Discussion of:

Growth or Glamour?

by Campbell, Polk, and Vuolteenaho

Kent Daniel

Kellogg-Northwestern and NBER

NBER Behavioral Finance Program Meeting

November 15, 2003

Other Factors

- Labor Income
- Proprietary Business Income Growth
- Rental Price Changes
- Luxury Good Consumption
- Innovations in Future Productivity Growth
- Conditional CAPM/CCAPM with a variety of conditioning variables
  - Equivalent to an additional factor in an unconditional model

CV Estimation of N_{DR} and N_{CF}

- The Campbell (1991) decomposition of the market return gives:

$$r_t = E_{t-1}[r_t] + N_{CF,t} - N_{DR,t}$$

- CV estimate $N_{DR,t}$ using a VAR; $N_{CF,t}$ then comes from the equation above:

$$N_{CF,t} = r_t - E_{t-1}[r_t] + N_{DR,t}$$

- Given the CV estimates:

$$\begin{aligned} N_{CF,t} \quad = \quad & 0.004 + 0.60\ R_{m,t} + 0.40\ R_{m,t-1} + 0.01\ \Delta PE_t \cdots \\ & -0.88\ \Delta TY_t \quad - 0.28\ \Delta VS_t \end{aligned}$$

CV Estimation of N_{DR} and N_{CF}

- The Campbell (1991) decomposition of the market return gives:

$$r_t = E_{t-1}[r_t] + N_{CF,t} - N_{DR,t}$$

- CV estimate $N_{DR,t}$ using a VAR; $N_{CF,t}$ then comes from the equation above:

$$N_{CF,t} = r_t - E_{t-1}[r_t] + N_{DR,t}$$

- Given the CV estimates:

$$\begin{aligned} N_{CF,t} \quad = \quad & 0.004 + 0.60\ R_{m,t} + 0.40\ R_{m,t-1} + 0.01\ \Delta PE_t \cdots \\ & -0.88\ \Delta TY_t \quad \underbrace{-0.28\ \Delta VS_t}_{\approx\ +0.28(r_{SH,t} - r_{SL,t})} \end{aligned}$$

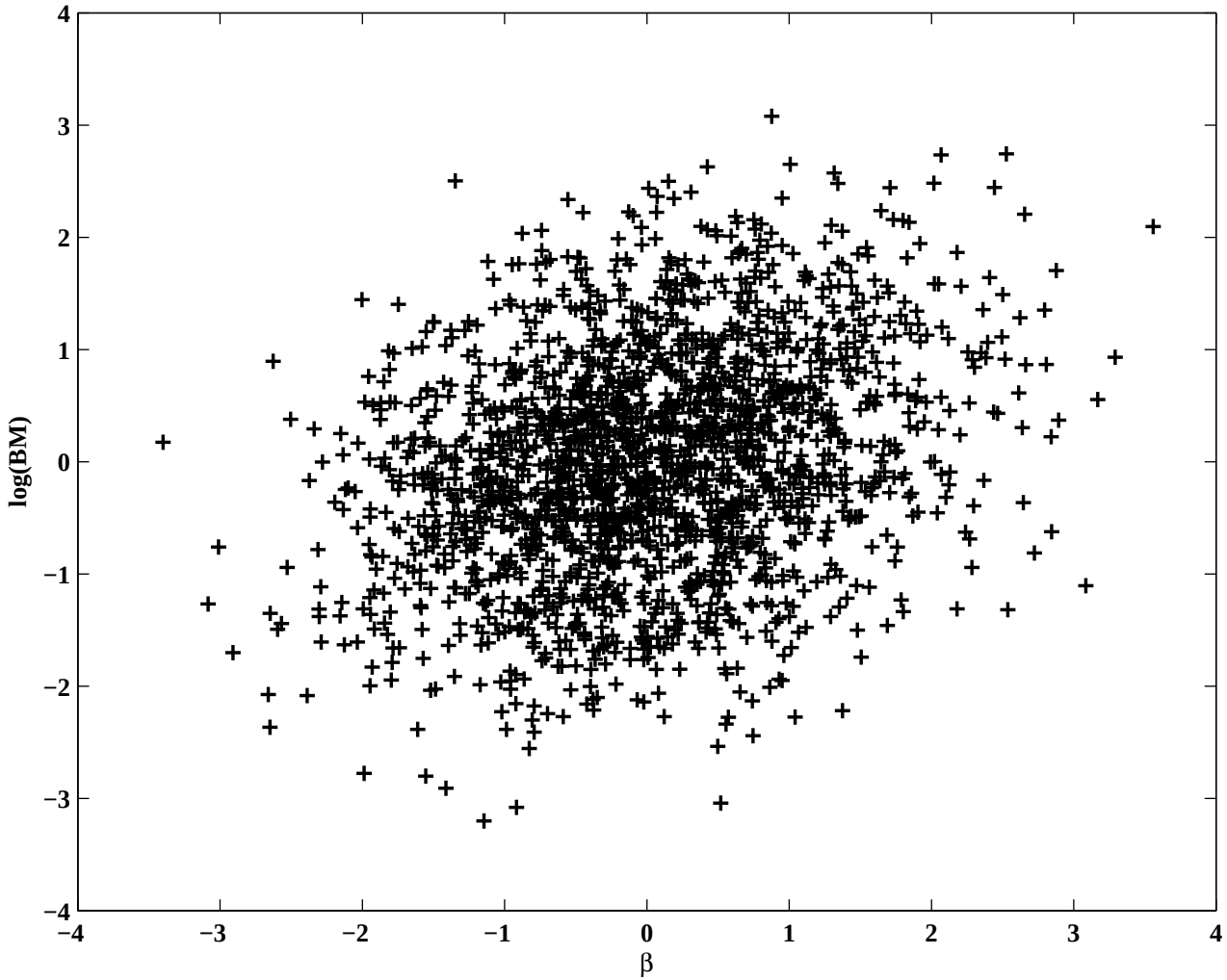
Assessing Test Power

- I'm going to argue that the reason the CV (and other factor model) tests might fail to reject the factor-models is the choice of the test assets (portfolios).
  - CV (and many others) use the 25 (24) Fama and French (1993) size/BM sorted portfolios.
  - Even if a proposed economic factor is only weakly correlated with the MVE portfolio return, testing the factor model with these portfolios will result in a failure to reject the model.
  - Related to arguments in Daniel and Titman (1997).

