

A ‘Wreckers Theory’ of Financial Distress
Discussing “In Search of Distress Risk”,
by John Y. Campbell, Jens Hilscher, and Jan Szilagyi

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Abstract

After developing a reduced form default risk indicator, Campbell, Hilscher and Szilagyi (2005) present evidence that stocks of distressed firms perform in a manner which is vastly inferior to stocks of financially healthy firms. It is not necessary to attribute the negative excess returns of distressed firms to inefficient or irrational markets, as the authors have done. Such negative excess returns can be shown to be the equilibrium outcome under efficiency in an environment where a subset of participants is able to draw returns “in kind” from distressed companies. For firms close to bankruptcy, non-cash returns to ownership may be the dominant form of payout. If markets are efficient, those returns must show up in stock valuation. This may be labelled the ‘wreckers theory’ of financial distress. It explains the entire pattern of results very well. I proceed to show how to test this hypothesis directly against the alternative of inefficient markets using the theory of convenience yields.

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A 'Wreckers Theory' of Financial Distress

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wrē'cker *n.* In vbl senses; one who tries from shore to bring about shipwreck with view to profiting from wreckage, or one who steals such wreckage; person employed in demolition or in recovering wrecked ship or its contents; [...] ¹

1. Challenging evidence

John Campbell and his co-authors (CHS) face us with a stark challenge. After developing a reduced form indicator of default risk based on a logit model for bankruptcy and a broader concept of company failure, they sort firms into ten different portfolios, according to their estimated default risk. Calculating returns on the basis of dividends and capital gains, they then show that the distressed firms strongly underperform financially healthy firms. The difference is magnified if returns are corrected using a CAPM or a Fama-French three-factor model. The type of risk presented by distressed companies is apparently not appreciated by capital markets, so their returns are at a high discount.

On the face of it, the paper belongs to the asset pricing anomaly literature. John Cochrane has characterised this literature in the following words:

[...] Ever since, the business of testing asset pricing models has been conducted in a simple loop:

- 1 Find a characteristic that you think is associated with average returns. Sort stocks into portfolios based on the characteristic, and check that there is a difference in average returns between portfolios. Worry here about measurement, survival bias, fishing bias, and all the other things that can ruin a pretty picture out of sample.
- 2 Compute betas for the portfolios, and check whether the average return spread is accounted for by the spread in betas.
- 3 If not, you have an anomaly. Consider multiple betas.²

The anomaly presented here comes with a twist, though. Fama and French (1996) and others have explained the anomalous high returns of "value stocks" by conjecturing that those firms are often close to bankruptcy: Their prices have been driven down by a string of bad news. And bankruptcy risk is something that markets should rather dislike. For a number of reasons losses due to default can be systematic, and the aggregate default rate is quite volatile. The data set analysed by CHS therefore looks ideal for testing the Fama and French conjecture, and this is perhaps what got the authors started on the paper. But now we see that markets actually seem

¹ From the Concise Oxford Dictionary of Current English, sixth edition.

² Cochrane (2005), p. 436.

to *like* default risk! And the anomaly is by no means a minor one. The three-factor alpha of the highest percentile of the failure risk distribution corresponds to a return of almost -25% at an annual rate.³ For the highest 5% it is still less than -15% annualised. The long-short portfolio that goes long the 10% of stocks with the lowest failure risk and short the 10% of stocks with the highest failure risk earns a whopping annual 23%! And although the evidence is somewhat mixed,⁴ there are other studies that come to very similar conclusions. Dichev (1998) reaches basically the same results as CHS using Altmann (1968) Z-score and Ohlson (1980) O-score rating, Griffith and Lemmon (2002) obtain negative excess returns for distressed firms with a low book-market ratio, and Garlappi, Shu and Yan (2005) find low returns for firms with a bad Standard and Poors's rating.

2. A 'wreckers theory' of financial distress

It is hard to believe that financial market participants as a group can be *that* irrational or inefficient. Therefore I would like to take one step back and try to tell the story of the paper from a completely different perspective. Imagine a firm being hit by a series of negative shocks, making losses and approaching a state of financial distress. With higher leverage, volatility increases and the sensitivity of share prices with respect to private information does, too: the ultimate fate of the firm depends on issues unknown to the general public. What is the ultimate reason for such losses? What is the true economic value of the assets? Are there hidden reserves? What is the firm's true strategy, and what are the prospects of success?

