Discussion: In Search of Distress Risk *and* Default Risk, Shareholder Advantage, and Stock Returns

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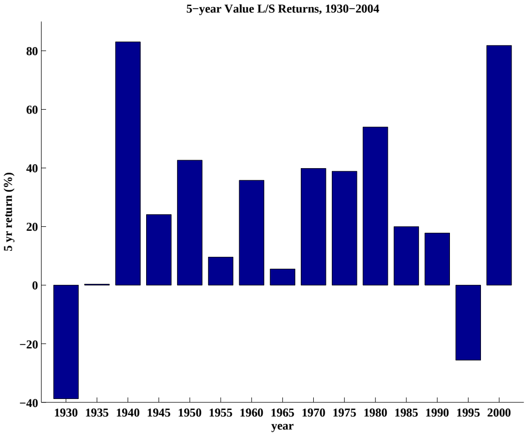
Two Views

- These papers address the same question: Can the distress premium can be explained by risk?
- These two papers provide opposite conclusions:
    - Garlappi, Shu and Yan (GSY) argue that it can.
    - Campbell, Hilscher and Szilagyi (CHS) argue that it cannot.
- I want to examine why they reach these conclusions.
- However, first let's review the history behind this question.

Background – The Value Effect

- An important and controversial issue in the asset pricing field is the origin of the value premium.
- Historically, value (high book-to-market) stocks have earned higher returns than growth (low BM) stocks.
- A combination of the Fama-French value portfolio with the market portfolio provides a Sharpe Ratio of 0.80, versus 0.31 for the market alone.

The Value Effect



Value and Distress

- If the value effect is a rational risk premium, then the marginal investor must:
  - have known that value firms would earn higher returns,
  - have chosen not to hold more value because of the pattern of returns
- Fama and French (1993, 1996) argue that the value premium may result from firms loading on a “distress factor.”
  - This explanation is consistent with, but not implied by, the lower past returns and lower past fundamental performance of value stocks.
  - For example, the return on distressed stocks may covary with the return to human capital (Fama and French (1996)).

A Distress Factor?

- However, there are some problems with the FF distress hypothesis:
- First, Shumway (2001) argues that BM is a poor proxy for distress.
- Second, Dichev (1998) and others show that, with a better distress proxy, more distressed firms have lower, not higher future returns.
- Griffin and Lemmon (2002) find that the “distress” effect is strongest among growth stocks, where it is also most negatively related to default probability.
  - Both Dichev and GL use the Ohlson (1980) model as a proxy for distress.

In Search of Distress Risk

Campbell, Hilscher and Szilagyi

- Campbell, Hilscher and Szilagyi (CHS) use a new set of predictive variables to forecast future bankruptcy
  - They fit this model to the Kamakura risk database of Chapter 7 and 11 events.
- Their model forecasts bankruptcies considerably better than other models.
- They also show that there is a strong negative relation between the risk of bankruptcy and abnormal returns (α).
  - This is true even after conditioning on size and book-to-market

MKMV Distress Measure

- CHS also examine the Moody's-KMV (Merton) distance-to-default (DD) measure.
- They find that adds little forecasting power, particularly at short horizons.
  - The DD measure provides a pseudo-R^2 of 15.9%
  - The CHS structural model gives a pseudo-R^2 of 31.2%
  - In multiple regressions, DD adds little to the CHS structural model.
    - This is consistent with the findings of Bharath and Shumway (2005).

CHS Unconditional Sort - Results

From CHS, Table 7:

	Percentile Cutoff Portfolios							Differences	
Portfolios	0005	0510	1020	8090	9095	9599	9900	10-90	20-80
p-hat	0.011%	0.014%	0.018%	0.11%	0.19%	0.34%	0.80%		
$\bar{r} - \bar{r}_m$	3.44	2.38	1.31	-4.35	-7.87	-6.30	-16.95	10.00	6.65
	(1.47)	(1.08)	(1.11)	(1.23)	(1.68)	(1.17)	(2.05)*	(1.86)	(1.51)
$\alpha_{3-\text{factor}}$	5.76	5.31	2.71	-12.63	-17.95	-15.87	-24.89	22.72	17.37
	(2.97)**	(2.86)**	(2.40)*	(4.60)**	(5.69)**	(3.85)**	(3.42)**	(6.10)**	(5.39)**
β_{RM}	-0.083	-0.111	-0.058	0.480	0.477	0.443	0.249	-0.568	-0.554
	(2.21)*	(3.09)**	(2.64)**	(9.05)**	(7.83)**	(5.56)**	(1.77)	(7.89)**	(8.90)**
β_{HML}	-0.474	-0.499	-0.177	0.849	0.916	0.829	0.612	-1.394	-1.182
	(9.67)**	(10.61)**	(6.17)**	(12.22)**	(11.49)**	(7.94)**	(3.33)**	(14.79)**	(14.51)**
β_{SMB}	0.212	0.037	-0.118	0.590	1.466	1.535	1.973	-1.394	-0.833
	(3.89)**	(0.70)	(3.69)**	(7.64)**	(16.52)**	(13.23)**	(9.63)**	(13.30)**	(9.19)**
Portfolio σ	0.112	0.105	0.057	0.169	0.225	0.258	0.396	0.258	0.211
Individual σ	0.361	0.351	0.305	0.511	0.685	0.793	0.949		

- p-hat is strongly associated with default

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- Mean returns (%/year) strongly decline with default probability.