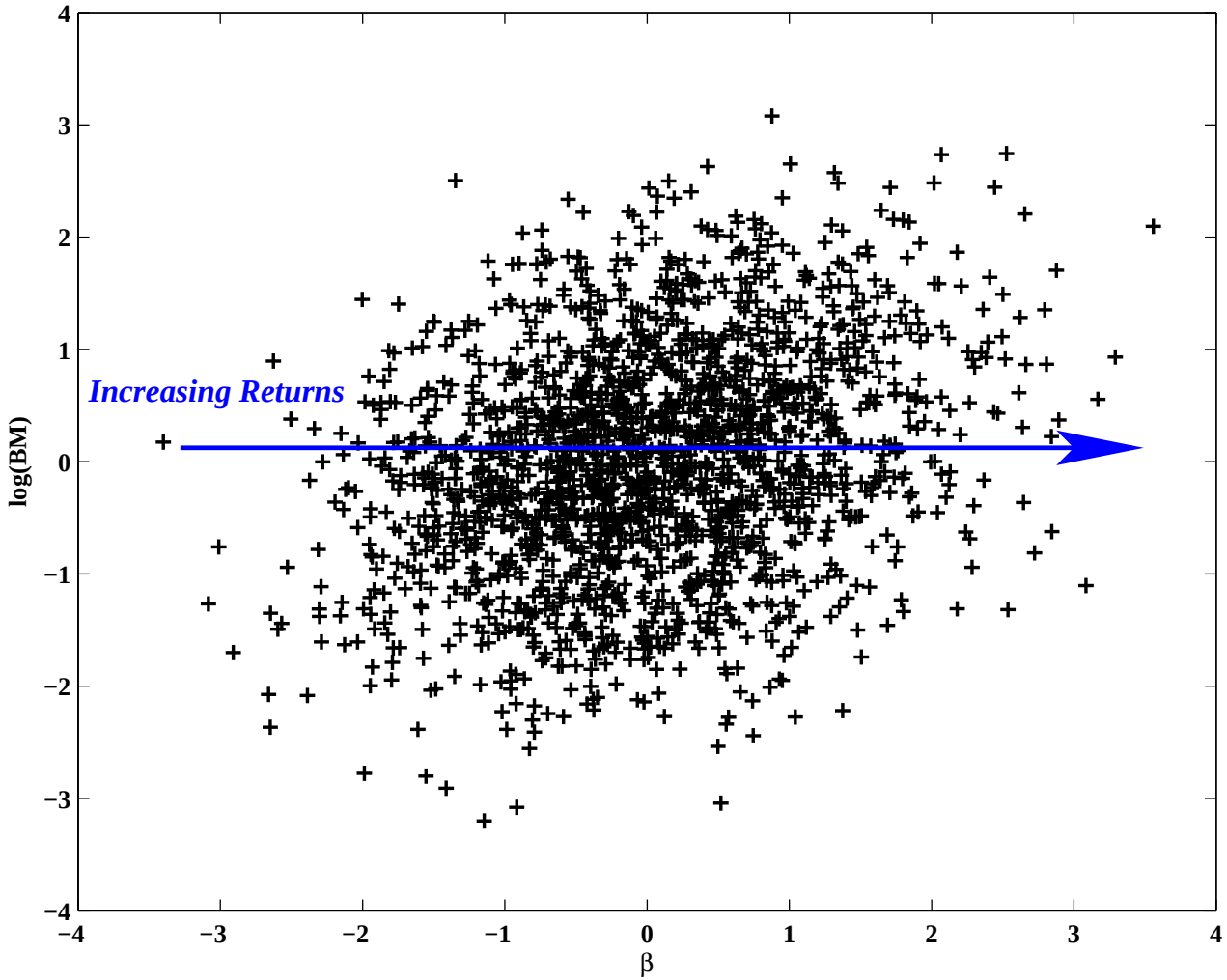
Simulation

- Simulated average returns and betas from 2500 firms.
- The $\log(BM)$s, and βs are drawn from a normal distribution with $\rho = 0.3$
- Simulate under an alternative hypothesis to assess test power.

