Accounting standard (−)	−0.004 (−2.09)	−0.004 (−1.99)	−0.001 (−0.30)
D×Disclosure requirement (−)	−0.372 (−2.13)	−0.333 (−1.78)	−0.213 (−1.07)
D×Number of analysts (−)	−0.020 (−2.78)	−0.016 (−2.34)	−0.015 (−1.25)
Legal origin			
D×English (?)	−0.209 (−1.25)	−0.218 (−1.24)	−0.019 (−0.10)
D×French (?)	−0.267 (−1.79)	−0.373 (−2.49)	0.081 (0.32)
D×German (?)	−0.253 (−1.36)	−0.208 (−1.08)	−0.392 (−1.20)
D×Nordic (?)	−0.153 (−0.61)	−0.100 (−0.41)	—
Beta/leverage			
D×Private credit to GDP (−/+)	−0.318 (−2.60)	−0.250 (−2.02)	−0.345 (−2.20)
Skewness			
D×Stock return skewness (+)	−0.049 (−0.46)	−0.102 (−0.91)	0.057 (0.46)

Table A1. Country Descriptives

For each country, we report the first year of data, total number of firms, average number of firms per month, and the means and medians of distance-to-default. The countries are ordered alphabetically within developed markets (first 20 countries) and emerging markets (last 14 countries). The overall sample period is 1992-2010.

	First year of data	Total number of firms	Average number of firms	Distance-to-default	
				Mean	Median
Australia	1992	2,116	715	14.3	8.7
Belgium	2000	189	121	10.1	7.5
Canada	1992	1576	575	12.1	7.3
Denmark	1992	280	151	9.0	6.9
Finland	2000	159	116	9.2	6.8
France	1992	1,249	579	8.4	6.0
Germany	1992	1,129	519	11.3	7.1
Greece	1996	360	228	7.2	3.9
Hong Kong	1996	218	165	8.7	5.0
Israel	2006	421	379	7.5	4.0
Italy	1992	394	179	8.1	5.7
Japan	1992	2,863	1,987	8.3	5.6
Netherlands	1992	221	135	10.7	7.7
New Zealand	2005	146	111	11.5	7.4
Norway	1997	327	136	8.3	5.1
Singapore	1995	581	307	8.7	5.3
Spain	1997	194	127	9.5	7.1
Sweden	2000	556	305	11.3	6.6
Switzerland	1992	302	170	9.7	7.6
U.K.	1992	3,234	1,319	11.1	7.3
Chile	1999	227	165	13.0	8.8
China	2000	871	720	7.6	5.6
India	1993	2,353	652	5.8	3.0
Indonesia	1996	425	223	8.2	3.6
Korea	1993	1,831	671	6.3	3.2
Malaysia	1992	952	507	9.0	5.3
Mexico	1999	156	104	10.1	5.7
Philippines	1997	249	167	11.5	4.9
Poland	2006	259	172	6.8	4.4
Russia	2007	306	190	8.8	3.7
South Africa	1993	685	249	9.6	5.9
Taiwan	1995	838	485	7.3	4.6
Thailand	1993	600	298	8.9	4.9
Turkey	1999	317	208	8.0	3.6

Table A2. Returns and Alphas on Distress Sorted Portfolios: Individual Country Results

For each country, we sort all stocks each calendar quarter into five equal-sized quintiles (most distressed, D1, to least distressed, D5) based on the distance-to-default measure. We calculate value-weighted returns of each quintile and form zero-investment portfolio of buying D1 and shorting D5. We show mean excess returns (in excess of the risk-free rate) and alphas from factor models. The CAPM one-factor model uses the market factor. The three factors in the 3-factor model are the Fama and French (1993) factors. The four factors in the 4-factor model are the Fama-French factors augmented with a momentum factor. Factors are constructed separately for each country. All returns and alphas are in percent per month and the corresponding *t*-statistics are in parentheses. The countries are ordered alphabetically within developed markets (first 20 countries) and emerging markets (last 14 countries). The sample period is 1992-2010.

