Discussion of:

Confounded Factors

by:
Joseph Gerakos and Juhani Linnainmaa

Kent Daniel†

†Columbia University, Graduate School of Business

NBER Summer Institute
11 July, 2013

Outline

- Summary & Model
- Related Empirical Results

GL fundamental-to-price measure decomposition

1. GL motivate their calculation of the book-return using a book-to-market ratio decomposition:

$$bm_t \equiv \log\left(\frac{BE_t}{ME_t}\right) = bm_{t-\tau} + \log\left(\frac{BE_t}{BE_{t-\tau}}\right) - \log\left(\frac{ME_t}{ME_{t-\tau}}\right)$$

2. The three components are:
   - The log-BM ratio τ periods ago: $bm_{t-\tau}$,
   - The log-change in book-value: $\log\left(BE_t/BE_{t-\tau}\right)$,
   - The log-change in the firm size: $\log\left(ME_t/ME_{t-\tau}\right)$.

GL fundamental-to-price measure decomposition

1. One can further break down the changes in log BE and ME into the sum of each years' changes:

$$bm_t \equiv \log\left(\frac{BE_t}{ME_t}\right) = bm_{t-\tau} + \underbrace{\log\left(\frac{BE_t}{BE_{t-\tau}}\right)}_{=\sum_{s=0}^{\tau-1} dbe_{t-s}} - \underbrace{\log\left(\frac{ME_t}{ME_{t-\tau}}\right)}_{=\sum_{s=0}^{\tau-1} dme_{t-s}}$$

2. GL argue that bm_t will only be an optimal forecast of the cross-section of returns if, in projecting future returns onto the 3 components, the projection coefficients are equal.
   - However, it is possible that the "components" of book-to-market forecast future returns differently
   - This would mean that B/M could be improved by re-weighting the different components.

Key Findings

- For forecasting future returns, it is easy to improve on book-to-market.
  - This hold both for Fama-MacBeth regressions, and in sorted portfolios.
  - The results are comparable in Japan and in the US.
- Other price-scaled variable anomalies (E/P, C/P and D/P)“re-appear” once we examine the priced-component of these variables.
  - This contrasts with Fama and French (1996), who argue that BM subsumes these other anomalies.

Beating book-to-market

Panel C: Disaggregated five-year changes in the book and market value of equity

		t-values	
Regressors	$\hat{b}_j$	$H_0: \hat{b}_j = 0$	$H_0: \hat{b}_j = b^*$
bm_{t-k}	0.118	1.26	−2.86
dbe_t	−0.004	−0.04	−2.57
dbe_{t-1}	−0.067	−0.74	−3.96
dbe_{t-2}	0.132	1.43	−1.51
dbe_{t-3}	0.097	1.11	−1.97
dbe_{t-4}	0.171	1.93	−0.95
$-dme_t$	0.431	3.83	2.17
$-dme_{t-1}$	0.436	4.18	2.64
$-dme_{t-2}$	0.374	3.99	2.00
$-dme_{t-3}$	0.369	3.65	2.04
$-dme_{t-4}$	0.417	4.18	3.09

Issuance

Panel D: Five-year low-level decomposition of BE/ME ratios

Regressors	$\hat{b}_j$	t-values $H_0: \hat{b}_j = 0$	t-values $H_0: \hat{b}_j = b^*$	Regressors	$\hat{b}_j$	t-values $H_0: \hat{b}_j = 0$	t-values $H_0: \hat{b}_j = b^*$
bm_{t-k}	0.118	1.26	−2.86				
Book side:				Market side:			
roe_t	0.411	2.93	1.25	$-r_t$	0.336	2.93	0.96
roe_{t-1}	0.181	1.27	−0.49	$-r_{t-1}$	0.367	3.49	1.47
roe_{t-2}	0.313	2.15	0.50	$-r_{t-2}$	0.348	3.79	1.42
roe_{t-3}	0.377	2.56	0.92	$-r_{t-3}$	0.333	3.45	1.38
roe_{t-4}	0.207	1.65	−0.31	$-r_{t-4}$	0.396	4.17	2.62
$-r^b_{\text{div},t}$	−0.721	−0.63	−0.81	$r_{\text{div},t}$	−1.202	−0.68	−0.84
$-r^b_{\text{div},t-1}$	−0.720	−0.62	−0.80	$r_{\text{div},t-1}$	0.173	0.09	−0.04
$-r^b_{\text{div},t-2}$	−0.580	−0.50	−0.68	$r_{\text{div},t-2}$	0.617	0.32	0.20
$-r^b_{\text{div},t-3}$	−1.012	−0.84	−1.01	$r_{\text{div},t-3}$	0.205	0.11	−0.02
$-r^b_{\text{div},t-4}$	−0.478	−0.39	−0.57	$r_{\text{div},t-4}$	−0.353	−0.20	−0.34
$r^b_{\text{iss},t}$	−0.532	−3.44	−4.51	$-r_{\text{iss},t}$	1.486	7.19	7.38
$r^b_{\text{iss},t-1}$	−0.614	−3.99	−4.95	$-r_{\text{iss},t-1}$	1.396	6.50	6.48
$r^b_{\text{iss},t-2}$	−0.152	−0.94	−2.31	$-r_{\text{iss},t-2}$	0.821	3.51	2.82
$r^b_{\text{iss},t-3}$	−0.367	−2.42	−3.76	$-r_{\text{iss},t-3}$	0.923	4.21	3.71
$r^b_{\text{iss},t-4}$	0.010	0.08	−1.62	$-r_{\text{iss},t-4}$	0.713	3.36	2.67