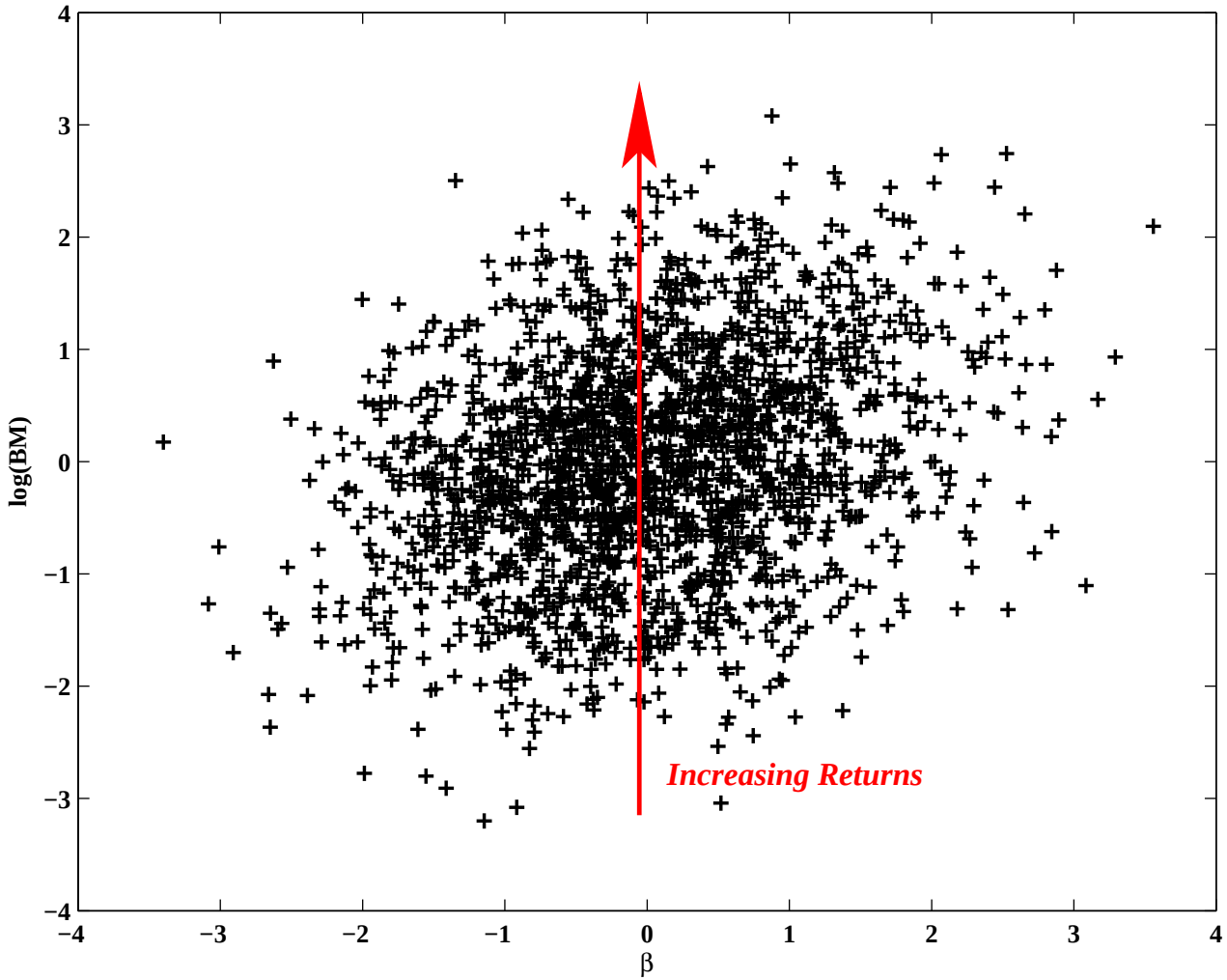
Simulated BM and Beta Distribution



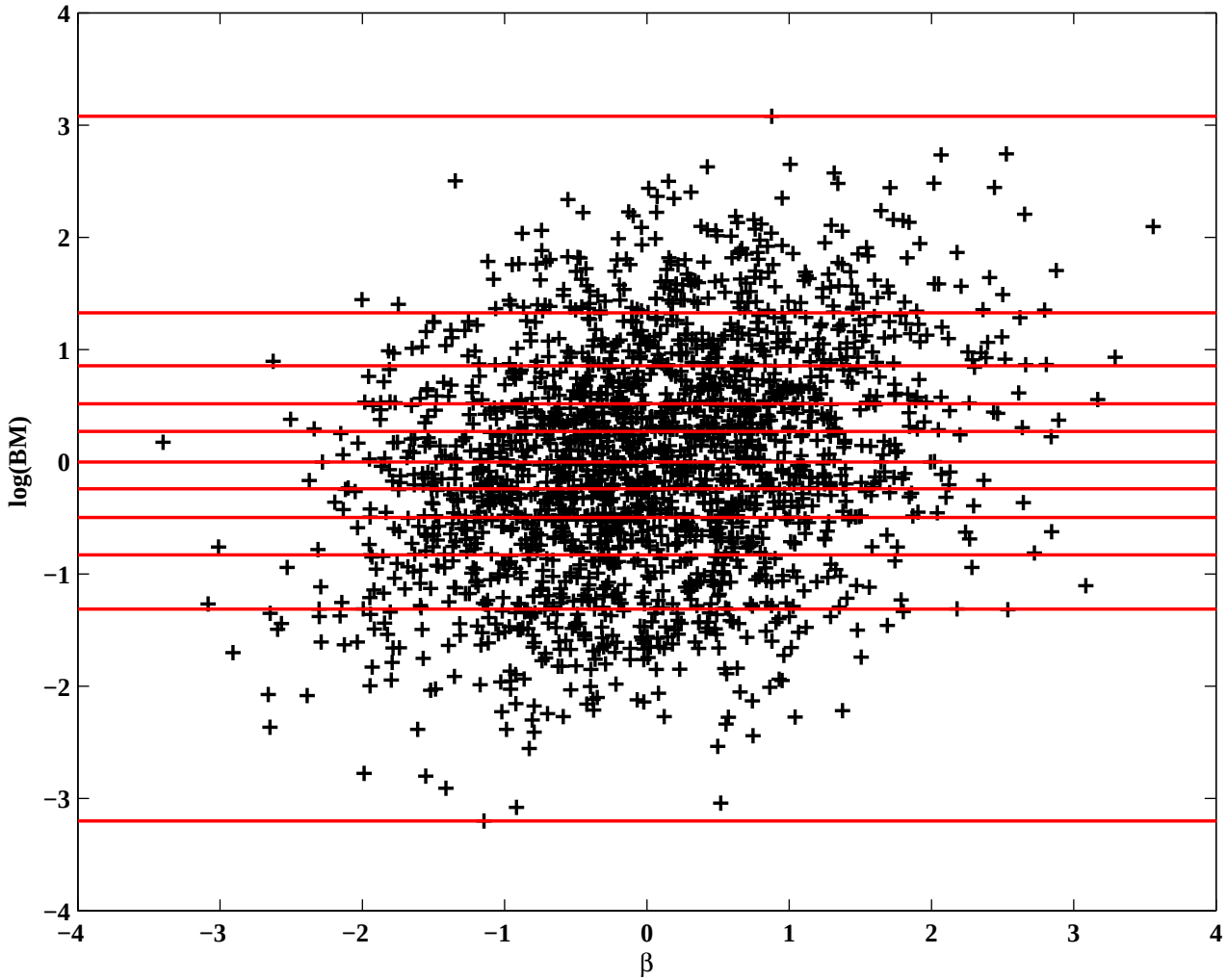
The Null Hypothesis



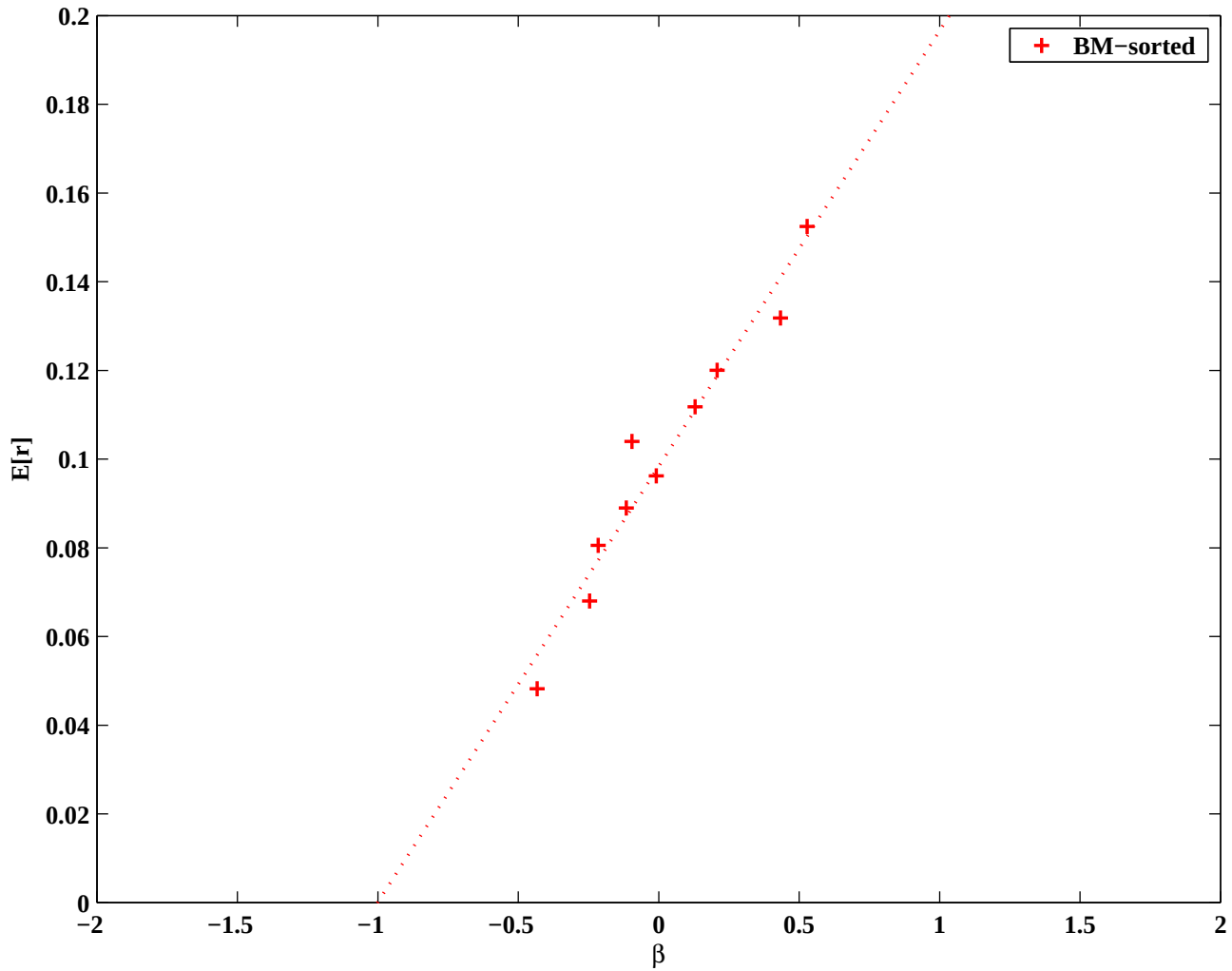
Alternative Hypothesis



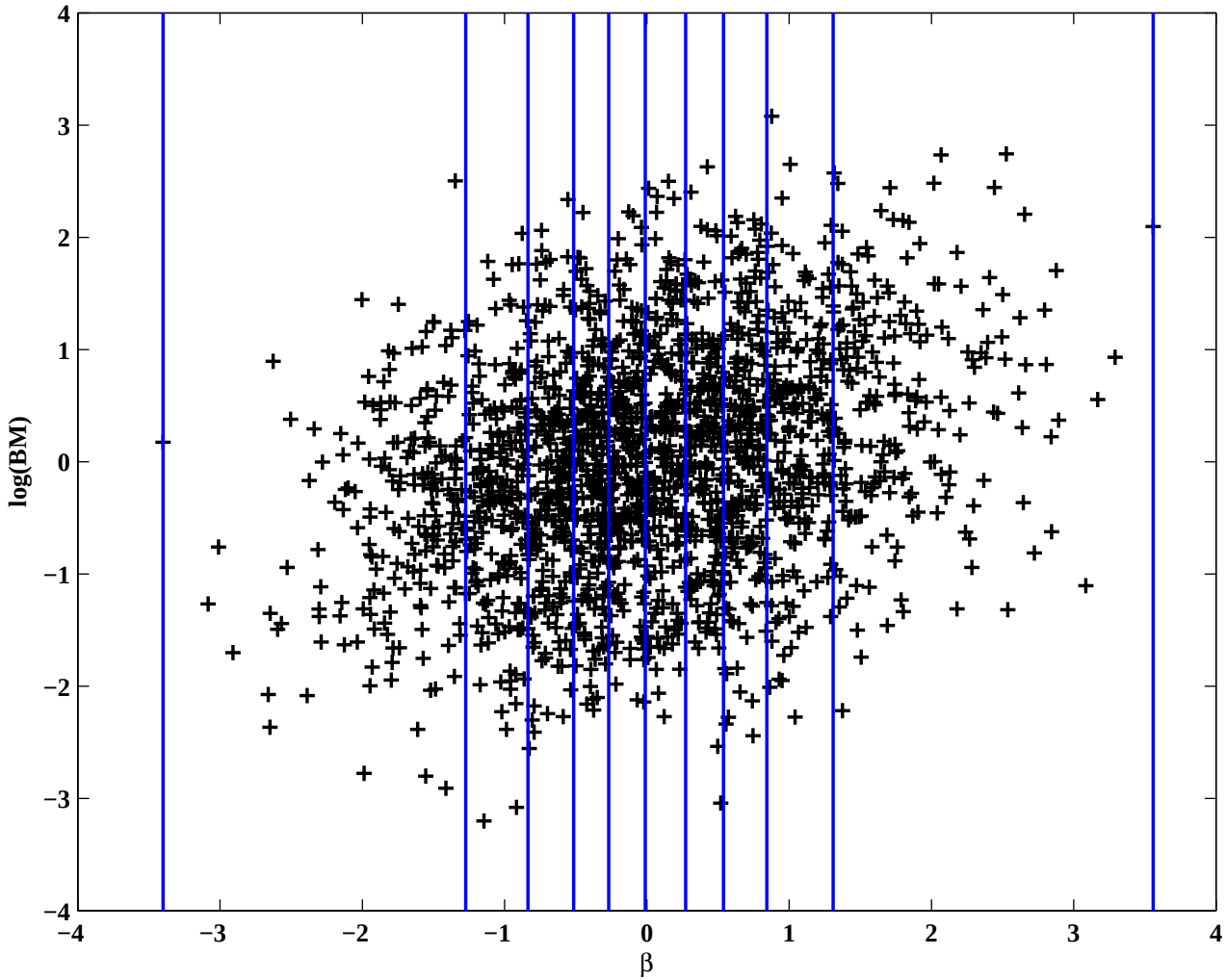
BM-Sorted Portfolio Formation



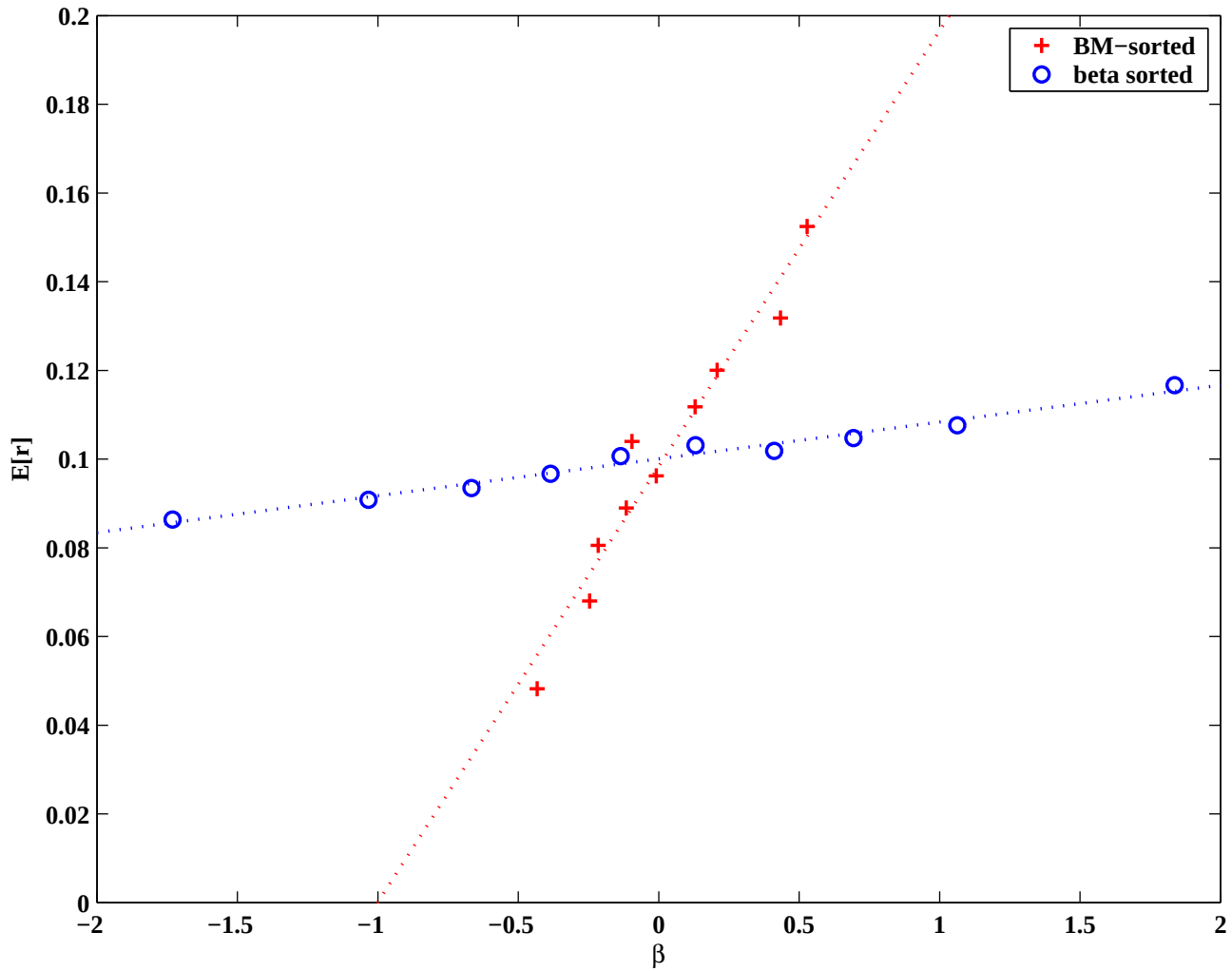
BM-Sort: *Risk and Return*



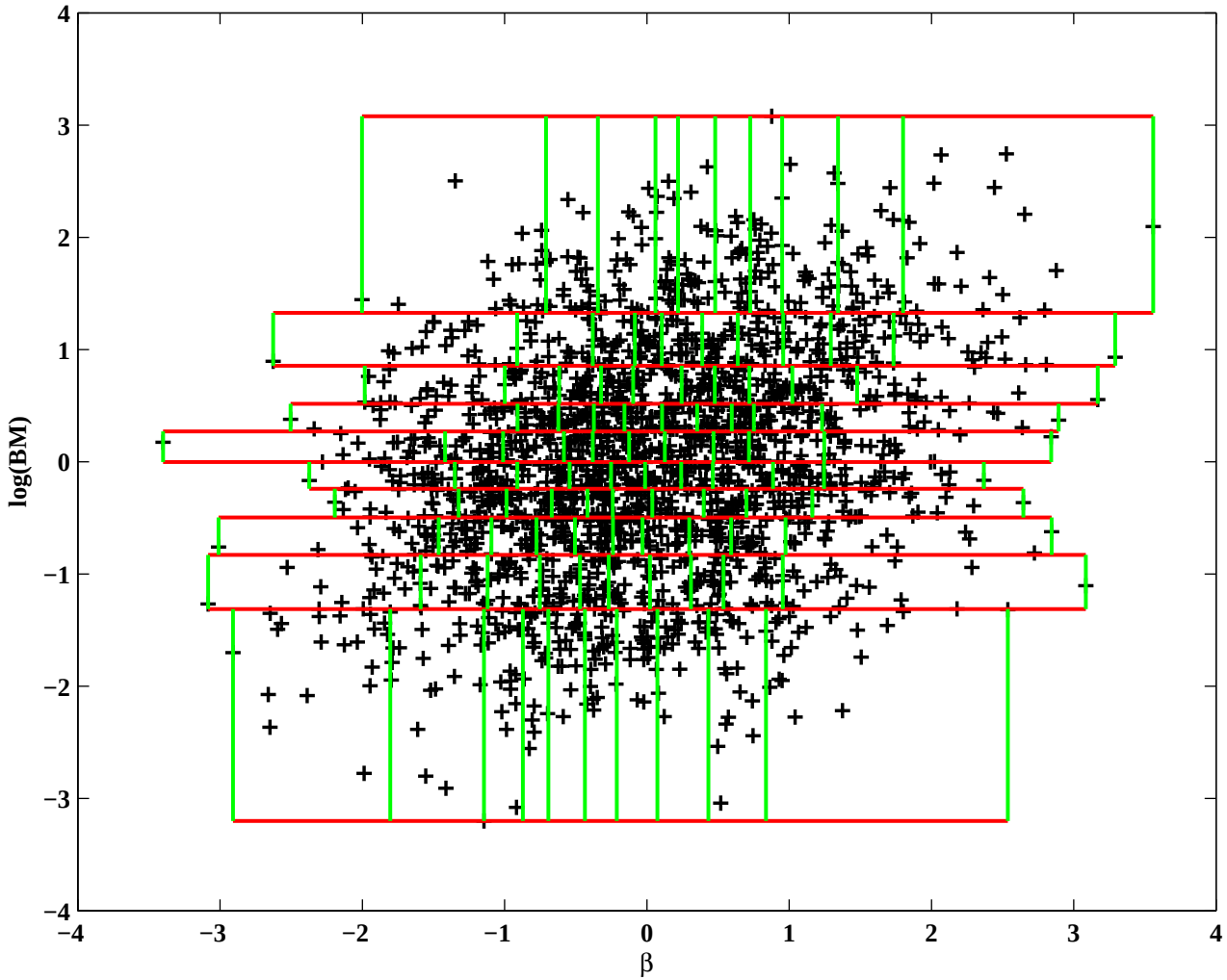
Risk-Sorted Portfolio Formation



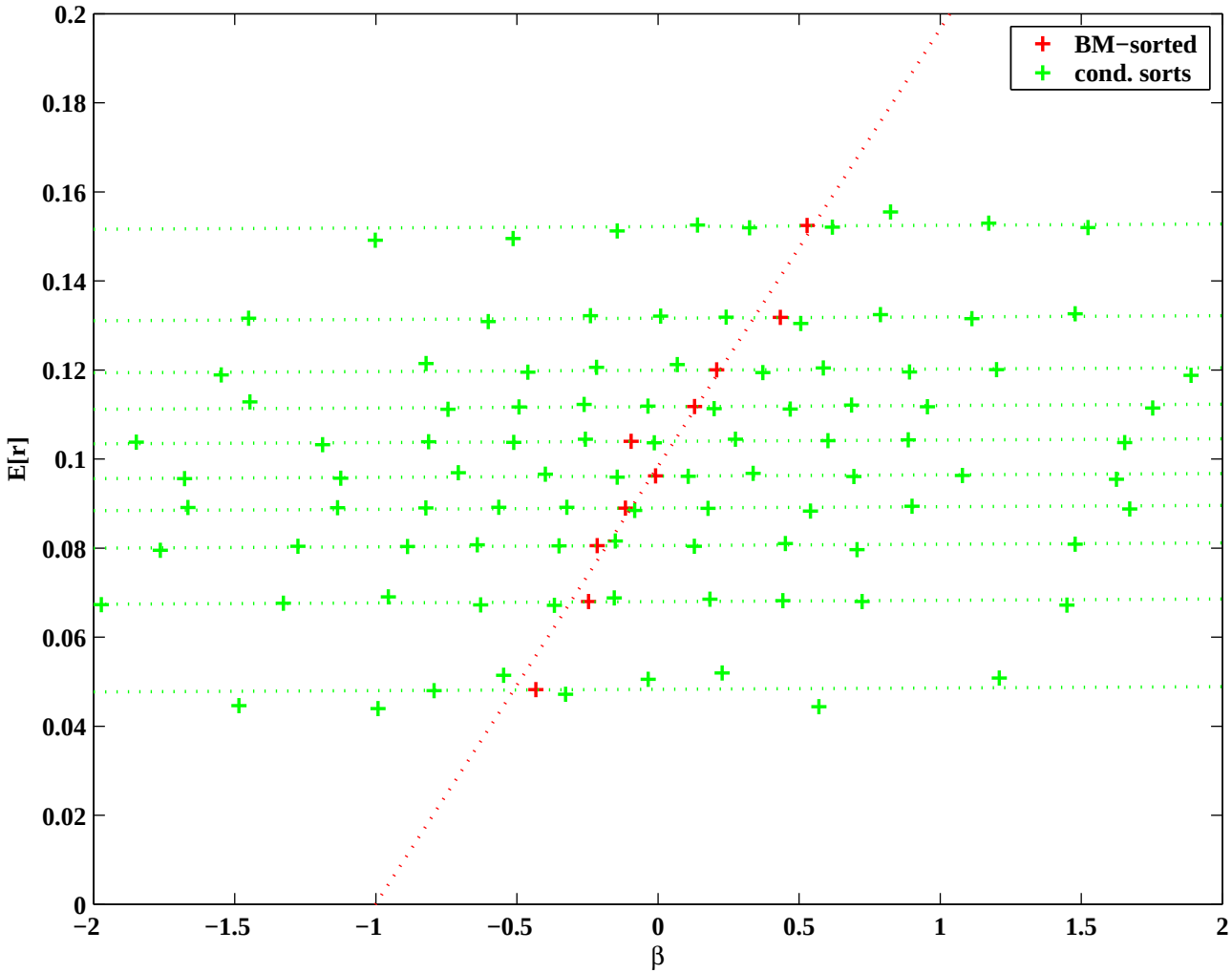
Risk-Sorted Portfolios