With information asymmetry becoming more important, uninformed investors – widows and orphans – will leave, as, from their perspective, it is a market for lemons. Very soon, equity will be owned by insiders – market participants who have a specific advantage in obtaining and interpreting information related to the company in question. Two groups come to mind: managers themselves, and competing firms or their owners. A third possibility might be private equity or funds, working on a restructuring.

It is this group of well-informed insiders that can draw returns on their investment in other ways than receiving a cash dividend payout. With managers, this is obvious: there is a large body of literature on corporate governance which shows how difficult it is to prevent managers from taking undue advantage of the firm. If the firm is distressed, it would not be wise to realise hidden reserves generating a cash flow, as this cash presumably would go to the creditors. Instead, the utility-maximising manager will try to make use of the firms' resources in a more

³ I am using the results for the three-factor model, because the 'moment factor' used in the four-factor model cannot be interpreted as a explanation in terms of risk – it just measures how much of the excess return can be attributed to persistence. We shall discuss the four-factor results below.

⁴ Vassalou and Xing (2004), using a distance to default measure derived from Merton's (1974) option pricing model, find positive excess returns for high-risk-firms, to the extent that they are small in size and have high BM ratios. The relevance of their results are disputed by Garlappi, Shu and Yan (2005) and Da and Gao (2005).

direct way. Competitors, on the other hand, are those market participants that have the best use of the firms material and non-material resources, among other things specialised labour, market information, technical and engineering information and product knowledge. Much of these resources can be transferred by anybody who happens to have executive power. Of course, controlling the market behaviour of the competing firm can also have a direct positive impact on the competitor's own profits. This type of benefit will not necessarily deplete the resources of the company.

This leads us to a crucial point: Equity is not only a right to receive dividends, it also confers *control rights*. These control rights have an economic value on their own, as they enable owners to draw a return in kind. If control rights had no economic value, who would care to have them? The value of control rights makes equity comparable to a commodity. The return of a storable commodity consists of two parts: the capital gain and the "convenience yield", that is,

[...] the flow of services which accrues to the owner of a physical inventory but not to the owner of a contract on future delivery.⁵

The convenience yield of corporate control comprises *all non-cash economic benefits of ownership*, by no means necessarily illegal ones. Although it does not show up in the books, the convenience yield of corporate control is economically equivalent to a dividend, and it will be valued as such – not only by the ultimate beneficiary, but also by all other market participants who try to form rational price expectations. The shares of distressed firms do generate returns which are consistent with their risk class, but only a subset of market participants can make use of the flows.

The transfer of assets and profits out of firms for the benefit of those who control them has been labelled "tunneling" by Johnson, La Porta, Lopez-de-Silanes and Shleifer (2000). They use legal cases to establish that in developed countries, too, the diversion of corporate resources from the corporation to the controlling shareholder can be substantial, and that much of this diversion is legal. They number a variety of legal forms of diverting resources,

including expropriation of corporate opportunities from a firm by its controlling shareholder, transfer pricing favoring the controlling shareholder, transfer of assets from a firm to its controlling shareholder at nonmarket prices, loan guarantees using the firms asset as collateral, and so on.⁶

My hypothesis is that the convenience yields conferred by ownership of a private company will form a *disproportionately large part of the total payoff of distressed firms*. This may be labelled the 'wreckers theory' of financial distress. Firms close to bankruptcy will be stripped of their assets, as the opportunity costs of not doing so are rising, and if markets are efficient, the resulting returns must show up in their valuation. Distressed firms are an easier prey for insiders with special uses for the firms' resources than healthy firms. The causality also goes the other way: Companies that are being depleted by insiders will very soon find themselves in a

⁵ Brennan, (1991), p.33.

⁶ Johnson, La Porta, Lopez-de-Silanes and Shleifer (2000), p. 26.

situation of financial distress. Eventually, and maybe most important, the process is self-reinforcing. With the conditional probability of bankruptcy increasing, it seems less and less advantageous to the owners to leave valuable resources in the firm. Thus, well-intentioned owners can turn into wreckers quite against their own inclination. Wrecks and wreckers are correlated phenomena: one causes the other.