Resurrecting Anomalies

		Sorts on unadjusted variables				Sorts on adjusted variables			
		Deciles		High − Low		Deciles		High − Low	
Anomaly variable	Model	1	10	$\hat{\alpha}$	R^2	1	10	$\hat{\alpha}$	R^2
E/P	$\bar{r}^e$	0.27	0.78	0.51		0.21	0.86	0.65	
		(1.11)	(3.33)	(2.67)		(0.88)	(3.81)	(3.80)	
	CAPM	−0.21	0.36	0.56	1.74%	−0.26	0.44	0.70	1.64%
		(−2.18)	(2.81)	(2.98)		(−2.70)	(3.98)	(4.11)	
	FF3	−0.02	0.02	0.04	46.85%	−0.21	0.25	0.45	14.14%
		(−0.24)	(0.24)	(0.31)		(−2.11)	(2.43)	(2.79)	
C/P	$\bar{r}^e$	0.27	0.74	0.47		0.15	0.90	0.74	
		(1.18)	(3.06)	(2.56)		(0.59)	(3.59)	(4.16)	
	CAPM	−0.19	0.30	0.49	0.21%	−0.36	0.44	0.80	1.75%
		(−2.26)	(2.32)	(2.69)		(−3.92)	(3.43)	(4.47)	
	FF3	−0.01	−0.05	−0.04	50.41%	−0.26	0.24	0.51	17.87%
		(−0.14)	(−0.47)	(−0.28)		(−2.93)	(2.04)	(3.06)	
D/P	$\bar{r}^e$	0.33	0.50	0.18		0.20	0.68	0.49	
		(1.30)	(2.46)	(0.77)		(0.78)	(3.02)	(2.51)	
	CAPM	−0.17	0.22	0.39	19.02%	−0.29	0.29	0.58	5.38%
		(−1.88)	(1.41)	(1.89)		(−2.67)	(2.19)	(3.08)	
	FF3	−0.04	−0.22	−0.18	58.60%	−0.22	−0.04	0.18	31.73%
		(−0.49)	(−2.01)	(−1.16)		(−1.97)	(−0.35)	(1.11)	

Is the MVE in span of HML & SMB?

- Below are the realized Sharpe-ratios of the *ex-post* tangency portfolios based on trading in:
  - The three Fama and French (1993) portfolios (Mkt, SMB, HML)
  - Carhart (1997) price momentum portfolio UMD.
  - Daniel-Titman (2006a) issuance (ISU) and accrual (ACR) portfolios
    - *All strategies are value-weighted and rebalanced annually.*

	Portfolio Weights (%)					*Ex-Post*
Mkt	SMB	HML	UMD	ISU	ACR	Sharpe ratio
100.00	–	–	–	–	–	0.31
75.07	24.93	–	–	–	–	0.32
28.19	14.63	57.18	–	–	–	0.80
21.13	10.16	41.92	26.79	–	–	1.18
18.82	15.33	13.87	9.55	42.44	–	1.55
17.35	14.47	12.32	8.18	36.65	11.04	1.60

Is the MVE in span of HML & SMB?

- Below are the realized Sharpe-ratios of the *ex-post* tangency portfolios based on trading in:
  - The three Fama and French (1993) portfolios (Mkt, SMB, HML)
  - Carhart (1997) price momentum portfolio UMD.
  - Daniel-Titman (2006a) issuance (ISU) and accrual (ACR) portfolios
    - *All strategies are value-weighted and rebalanced annually.*

	Portfolio Weights (%)					*Ex-Post*
Mkt	SMB	HML	UMD	ISU	ACR	Sharpe ratio
100.00	–	–	–	–	–	0.31
75.07	24.93	–	–	–	–	0.32
28.19	14.63	57.18	–	–	–	0.80
21.13	10.16	41.92	26.79	–	–	1.18
18.82	15.33	13.87	9.55	42.44	–	1.55
17.35	14.47	12.32	8.18	36.65	11.04	1.60

Is the MVE in span of HML & SMB?