Characteristic-Risk Sorted Portfolios



Characteristic-Risk Sorted Portfolios



CV Early-Period Results

- Again, in the first period, both β_{CF} and β_{DR} are higher for value firms than for growth.
- Thus, the standard CAPM describes the returns of the Size/BM sorted portfolios.
- Let's examine the returns of portfolios sorted on the basis of size, BM and *pre-formation market betas*:
  1. Is there variation in β_{Mkt} (and β_{CF}) unrelated to size/BM?
  2. Do high β firms have high returns whether or not they are high BM?

BM/Size/Pre-β_{Mkt} Portfolios - $\bar{r}$s and Post-Formation βs

Chr Prt		$\bar{r}$ (%/mo)					$t(\bar{r})$					$\bar{r}$	$t(\bar{r})$
SZ	BM	1	2	3	4	5	1	2	3	4	5	$5-1$	
1	1	1.22	1.18	1.19	0.85	0.81	(3.48)	(2.54)	(2.57)	(1.47)	(1.39)	-0.40	(-0.96)
1	2	1.40	1.28	1.41	1.17	1.24	(4.40)	(3.42)	(3.38)	(2.32)	(2.41)	-0.16	(-0.51)
1	3	1.33	1.47	1.68	1.56	1.44	(3.91)	(3.36)	(3.26)	(3.19)	(2.36)	0.11	(0.30)
2	1	1.02	0.98	1.07	0.98	0.94	(4.40)	(3.45)	(3.03)	(2.56)	(2.18)	-0.08	(-0.28)
2	2	1.23	1.20	1.28	1.37	1.18	(5.09)	(4.03)	(3.71)	(3.56)	(2.57)	-0.05	(-0.18)
2	3	1.09	1.30	1.32	1.34	1.28	(3.53)	(3.21)	(3.11)	(2.75)	(2.39)	0.19	(0.54)
3	1	0.70	0.86	0.86	1.07	0.96	(3.46)	(3.75)	(3.16)	(3.50)	(2.77)	0.26	(1.19)
3	2	0.93	1.07	1.27	1.06	0.99	(4.37)	(4.02)	(3.99)	(3.14)	(2.47)	0.06	(0.20)
3	3	0.99	1.11	1.24	1.31	1.26	(3.14)	(2.94)	(2.87)	(2.92)	(2.48)	0.27	(0.88)
avg prt		1.10	1.16	1.26	1.19	1.12	(4.42)	(3.68)	(3.48)	(2.93)	(2.48)	0.02	(0.09)