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- 3-factor alphas decline even more quickly with default probability

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- Loadings on each of the 3 factors are far higher for high default probability firms

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- Moreover, both portfolio risk and idiosyncratic risk are higher for high default risk firms.

Default Risk, Shareholder Advantage, and Stock Returns by Garlappi, Shu and Yan

- The GSY paper proposes both a theoretical model and new empirical tests.
- The model argues that the low returns of distressed stocks is a result of lower risk.
- The risk of distressed stocks is dependent on:
  1. Shareholder Bargaining Power
  2. Liquidation Costs
- The model is designed to show that, for high SBP and high liquidation cost firms, equity value will be less sensitive to underlying firm value movements.
  - Thus the model predicts that the riskiness of the equity will *fall* as default risk increases.

GSY Empirical Findings

- Empirically, the authors find that the sign of

$$\frac{\partial E(r)}{\partial\ \mathrm{EDF}}$$

is in fact dependent on proxies for SBP and liquidation costs

Model Overview – Firm Value

1. The value of the (all equity) firm follows GBM with constant $E(r) = \mu > r_f$ and constant payout rate δ:

$$dV_t = (\mu - \delta) V_t dt + \sigma V_t dB_t$$

2. Firms have existing perpetual debt with a coupon of c.
   - Paying this coupon results in a continuous tax shield of τc.
3. The firm value, including tax shields, is $v(V_t) > V_t$.

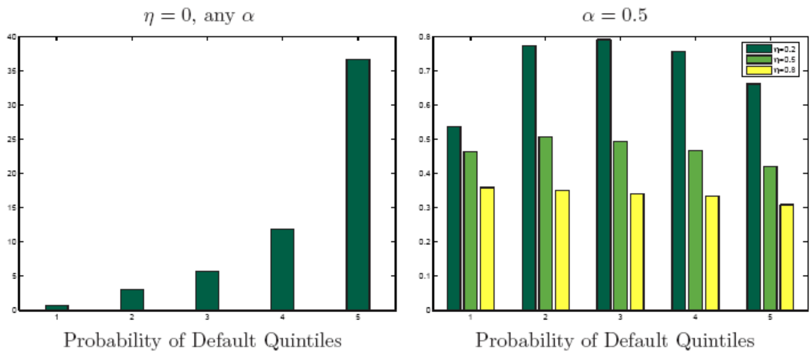
Model Overview – Liquidation

4. At liquidation , firm value drops by the fraction α
   - *i.e.*, $V_t \rightarrow (1 - \alpha)V_t$
   - Absolute priority is followed on liquidation.
   - In this model, the firm is never liquidated.
5. Upon entry to Chapter 11, the debt and equity holders enter a Nash bargaining game and renegotiate the value of their claimn (debt/equity).
   - The gains to renegotiation $(v(V) - (1 - \alpha)V)$ are divided between the equity and debt holders.
   - The equity-holders get fraction η of these gains
6. The equity holders choose to enter Chapter 11 when it is optimal for them to do so.

Expected Returns and Default Risk

- An implication of this model is that, in some cases, $\partial \bar{r} / \partial \, \mathrm{EDF} < 0$:

Panel A: Effect of bargaining power η



GSY Empirical Work

- To test their model, GSY use the Moody's-KMV measure of Expected Default Frequency (EDF), in combination with CRSP/COMPUSTAT.
  - They show that, among firms with high SBP and high liquidation costs, $\partial \bar{r} / \partial \, \mathrm{EDF} < 0$
  - However, among low SBP/low liquidation cost firms, $\partial \bar{r} / \partial \, \mathrm{EDF} > 0$.
- GSY use multiple proxies for both SBP and liquidation costs:
  - Asset Size, BM, R&D, Herfindahl Index, Asset Tangibility

GSY Empirical Work

- For example, GSY's Table 7 examines returns to portfolios sorted on BM and EDF:

	Low		EDF		High		
	1	2	3	4	5	High−Low	t-value
Raw Returns							
Low	0.97	0.69	0.63	0.00	-0.09	-1.05**	-2.31
Medium	1.05	1.19	1.17	1.17	0.71	-0.34	-0.81
High	1.06	1.35	1.31	1.58	1.51	0.46	1.20
High−Low	0.09	0.66***	0.68***	1.58***	1.60***	1.51***	
t-value	0.49	2.76	2.80	5.65	4.79	4.53	

- *Only the low BM, high EDF, portfolio has low returns, consistent with the GSY model predictions.*

GSY Model – Additional Implication

- However, there are actually two key implications of the HSY model:
  1. The return of high EDF, high SBP, low LC firms should be low.
  2. The risk of high EDF, high SBP, low LC firms should also be low.
- The second implication of HSY is not tested, at least here.