- Below are the realized Sharpe-ratios of the *ex-post* tangency portfolios based on trading in:
  - The three Fama and French (1993) portfolios (Mkt, SMB, HML)
  - Carhart (1997) price momentum portfolio UMD.
  - Daniel-Titman (2006a) issuance (ISU) and accrual (ACR) portfolios
    - *All strategies are value-weighted and rebalanced annually.*

Portfolio Weights (%)						*Ex-Post*
Mkt	SMB	HML	UMD	ISU	ACR	Sharpe ratio
100.00	–	–	–	–	–	0.31
75.07	24.93	–	–	–	–	0.32
28.19	14.63	57.18	–	–	–	0.80
21.13	10.16	41.92	26.79	–	–	1.18
18.82	15.33	13.87	9.55	42.44	–	1.55
17.35	14.47	12.32	8.18	36.65	11.04	1.60

Is the MVE in span of HML & SMB?

- Below are the realized Sharpe-ratios of the *ex-post* tangency portfolios based on trading in:
  - The three Fama and French (1993) portfolios (Mkt, SMB, HML)
  - Carhart (1997) price momentum portfolio UMD.
  - Daniel-Titman (2006a) issuance (ISU) and accrual (ACR) portfolios
    - *All strategies are value-weighted and rebalanced annually.*

Portfolio Weights (%)						*Ex-Post*
Mkt	SMB	HML	UMD	ISU	ACR	Sharpe ratio
100.00	–	–	–	–	–	0.31
75.07	24.93	–	–	–	–	0.32
28.19	14.63	57.18	–	–	–	0.80
21.13	10.16	41.92	26.79	–	–	1.18
18.82	15.33	13.87	9.55	42.44	–	1.55
17.35	14.47	12.32	8.18	36.65	11.04	1.60

BM decomposition is Arbitrary

1. GL motivate their calculation of the book-return using a book-to-market ratio decomposition:

$$bm_{i,t} \equiv \log\left(\frac{BE_{i,t}}{ME_{i,t}}\right) = bm_{i,t-\tau} + \log\left(\frac{BE_{i,t}}{BE_{i,t-\tau}}\right) - \log\left(\frac{ME_{i,t}}{ME_{i,t-\tau}}\right)$$

2. However, this decomposition is arbitray. We could also use book- and market-value per share:

$$bm_{i,t} = bm_{i,t-\tau} + \log\left(\frac{B_{i,t}}{B_{i,t-\tau}}\right) - \log\left(\frac{P_{i,t}}{P_{i,t-\tau}}\right)$$

3. and, for that matter, we can add any constant $n_{i,t}$ to both the changes in book and market:

$$bm_{i,t} = bm_{i,t-\tau} + \left[\log\left(\frac{BE_{i,t}}{BE_{i,t-\tau}}\right) + n_{i,t}\right] - \left[\log\left(\frac{ME_{i,t}}{ME_{i,t-\tau}}\right) + n_{i,t}\right]$$

BM decomposition is Arbitrary

1. GL motivate their calculation of the book-return using a book-to-market ratio decomposition:

$$bm_{i,t} \equiv \log\left(\frac{BE_{i,t}}{ME_{i,t}}\right) = bm_{i,t-\tau} + \log\left(\frac{BE_{i,t}}{BE_{i,t-\tau}}\right) - \log\left(\frac{ME_{i,t}}{ME_{i,t-\tau}}\right)$$

2. However, this decomposition is arbitray. We could also use book- and market-value per share:

$$bm_{i,t} = bm_{i,t-\tau} + \log\left(\frac{B_{i,t}}{B_{i,t-\tau}}\right) - \log\left(\frac{P_{i,t}}{P_{i,t-\tau}}\right)$$

3. and, for that matter, we can add any constant $n_{i,t}$ to both the changes in book and market:

$$bm_{i,t} = bm_{i,t-\tau} + \left[\log\left(\frac{BE_{i,t}}{BE_{i,t-\tau}}\right) + n_{i,t}\right] - \left[\log\left(\frac{ME_{i,t}}{ME_{i,t-\tau}}\right) + n_{i,t}\right]$$

BM decomposition is Arbitrary

1. GL motivate their calculation of the book-return using a book-to-market ratio decomposition:

$$bm_{i,t} \equiv \log\left(\frac{BE_{i,t}}{ME_{i,t}}\right) = bm_{i,t-\tau} + \log\left(\frac{BE_{i,t}}{BE_{i,t-\tau}}\right) - \log\left(\frac{ME_{i,t}}{ME_{i,t-\tau}}\right)$$