Chr Prt		$\hat{\beta}_{Mkt}$					$t(\hat{\beta}_{Mkt})$					$\hat{\beta}_{Mkt}$	$t(\hat{\beta}_M)$
SZ	BM	1	2	3	4	5	1	2	3	4	5	$5-1$	
1	1	1.03	1.40	1.30	1.71	1.76	(22.09)	(23.13)	(19.99)	(22.09)	(22.96)	0.73	(9.50)
1	2	1.06	1.24	1.40	1.66	1.70	(31.88)	(30.99)	(33.38)	(30.01)	(30.81)	0.64	(11.94)
1	3	1.07	1.40	1.66	1.61	1.88	(25.87)	(27.62)	(28.25)	(30.35)	(25.03)	0.82	(14.15)
2	1	0.78	0.99	1.25	1.36	1.53	(32.85)	(39.48)	(42.87)	(42.84)	(41.48)	0.75	(17.82)
2	2	0.82	1.05	1.24	1.40	1.63	(34.11)	(42.33)	(47.79)	(50.05)	(43.75)	0.81	(20.53)
2	3	0.99	1.39	1.47	1.63	1.80	(27.17)	(36.04)	(36.88)	(32.82)	(32.45)	0.81	(14.11)
3	1	0.70	0.82	0.99	1.13	1.29	(36.81)	(48.07)	(53.82)	(58.54)	(59.26)	0.58	(18.06)
3	2	0.70	0.89	1.11	1.21	1.40	(30.50)	(32.76)	(40.13)	(45.52)	(40.22)	0.70	(14.70)
3	3	1.04	1.27	1.44	1.56	1.71	(31.20)	(32.06)	(31.45)	(37.86)	(33.24)	0.66	(12.75)
avg prt		0.91	1.16	1.32	1.47	1.63	(53.20)	(56.75)	(53.61)	(50.75)	(47.68)	0.72	(23.80)

Time Series Regression Intercepts

Early Period

$$\tilde{r}_{i,t} = \alpha_i + \beta_{i,M}\tilde{r}_{M,t} + \tilde{\epsilon}_{i,t}$$

Chr Prt		$\hat{\alpha}$					$t(\hat{\alpha})$					$\hat{\alpha}$	$t(\hat{\alpha})$
SZ	BM	1	2	3	4	5	1	2	3	4	5	$5-1$	
1	1	0.24	-0.15	-0.05	-0.78	-0.86	(1.01)	(-0.50)	(-0.17)	(-2.02)	(-2.26)	-1.10	(-2.88)
1	2	0.39	0.10	0.07	-0.41	-0.38	(2.34)	(0.50)	(0.33)	(-1.49)	(-1.39)	-0.77	(-2.87)
1	3	0.32	0.13	0.10	0.02	-0.36	(1.54)	(0.53)	(0.33)	(0.09)	(-0.96)	-0.67	(-2.34)
2	1	0.28	0.03	-0.13	-0.31	-0.51	(2.34)	(0.27)	(-0.87)	(-2.00)	(-2.80)	-0.79	(-3.79)
2	2	0.45	0.19	0.09	0.04	-0.38	(3.75)	(1.57)	(0.73)	(0.27)	(-2.04)	-0.83	(-4.20)
2	3	0.15	-0.03	-0.08	-0.22	-0.43	(0.85)	(-0.14)	(-0.39)	(-0.89)	(-1.57)	-0.59	(-2.05)
3	1	0.03	0.07	-0.09	-0.01	-0.26	(0.36)	(0.81)	(-0.96)	(-0.08)	(-2.43)	-0.30	(-1.84)
3	2	0.26	0.22	0.20	-0.09	-0.35	(2.27)	(1.61)	(1.48)	(-0.71)	(-2.03)	-0.61	(-2.57)
3	3	-0.01	-0.09	-0.13	-0.18	-0.37	(-0.05)	(-0.48)	(-0.58)	(-0.86)	(-1.46)	-0.36	(-1.40)
avg prt		0.23	0.05	-0.00	-0.22	-0.43	(2.75)	(0.52)	(-0.01)	(-1.49)	(-2.55)	-0.67	(-4.42)

Early Period Post-Formation CF and DR betas

Chr Prt		$\hat{\beta}_{CF}$					$t(\hat{\beta}_{CF})$					$\hat{\beta}_{CF}$	$t(\hat{\beta}_{CF})$
SZ	BM	1	2	3	4	5	1	2	3	4	5	$5-1$	
1	1	0.20	0.26	0.26	0.38	0.45	(4.98)	(4.97)	(4.91)	(5.95)	(7.03)	0.26	(5.44)
1	2	0.22	0.28	0.29	0.36	0.42	(6.15)	(6.82)	(6.34)	(6.42)	(7.57)	0.21	(5.94)
1	3	0.31	0.35	0.42	0.41	0.47	(8.49)	(7.39)	(7.54)	(7.75)	(7.07)	0.16	(4.05)
2	1	0.13	0.18	0.24	0.26	0.27	(4.94)	(5.56)	(6.01)	(6.15)	(5.49)	0.14	(4.27)
2	2	0.18	0.24	0.25	0.30	0.34	(6.81)	(7.47)	(6.70)	(7.11)	(6.67)	0.16	(4.84)
2	3	0.28	0.37	0.39	0.43	0.45	(8.45)	(8.53)	(8.68)	(8.24)	(7.75)	0.17	(4.27)
3	1	0.09	0.13	0.16	0.16	0.24	(3.73)	(4.97)	(5.34)	(4.75)	(6.16)	0.15	(6.24)
3	2	0.13	0.21	0.21	0.25	0.29	(5.34)	(7.26)	(5.99)	(6.70)	(6.45)	0.16	(4.70)
3	3	0.22	0.31	0.32	0.34	0.42	(6.28)	(7.67)	(6.75)	(6.96)	(7.66)	0.20	(5.88)
avg prt		0.19	0.26	0.28	0.32	0.37	(7.13)	(7.57)	(7.19)	(7.29)	(7.56)	0.18	(6.77)

Chr Prt		$\hat{\beta}_{DR}$					$t(\hat{\beta}_{DR})$					$\hat{\beta}_{DR}$	$t(\hat{\beta}_{DR})$
SZ	BM	1	2	3	4	5	1	2	3	4	5	$5-1$	
1	1	0.84	0.99	1.02	1.13	1.27	(11.91)	(10.07)	(10.57)	(9.04)	(10.37)	0.43	(4.46)
1	2	0.77	0.91	1.02	1.11	1.19	(12.08)	(12.09)	(12.31)	(10.57)	(11.36)	0.42	(6.02)
1	3	0.82	1.00	1.08	1.15	1.24	(11.91)	(11.06)	(9.91)	(11.48)	(9.55)	0.42	(5.18)
2	1	0.63	0.72	0.91	0.96	1.02	(14.19)	(12.86)	(13.15)	(12.65)	(11.55)	0.39	(6.09)
2	2	0.62	0.75	0.89	0.97	1.13	(13.04)	(12.77)	(13.14)	(12.69)	(12.35)	0.51	(8.22)
2	3	0.68	0.86	0.93	1.04	1.17	(10.60)	(10.06)	(10.51)	(10.17)	(10.43)	0.48	(6.11)
3	1	0.54	0.61	0.69	0.82	0.90	(13.87)	(13.81)	(13.05)	(13.93)	(13.21)	0.36	(7.35)
3	2	0.49	0.52	0.75	0.79	0.91	(11.38)	(9.04)	(11.56)	(11.40)	(11.05)	0.42	(6.21)
3	3	0.65	0.86	0.91	1.01	1.08	(9.73)	(11.08)	(9.96)	(10.90)	(10.15)	0.43	(6.20)
avg prt		0.67	0.80	0.91	1.00	1.10	(14.12)	(12.87)	(12.78)	(12.29)	(12.11)	0.43	(8.25)

