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Summary of “In Search of Distress Risk”¹

Corporate failures tend to concentrate in a macro environment where investment opportunities deteriorate, and the stocks of financially distressed firms tend to move together. Since the distress risk cannot be diversified away, equity investors should charge a premium for bearing such risk. However, this paper shows us the exact opposite: Distressed stocks underperform safe stocks for two decades (1981-2003).

The authors design a model to predict failure events, including bankruptcy, being downgraded to D, and delisting.² Predictive variables include profitability, book to market equity ratio, cash holdings, past stock return, leverage, firm market cap (size) relative to the whole market, and volatility.³ They use market equity to calculate leverage, since it is more forward-looking than book equity. Indeed, as the forecast horizon increases, market-based variables become more important than stale accounting information. The model performs better than O-score and Z-score, and almost doubles the accuracy of “distance-to-default” (DD) popularized by Moody’s KMV.⁴ The safest 5% stocks have an average predicted failure probability of 1bp, while the riskiest 5% have a failure probability of 34bp.

To examine whether distressed stocks offer a premium, the authors sort stocks into ten portfolios each year by the 12-month ahead predicted failure probability.⁵ Portfolios with failure probability above 60 percentile have *negative* excess average return over Treasury bill rate (the risk-free rate). The riskiest 1% stocks have an average annual excess return of -16.1%. High-risk stocks are also volatile. The portfolio containing stocks above 95% percentile of failure probability has an annual standard deviation of 26%, while the standard deviation of the portfolio containing stocks below 5% percentile is only 12%.

A long-short portfolio that buys the safest decile of stocks and sells the decile with the highest failure risk has an average annual excess return of 9.7%, and Sharpe ratio comparable to the aggregate stock market. It has statistically significant CAPM alpha of 12.1% and Fama-French three-factor alpha of 22.7%, both annualized.⁶ Since distressed stocks exhibit negative momentum, adding a momentum factor decreases the long-short alpha to 12.1%.⁷ In a follow-up paper published on Journal of Investment Management in 2011, the authors extend the sample to 2008 and obtain similar results.

Is the distress anomaly a small stock phenomenon? The value-weighted average size of safest stocks is 18 times larger than the average size of the 5% most distressed stocks. After sorting stocks into market cap quintiles, the previous long-short portfolio delivers much higher excess return and alpha in the bottom quintile (smallest) than in the top quintile (largest). However, this is mainly driven by the wider spread of failure probability among small stocks. Market-to-book ratios are high at both extremes of the failure risk distribution and lower in the middle. When the stocks are sorted by book-to-market, the excess return of the long-short strategy is more extreme among growth stocks.⁸

Is the distress anomaly from investors’ valuation errors? It is natural to test whether investors are ready to trade new information into the stock prices. Around earnings announcements, the authors

find most distressed stocks actually outperform. Moreover, the long-short return has a correlation of 0.22 with VIX. This is consistent with flight-to-quality phenomenon where investors sell distressed assets in a high risk-averse environment. It seems that investors do pay attention to firms' financial health, but may have not fully appreciated the predictability of corporate failure.

It is possible that the anomaly is a sample-specific phenomenon. In 1980s and 1990s, debtholders may have become unexpectedly more adept at forcing bankruptcy or transferring resources from equityholders to debtholders after default occurs. In the U.S. equity market, institutional ownership has dramatically increased during the sample period. Therefore, given the institutions' aversion to hold shares of financially distressed firms, the distressed stocks have underperformed probably due to the persistent selling pressure from the growing institutional shareholders.

Some investors may have special motives to hold distressed stocks. As shown in this paper, distressed stocks exhibit positive skewness that suits investors with a particular behavioral bias described by the "cumulative prospect theory".⁹ Majority owners of distressed companies can extract private benefits of control, for example, by buying the company's assets at bargain prices.

What limits diversified rational investors from arbitraging away this anomaly? To answer this question, the authors show that the long-short strategy delivers higher average return and alpha among stocks with low analyst coverage, low institutional ownership, and low turnover. Information disseminates more slowly when fewer analysts cover a stock. Since the long-short return is mainly from the short leg, it is hard to implement the strategy when there are few institutional investors ready to lend their shares. A stock with low turnover tends to be expensive to trade in big quantity. These limits to arbitrage help us to understand why the distress anomaly has persisted.

¹ Campbell, John Y., Jens Hilscher, and Jan Szilagyi, 2008, *Journal of Finance* 63, 2899-2939.

² The model is a reduced form logistic model shown by Equation (1) in the paper.

³ Accounting variables are lagged for at least two months. Volatility is calculated for each month using daily stock prices.

⁴ The model's R^2 is c.30%, while DD has R^2 of 16%. Adding DD as extra predictive variable does not improve prediction.

⁵ The portfolios are value weighted, and contain stocks in percentiles 0 to 5, 5 to 10, 10 to 20, 20 to 40, 40 to 60, 60 to 80, 80 to 90, 90 to 95, 95 to 99, and 99 to 100 of the failure risk distribution. When sorting stocks every year, the prediction model only uses data up to that to avoid forward-looking bias.

⁶ The distressed stocks have very strong positive loadings on small-minus-big (size) and high-minus-low (value) factors, while the safe stocks have all negative loadings. So, adding the size and value factors to CAPM amplifies the alpha.

⁷ For details of the factors, please refer to: Fama, Eugene F., and Kenneth R. French, 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics* 33, 3-56; Carhart, Mark M., 1997, On persistence in mutual fund performance, *Journal of Finance* 52, 57-82.

⁸ After regressing the returns of the long-short portfolio on log failure probability, the authors find the average residuals do not differ significantly across size and book-to-market quintiles.

⁹ Please refer to: Tversky, Amos, and Daniel Kahneman, 1992, Advances in prospect theory: Cumulative representation of uncertainty, *Journal of Risk and Uncertainty* 5, 297-323; Barberis, Nicholas, and Ming Huang, 2008, Stocks as lotteries: The implications of probability weighting for security prices, *American Economic Review*, 98, 2066-2100.