	Excess return	CAPM alpha	3-factor alpha	4-factor alpha
Australia	−0.03	−0.24	−0.18	−0.04
	(−0.08)	(−0.77)	(−0.55)	(−0.14)
Belgium	−0.52	−0.72	−0.74	−0.43
	(−0.77)	(−1.45)	(−1.45)	(−0.92)
Canada	−0.05	−0.23	−0.19	0.12
	(−0.15)	(−0.64)	(−0.52)	(0.33)
Denmark	−0.37	−0.62	−0.94	−0.43
	(−0.85)	(−1.43)	(−2.19)	(−1.03)
Finland	−0.33	−0.32	−0.12	0.04
	(−0.43)	(−0.48)	(−0.16)	(0.06)
France	−0.48	−0.79	−1.21	−0.39
	(−0.85)	(−1.52)	(−2.35)	(−0.83)
Germany	0.14	−0.15	−0.15	−0.06
	(0.33)	(−0.41)	(−0.41)	(−0.15)
Greece	−0.41	−0.65	−0.95	−0.88
	(−0.54)	(−0.98)	(−1.55)	(−1.46)
Hong Kong	0.23	−0.28	−0.58	−0.48
	(0.23)	(−0.32)	(−0.71)	(−0.61)
Israel	−0.37	−1.34	−1.11	−0.51
	(−0.28)	(−1.25)	(−0.99)	(−0.60)
Italy	−0.33	−0.42	−0.36	−0.17
	(−0.90)	(−1.18)	(−1.01)	(−0.50)
Japan	−0.10	−0.06	0.11	0.09
	(−0.28)	(−0.22)	(0.45)	(0.42)
Netherlands	−0.35	−0.87	−0.86	−0.04
	(−0.57)	(−1.61)	(−1.58)	(−0.07)
New Zealand	−0.49	−0.50	−0.55	−0.53
	(−0.70)	(−0.71)	(−0.77)	(−0.73)
Norway	−0.43	−0.65	−0.77	−0.50
	(−0.83)	(−1.30)	(−1.54)	(−0.98)
Singapore	0.02	−0.38	−0.55	−0.49
	(0.02)	(−0.85)	(−1.33)	(−1.22)
Spain	−0.43	−0.73	−0.69	−0.67
	(−0.83)	(−1.54)	(−1.46)	(−1.39)
Sweden	−0.26	−0.67	−0.66	−0.19
	(−0.26)	(−0.79)	(−0.76)	(−0.24)
Switzerland	−0.27	−0.64	−1.16	−0.30

	(−0.56)	(−1.38)	(−2.49)	(−0.74)
U.K.	−0.19	−0.39	−0.53	0.41
	(−0.49)	(−1.07)	(−1.45)	(1.29)
Chile	0.67	0.08	0.13	0.14
	(1.39)	(0.20)	(0.31)	(0.32)
China	−0.04	−0.10	−0.91	−0.84
	(−0.10)	(−0.22)	(−2.66)	(−2.57)
India	0.34	−0.13	−0.21	−0.30
	(0.61)	(−0.26)	(−0.42)	(−0.64)
Indonesia	0.88	0.43	−0.08	−0.28
	(1.07)	(0.58)	(−0.12)	(−0.45)
Korea	−0.26	−0.73	−0.81	−1.03
	(−0.44)	(−1.56)	(−1.73)	(−2.20)
Malaysia	0.02	−0.46	−0.71	−0.60
	(0.02)	(−0.88)	(−1.46)	(−1.48)
Mexico	0.83	0.20	−0.33	−0.01
	(1.06)	(0.26)	(−0.46)	(−0.01)
Philippines	1.92	1.62	1.61	1.52
	(2.27)	(2.51)	(2.46)	(2.32)
Poland	2.29	2.10	0.49	0.50
	(1.55)	(1.45)	(0.39)	(0.41)
Russia	0.47	0.32	0.60	0.10
	(0.28)	(0.20)	(0.36)	(0.06)
South Africa	0.30	0.25	0.13	0.22
	(0.60)	(0.50)	(0.24)	(0.42)
Taiwan	−0.02	−0.23	−0.39	−0.42
	(−0.04)	(−0.50)	(−0.92)	(−0.98)
Thailand	0.52	0.08	−0.19	0.00
	(0.71)	(0.15)	(−0.38)	(0.01)
Turkey	0.88	0.48	0.58	0.65
	(1.19)	(0.68)	(0.83)	(0.92)