CV Late-Period Results

- In the later period, CV find that both β_{CF} is again higher for value firms than for growth.
- However, β_{DR} is considerably lower for value firms.
- Thus, value firms have lower total beta, but higher average returns.
- Here, I'll examine the returns of portfolios sorted on the basis of size, BM and *pre-formation CF Betas*

Late Period Post-Formation CF and DR betas

Chr Prt		$\hat{\beta}_{CF}$					$t(\hat{\beta}_{CF})$					$\hat{\beta}_{CF}$	$t(\hat{\beta}_{CF})$
SZ	BM	1	2	3	4	5	1	2	3	4	5	$5-1$	
1	1	0.090	0.110	0.119	0.136	0.157	(2.62)	(3.04)	(3.04)	(3.08)	(3.25)	0.067	(2.54)
1	2	0.117	0.127	0.134	0.153	0.181	(4.55)	(4.46)	(4.16)	(4.20)	(4.22)	0.064	(2.63)
1	3	0.133	0.153	0.170	0.160	0.211	(4.89)	(5.25)	(5.24)	(4.47)	(5.12)	0.078	(3.63)
2	1	0.077	0.074	0.091	0.099	0.130	(2.82)	(2.39)	(2.72)	(2.74)	(2.86)	0.053	(1.93)
2	2	0.106	0.110	0.135	0.158	0.157	(4.71)	(4.14)	(4.94)	(5.19)	(4.23)	0.051	(2.10)
2	3	0.115	0.134	0.141	0.173	0.214	(4.83)	(4.99)	(4.71)	(5.41)	(5.49)	0.098	(3.54)
3	1	0.061	0.058	0.068	0.074	0.091	(2.49)	(2.27)	(2.42)	(2.41)	(2.50)	0.031	(1.27)
3	2	0.052	0.075	0.100	0.118	0.146	(2.28)	(3.04)	(3.74)	(4.15)	(4.39)	0.094	(3.70)
3	3	0.084	0.099	0.127	0.123	0.161	(3.50)	(4.00)	(4.48)	(3.95)	(4.67)	0.077	(2.90)
avg prt		0.093	0.104	0.121	0.133	0.161	(4.15)	(4.18)	(4.32)	(4.32)	(4.40)	0.068	(3.54)

Chr Prt		$\hat{\beta}_{DR}$					$t(\hat{\beta}_{DR})$					$\hat{\beta}_{DR}$	$t(\hat{\beta}_{DR})$
SZ	BM	1	2	3	4	5	1	2	3	4	5	$5-1$	
1	1	1.188	1.267	1.386	1.542	1.658	(17.05)	(17.46)	(17.77)	(17.32)	(16.82)	0.470	(7.28)
1	2	0.859	0.962	1.117	1.237	1.466	(15.90)	(16.07)	(16.92)	(16.37)	(16.55)	0.607	(10.79)
1	3	0.852	0.929	1.037	1.188	1.356	(14.22)	(14.56)	(14.61)	(15.71)	(15.32)	0.504	(9.93)
2	1	0.927	1.108	1.221	1.324	1.642	(16.71)	(18.46)	(18.78)	(18.85)	(18.47)	0.715	(11.33)
2	2	0.669	0.903	0.948	1.030	1.302	(13.35)	(16.44)	(16.63)	(15.91)	(17.34)	0.632	(11.49)
2	3	0.608	0.786	0.952	1.006	1.217	(10.80)	(12.89)	(14.65)	(14.28)	(14.11)	0.609	(9.11)
3	1	0.780	0.877	1.020	1.132	1.304	(15.21)	(17.21)	(18.72)	(19.45)	(18.25)	0.524	(9.16)
3	2	0.551	0.697	0.870	0.878	1.128	(10.41)	(12.69)	(15.27)	(14.07)	(16.35)	0.577	(9.52)
3	3	0.500	0.583	0.759	0.947	1.059	(8.58)	(9.97)	(11.56)	(13.81)	(13.93)	0.560	(8.71)
avg prt		0.770	0.901	1.034	1.143	1.348	(16.80)	(18.15)	(18.90)	(19.05)	(18.79)	0.577	(13.67)

Late Period Average Portfolio Returns

Chr Prt		$\bar{r}$ (%/mo)					$t(\bar{r})$					$\bar{r}$	$t(\bar{r})$
SZ	BM	1	2	3	4	5	1	2	3	4	5	$5-1$	
1	1	0.53	0.57	0.77	0.53	0.24	(1.81)	(1.87)	(2.30)	(1.40)	(0.59)	-0.29	(-1.28)
1	2	0.71	0.85	0.88	0.76	0.95	(3.23)	(3.45)	(3.18)	(2.44)	(2.57)	0.23	(1.12)
1	3	1.04	0.95	1.07	1.02	1.11	(4.40)	(3.75)	(3.78)	(3.31)	(3.10)	0.07	(0.39)
2	1	0.66	0.64	0.55	0.42	0.49	(2.87)	(2.45)	(1.92)	(1.37)	(1.27)	-0.17	(-0.74)
2	2	0.63	0.62	0.80	0.66	0.93	(3.26)	(2.71)	(3.39)	(2.49)	(2.92)	0.29	(1.44)
2	3	0.67	0.90	1.02	0.95	1.02	(3.25)	(3.88)	(3.97)	(3.43)	(3.02)	0.35	(1.48)
3	1	0.57	0.55	0.54	0.48	0.52	(2.75)	(2.54)	(2.27)	(1.87)	(1.67)	-0.05	(-0.25)
3	2	0.51	0.61	0.48	0.57	0.77	(2.67)	(2.94)	(2.10)	(2.32)	(2.69)	0.25	(1.17)
3	3	0.67	0.57	0.73	0.75	0.79	(3.29)	(2.70)	(3.00)	(2.80)	(2.65)	0.11	(0.50)
avg prt		1.19	1.22	1.28	1.21	1.28	(6.26)	(5.73)	(5.38)	(4.60)	(4.10)	0.09	(0.54)

References

Campbell, John Y., 1991, A variance decomposition for stock returns, *Economic Journal* 101, 155–173.

Daniel, Kent D., and Sheridan Titman, 1997, Evidence on the characteristics of cross-sectional variation in common stock returns, *Journal of Finance* 52, 1–33.

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.