Risk Implications

- Recall that the cum-dividend value of the firm, net of tax-shields, follows:

$$\left(\frac{dV}{V} - rdt\right) = (\mu - r)dt + \sigma_V dB_t$$

- This means that the cum-dividend value of equity follows:

$$\left(\frac{dE}{E} - rdt\right) = \frac{\sigma_E}{\sigma_V}(\mu - r)dt + \sigma_E dB_t$$

- This is just a complicated way of saying that the only way that a firm can earn a high return is if it is risky!

Other Empirical Work

- Griffin and Lemmon (2002) do examine both the risk and return of these portfolios.
- Mean returns look like those obtained in GSY:

	Book-to-Market Equity				
O-score	L	M	H	Ret(H)-(L)	(p-value)
			Size-Adjusted		
L	13.28	15.76	17.15	3.87	(0.068)
2	15.58	17.33	18.83	3.25	(0.022)
3	13.05	17.38	18.54	5.49	(0.000)
4	11.61	16.80	22.23	10.62	(0.000)
H	6.36	15.98	20.80	14.44	(0.000)
Ret(H-L)	-6.92	0.22	3.65		
(p-value)	(0.001)	(0.963)	(0.088)		

Other Empirical Work

- However, Griffin and Lemmon find that the low BM, high Ohlson measure firms are actually slightly higher risk.
- This is true for both small firms:

Small Firms

	α			t(α)		
	LBM	M	HBM	LBM	M	HBM
LO	0.05	0.15	0.23	0.25	1.25	1.77
2	-0.13	0.25	0.24	-0.62	2.21	2.17
3	-0.27	0.03	0.11	-1.00	0.31	1.06
4	-0.49	-0.29	0.09	-2.98	-2.35	0.83
HO	-0.73	-0.18	0.11	-3.73	-1.13	0.64

Other Empirical Work

- However, Griffin and Lemmon find that the low BM, high Ohlson measure firms are actually slightly higher risk.
- This is true for both small firms and large:

Large Firms

	α			t(α)		
	LBM	M	HBM	LBM	M	HBM
LO	0.10	0.05	-0.04	1.27	0.54	-0.26
2	0.15	-0.05	-0.04	1.65	-0.64	-0.33
3	-0.03	-0.08	-0.13	-0.24	-0.88	-1.32
4	-0.39	-0.05	0.20	-2.64	-0.49	1.24
HO	-0.87	-0.32	-0.40	-4.42	-1.47	-1.25

Open Questions

1. It is possible that some other risk measure might explain the returns of the growth, high EDF stocks.
2. If it is not risk, what is responsible for these return patterns?
    - The market fails to fully incorporate the info in the distress measure (?)
    - size, BM, *etc.*, are potentially proxies for the costs of arbitrage or for information uncertainty.
3. Which of the variables that forecast distress forecast equity returns? *Why?*

Value-Distress Interaction

From CHS, Table 8:

Panel B - 3-factor alpha

BM\Phat	Low				High	Low - High
High	4.02	0.39	0.58	-10.41	-15.48	19.50
	(2.56)*	(0.22)	(0.23)	(3.11)**	(4.07)**	(4.66)**
	5.82	3.30	0.68	0.86	-9.19	15.01
	(3.33)**	(2.41)*	(0.41)	(0.43)	(2.80)**	(3.59)**
	2.96	2.40	0.24	-3.18	-11.88	14.84
	(1.91)	(1.67)	(0.16)	(1.61)	(4.33)**	(4.54)**
	4.53	-0.74	-2.27	-5.21	-10.46	14.99
	(2.70)**	(0.62)	(1.61)	(2.35)*	(3.34)**	(3.58)**
Low	7.27	1.15	-5.12	-10.39	-18.02	25.28
	(4.50)**	(0.80)	(2.70)**	(4.54)**	(5.96)**	(6.79)**
High - Low	-3.24	-0.76	5.71	-0.02	2.54	
	(1.41)	(0.33)	(1.85)	(0.01)	(0.63)	

- Using the CHS distress measure, the high BM, high distress portfolio has low returns.