2. However, this decomposition is arbitray. We could also use book- and market-value per share:

$$bm_{i,t} = bm_{i,t-\tau} + \log\left(\frac{B_{i,t}}{B_{i,t-\tau}}\right) - \log\left(\frac{P_{i,t}}{P_{i,t-\tau}}\right)$$

3. and, for that matter, we can add any constant $n_{i,t}$ to both the changes in book and market:

$$bm_{i,t} = bm_{i,t-\tau} + \left[\log\left(\frac{BE_{i,t}}{BE_{i,t-\tau}}\right) + n_{i,t}\right] - \left[\log\left(\frac{ME_{i,t}}{ME_{i,t-\tau}}\right) + n_{i,t}\right]$$

DT(2006) Decomposition

- In DT(2006), we choose the factor $n_i(t-\tau,t)$ that converts the log-price change into a return

$$bm_{i,t} = bm_{i,t-\tau} + \underbrace{\left[\log\left(\frac{B_{i,t}}{B_{i,t-\tau}}\right) + n_{i,t-\tau,t}\right]}_{r_i^B(t-\tau,t)} - \underbrace{\left[\log\left(\frac{P_{i,t}}{P_{i,t-\tau}}\right) + n_{i,t-\tau}\right.}_{r_i(t-\tau,t)}$$

  - The "book-return" ($r_i^B(t-\tau,t)$) is (log) of the dollars of book-value one would hold at time t, per \$1 of book-value held at time $t-\tau$.

DT(2006) Fama-MacBeth Regressions

	Const	bm_t	bm_{t-5}	$r^B(t-5,t)$	$r(t-5,t)$
1	1.274	0.296			
	(5.01)	(3.44)			
2	1.204		0.115		
	(4.68)		(1.82)		
3	1.268			-0.117	
	(4.79)			(-1.87)	
4	1.303				-0.237
	(5.18)				(-3.08)
6	1.206		0.097	-0.061	
	(4.64)		(1.37)	(-0.90)	
7	1.263		0.232	0.229	-0.344
	(5.19)		(2.64)	(2.60)	(-3.45)

Note: All coefficients are $\times 100$.

Intangible Returns

- Our interpretation of the last slide is that the variable that what explains future returns is the past individual stock return, *orthogonalized to past changes in accounting variables*.
- We define the *intangible return*, relative to book, as the residual from the regression:

$$r(t-5,t) = \alpha + \beta \cdot bm_{t-5} + \gamma \cdot r^B(t-5,t) + \tilde{u}_t \qquad (1)$$

  That is:

$$r^{I(B)}(t-5,t) \equiv \tilde{u}_t \qquad \left(\perp r^B(t-5,t), bm_{t-5}\right)$$

- We find, once we orthogonalize the past return to accounting variable changes, *none of accounting variables we examine (Book, Sales, Cashflow, Earnings) forecast future returns.*

Issuance

- The difference between the DT r and r^B and the dme and dbe variables used here, , mathematically, is our issuance variable:

$$\sum_{s=0}^{\tau-1} dme_{i,t-s} = r_i(t-\tau,t) + \boldsymbol{\iota}_i(t-\tau,t)$$

$$\sum_{s=0}^{\tau-1} dbe_{i,t-s} = r_i^B(t-\tau,t) + \boldsymbol{\iota}_i(t-\tau,t)$$

Forecasting the cross-section of returns

	Const	bm_t	bm_{t-5}	$r^B(t-5,t)$	$r^{I(B)}$	$\iota(t-5,t)$
3	1.202		0.057	-0.083	-0.300	-0.517
	(4.60)		(0.87)	(-1.27)	(-3.14)	(-4.06)
	Const	sp_t	sp_{t-5}	$r^{SLS}(t-5,t)$	$r^{I(S)}$	$\iota(t-5,t)$
6	1.074		0.068	0.061	-0.300	-0.511
	(4.15)		(1.44)	(1.13)	(-3.62)	(-3.80)
	Const	cp_t	cp_{t-5}	$r^{CF}(t-5,t)$	$r^{I(C)}$	$\iota(t-5,t)$
9	1.286		0.048	-0.052	-0.426	-0.457
	(5.01)		(0.75)	(-1.20)	(-4.05)	(-3.78)
	Const	ep_t	ep_{t-5}	$r^{ERN}(t-5,t)$	$r^{I(E)}$	$\iota(t-5,t)$
12	1.250		0.037	-0.007	-0.403	-0.451
	(4.88)		(0.62)	(-0.18)	(-3.81)	(-3.79)

References I

Carhart, Mark M., 1997, On persistence in mutual fund performance, *Journal of Finance* 52, 57–82.

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.

———, 1996, Multifactor explanations of asset pricing anomalies, *Journal of Finance* 51, 55–84.