

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

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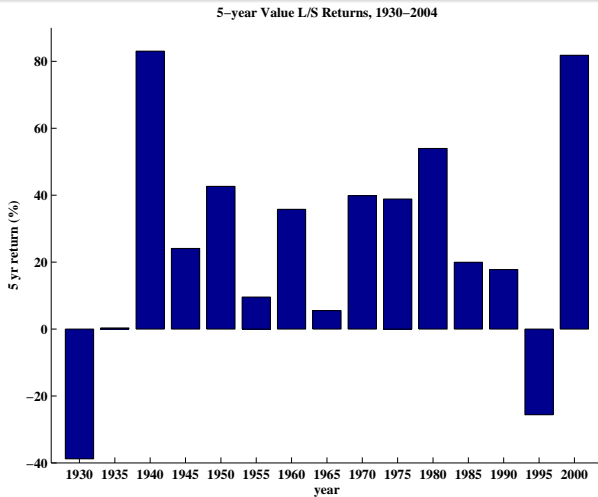
Two Views

- 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:

Portfolios	Percentile Cutoff Portfolios							Differences	
	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 (1.47)	2.38 (1.08)	1.31 (1.11)	-4.35 (1.23)	-7.87 (1.68)	-6.30 (1.17)	-16.95 (2.05)*	10.00 (1.86)	6.65 (1.51)
α_3 -factor	5.76 (2.97)**	5.31 (2.86)**	2.71 (2.40)*	-12.63 (4.60)**	-17.95 (5.69)**	-15.87 (3.85)**	-24.89 (3.42)**	22.72 (6.10)**	17.37 (5.39)**
β_{RM}	-0.083 (2.21)*	-0.111 (3.09)**	-0.058 (2.64)**	0.480 (9.05)**	0.477 (7.83)**	0.443 (5.56)**	0.249 (1.77)	-0.568 (7.89)**	-0.554 (8.90)**
β_{HML}	-0.474 (9.67)**	-0.499 (10.61)**	-0.177 (6.17)**	0.849 (12.22)**	0.916 (11.49)**	0.829 (7.94)**	0.612 (3.33)**	-1.394 (14.79)**	-1.182 (14.51)**
β_{SMB}	0.212 (3.89)**	0.037 (0.70)	-0.118 (3.69)**	0.590 (7.64)**	1.466 (16.52)**	1.535 (13.23)**	1.973 (9.63)**	-1.394 (13.30)**	-0.833 (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

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

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 $v(V_t) > V_t$.

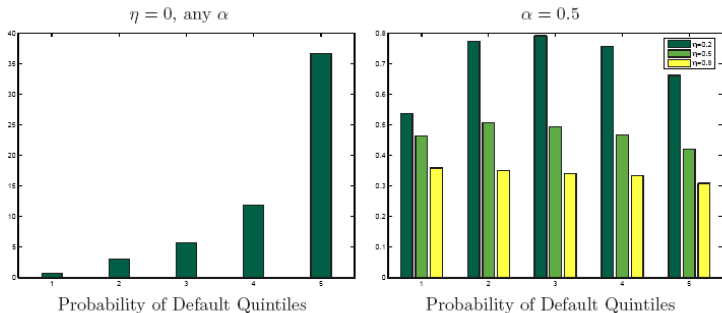
Model Overview – Liquidation

- 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.
- Upon entry to Chapter 11, the debt and equity holders enter a Nash bargaining game and renegotiate the value of their claim (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
- 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, $\partial \bar{r} / \partial \text{EDF} < 0$:

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, $\partial \bar{r} / \partial \text{EDF} < 0$
 - However, among low SBP/low liquidation cost firms, $\partial \bar{r} / \partial \text{EDF} > 0$.
- 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:

O-score	Book-to-Market Equity				(p-value)
	L	M	H	Ret(H)-(L)	
	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					
	LBM	α		LBM	$t(\alpha)$	
		M	HBM		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			$t(\alpha)$		
	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)**
Low	4.53	-0.74	-2.27	-5.21	-10.46	14.99
	(2.70)**	(0.62)	(1.61)	(2.35)*	(3.34)**	(3.58)**
	7.27	1.15	-5.12	-10.39	-18.02	25.28
High - Low	(4.50)**	(0.80)	(2.70)**	(4.54)**	(5.96)**	(6.79)**
	-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.