3. Testing the hypothesis

How would one go about testing this hypothesis? It is useful to start from the idea that at each point in time, the firm is valued according to the present value⁷ of an asset with random pay-offs ψ_t .

$$p_t = \frac{1}{1 + \mu} \sum_{i=0}^{\infty} \frac{1}{(1 + \mu)^i} E_t \psi_{t+i} \quad (1)$$

which is the solution of :

$$E_t p_{t+1} = (1 + \mu) p_t - \psi_t. \quad (2)$$

This equation is constitutive for the efficient market hypothesis. The parameter μ is the asset specific one-period discount rate, that is, the expected return an investor would require to hold a unit of the asset. Then

$$\frac{\psi_t}{p_t} = 1 + \mu - E_t \frac{p_{t+1}}{p_t} = - \left(E_t \frac{\Delta p_{t+1}}{p_t} - \mu \right) \quad (3)$$

Assume for a moment that there are no cash dividends, so that ψ_t is identical to the convenience yield of control rights. Then the right-hand side of the equation is the *excess return* of the asset, given its risk class, and it fully identifies the convenience yield. If there is a cash component in the payout, it has to be brought to the right-hand side:

$$\frac{\omega_t}{p_t} = - \left(E_t \frac{\Delta p_{t+1}}{p_t} + \frac{D_t}{p_t} - \mu \right) \quad (4)$$

Here, ω_t/p_t is the return from control rights and the right-hand side is again the excess return, this time including cash dividends D_t .

We can use the excess return as an unbiased estimator for the convenience yield, if μ is known. For the wreckers theory to hold, it is enough that for a given stream of expected total returns ψ_t the share of convenience yield of control rights is higher – which is a rather mild requirement, given that in many cases distressed companies do not pay out any dividends at all. As we do not know the one-period discount rate, we assume that the risk structure of the total payout is correctly described by the distribution of the other two constituent parts of the

⁷ The empirical implications of the present value model have been worked out in full by Campbell and Shiller (1987).

returns, dividends and capital gains. Then a viable routine for estimating the convenience yield is

- to sort firms into portfolios according to their default risk,
- to calculate returns without the convenience yield components,
- to estimate a CAPM or a factor model in order to generate the appropriate risk-adjusted returns, and then
- to compare the alphas of portfolios with high and low default risk. If the portfolio with the lowest default risk does not confer any convenience yields on its proprietors, then the excess returns of the higher risk portfolios is a direct estimate of the convenience yield. If this is not true, then the excess returns give us the *differential* convenience yields of distressed companies.⁸

This, of course, is exactly what John Campbell and his co-authors have done. Thus, the measured excess returns may simply be a fair estimate of the rate at which owners are drawing non-dividend returns from their control rights, either depleting the resources of their company, or using them in a way that is beneficial to their other interests. We have seen that excess returns are a smoothly decreasing function of default risk, as they should be according the wreckers theory. The results of Dichev (1998) look very much the same, both quantitatively and qualitatively.

The next step would be to compare subsets of firms. Given default risk, the convenience yield should be higher for small firms, as it will be easier to generate returns in kind using the control rights of equity if there is no multi-layered management and a controlling department. And this is the evidence that the authors brought up. For large firms, there is an annualised returns differential of 11.5% between low risk firm and high risk firms. For the smallest size category, it is 17.5%.

It is clear that the convenience yield should show a large degree of persistence, as in most cases it will be based on a *stream* of non-financial rewards. Again, the authors have done the test for us. In addition to the CAPM alphas and the three-factor alphas, they calculate alphas on the basis of the four-factor model proposed by Carhart (1997) that also includes a momentum factor. This momentum factor offers no explanation of return differentials in terms of risk, but it shows how much of the excessive return can be attributed to the fact that they are persistent. It turns out that using the four-factor model including a momentum portfolio cuts the negative alphas of distressed stocks roughly in half, although there is little effect on the excess return of the portfolio formed on the very highest percentile of default risk.

Ultimately, the wreckers effect should be stronger when information are asymmetric. Fortunately, CHS (2005) contains a measure of information asymmetry, the book-market ratio.

⁸ The latter case is not a big problem: adding portfolios to securities that do not confer equity-style control rights, like standard bonds, will give us the absolute convenience yields.

When market value and book value are out of line, then the information value of accounting data is weak. As it turns out, the negative excess premium for distressed companies is larger both for high *and* for low BM ratios (Table 8, Panel A and B).

The wreckers theory is able to explain the entire pattern of results, without invoking any inefficiencies.

4. Telling the two explanations apart

We have two competing explanations for the large negative excess returns, the first one in two variations:

- 1 The excess returns are a true anomaly, because
 - a. markets are irrational. More specifically, financial institutions have a pronounced dislike of shares of distressed firms, which cannot be explained by return characteristics. While the market share of institutions went up, the shares of distressed firms underperformed. This is the interpretation given at the end of Section 5 of CHS.
 - b. markets are inefficient. The information set of financial markets does not encompass the CHS default indicator, although all components were available at the time. This is the interpretation given at the beginning of Section 4 of CHS.
- 2 The excess return is the mirror image of the convenience yield of corporate control. Markets are efficient. This is the wreckers theory.

In its full generality, market irrationality (explanation 1.a) can never be falsified – it is what one would accept if all other meaningful explanations fail. Explanation 1b has the problem that the ingredients of the CHS default indicator are rather straightforward, and the authors have taken great pains to ensure that they were available at the time. An initial test of the encompassing hypothesis would be to do a sorting using the scores of one of the leading rating agencies. If the anomaly still shows up, this would be evidence against the non-encompassing explanation. Actually, this experiment has been performed for us by Garlappi, Shu and Yan (2005). Sorting portfolios according to the S&P rating, the results are strongly significant and consistent with CHS and Dichev (1998).

There is a straightforward test of explanation 2 against the inefficient market hypothesis, beyond what we have done already. Brennan's definition of the convenience yield cited above gives us the clue. If there are forward contracts or futures for the shares in question, a simple arbitrage calculation from forming a replication portfolio results in⁹

$$\psi_{t,T} = (1 + r_T) p_t - f_{T,t} . \tag{5}$$

⁹ See Pindyck (1993).

Here, $\psi_{t,T}$ is the (capitalised) flow of returns, including possible convenience yields, over the period t to $t+T$, per share. As before, p_t is the stock price. $f_{T,t}$ is the forward price for delivery at $t+T$, and r_T is the *risk-free* T-periods interest rate. Future prices can be reconstructed by a combination of put and call options, if these are available. The equation holds for short sales, too, as insiders will not lend out their shares without being compensated for the full return, including the convenience yield lost.

First of all, equation (5) enables us to directly *measure* the expected total flow of returns (including dividends). Again subtracting dividends on both sides gives us the convenience yield. Is it different from zero? Did financial markets expect the negative capital gains?

By comparing spot and future prices, we can see whether the financial markets were aware of the large negative financial returns of distressed firms. If those shares had large negative financial returns and the difference between spot and future prices does not mirror this, the wreckers theory is refuted. But if it does, the convenience yield has been shown to exist. This would definitely disprove the non-encompassing hypothesis and, furthermore, make the irrationality hypothesis look extremely dubious, as the latter would now imply that market participants threw their money out of the window *knowingly*. If a substantive convenience component can be found, we can add it to the two other return components and repeat the estimation procedure to see whether there remains a negative alpha to be explained.

5. Outlook

Cochrane (2002) investigates the convenience yield of holding stocks of new market companies during the tech-stock bubble in order to explain certain aspects of their overvaluation. His account rests on a more traditional type of convenience yield: the transaction services of shares in a situation where short selling is impossible or very expensive. Although transaction services may in some cases be part of the non-financial yields of holding stocks, this effect is unlikely to be of much generic relevance in the case of distressed companies. However, the argument reminds us that it is necessary to take a look to see whether those underperforming distressed firms are not really overvalued internet stocks at the turn of the century. It would then still be an anomaly, but at least a well-known one.

The explanation advanced here focuses on the non-financial rewards of corporate control. Johnson, Boone, Breach and Friedman (2000) have shown that measures for corporate governance, particularly the protection of minority shareholders, explain the extent of losses during the Asian crisis. They conjecture that in countries with weak corporate governance, worse economic prospects result in more expropriation by managers and thus a larger fall in asset prices. Our short paper links this idea to the theory of convenience yields and shows how the diversion of funds can be measured directly under the assumption of efficient markets.

There many other ways in which this research can be extended. It would be important to see whether a change in the financial situation of a firm is correlated with a change in the

ownership structure, and whether a firm that retains the original ownership structure is less likely to demonstrate those large negative financial returns. The effect should be linked to the existence of large dominant shareholders or homogeneous groups, such as managers. What other elements in the corporate governance structure is a high convenience yield correlated with? Finally, the ‘wreckers effect’ can be expected to be stronger in innovative markets, because human capital and information related assets can be dislocated with relative ease.

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