Discussion of:

Is Value Riskier Than Growth?

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The CAPM and the Value Effect

- The expected returns of value stocks appear too high for their risk, as measured by the unconditional CAPM β.
- There are a number of reasons why market risk might not be the appropriate measure:
  1. The market proxy used isn't the true wealth portfolio.
  2. Investors may be paying to hedge changes in their investment opportunity set (Merton (1973)).
  3. Frictions/Market Segmentation
- In contrast, PZ argue that the CAPM β is the right risk measure, but empirically we haven't done a very good job measuring it!

Are Value Stocks Riskier?

- Lakonishok, Shleifer, and Vishny (1994) argue that value stocks are not riskier:
  - They do better in market downturns
    - $\Rightarrow$ Lower unconditional β
  - They do better in economic downturns
- This paper addresses the first point:
  - PZ argue that the unconditional CAPM β is the wrong measure of risk, and that you need to examine conditional βs to assess riskiness.

Conditional CAPM - *Example*

Consider the following 2-state world (w/ equal probs):

	State 1	State 2
$E(r_M\|s)$	2%	20%
$E(\beta_V\|s)$	0.5	1.5
$E(r_V\|s)$	1%	30%
$E(\beta_G\|s)$	1.5	0.8
$E(r_G\|s)$	3%	16%

	Val.	Grwth	Mkt
β_i^U	1	1.15	1
$E(r_i)$	15.5%	9.5%	11%
$\beta_i^U \bar{r}_m$	11%	11.65%	–
α_i^U	4.5%	-2.15%	–

- The *conditional* CAPM holds; the *unconditional* CAPM does not.
- The reason is the covariation between the βs and $E[r_m]$.
  - The V stocks have positive market timing
  - The G stocks have negative market timing

The Conditional CAPM

- The CAPM states that:

$$E_{t-1}[r_{i,t}] = \beta_{i,t-1} E_{t-1}[r_{M,t}]$$

  where:

  - $r_{i,t}$ is the expected excess return on *any* portfolio
  - $E_{t-1}[r_{M,t}]$ is the expected excess return on the VW index

- Taking unconditional expectations, and using the definition of the covariance:

$$E[r_{i,t}] = \underbrace{E[\beta_{i,t-1}]}_{\approx \beta_i^U} \cdot E[r_{M,t}] + \underbrace{cov(\beta_{i,t-1}, E_{t-1}[r_{M,t}])}_{\approx \alpha_i^{uncond}}$$

Estimating a Conditional Model

In situations where the factor-mimicking portfolios return is observable, Cochrane notes that the the moment restriction:

$$E_t\left[r_{i,t+1} - \beta_{i,t} \cdot r_{m,t+1}\right] = 0$$

can be tested by an test of the corresponding moment conditions:

$$E[[r_{i,t+1} - \alpha_i - \underbrace{\mathbf{Z}_t \mathbf{b}_i}_{\equiv \beta_{i,t}} r_{m,t+1}][\iota\ \mathbf{Z}_t r_{m,t+1}]^T] = 0$$

where $\alpha_i = 0$.

- This specification assumes that the βs are linear in the Z_ts.
- Managed portfolio interpretation:

$$r_{i,t+1} = \alpha_i + b_{i,0} \cdot r_{m,t+1} + b_{i,1} \cdot Z_{1,t} r_{m,t} + \cdots + b_{i,4} \cdot Z_{4,t} r_{m,t} + \epsilon_{i,t+1}$$

GMM Estimation

PZ's GMM moment restrictions are:

$$E\left[[r_{i,t+1} - \alpha_i - (\mathbf{Z}_t r_{m,t+1})\mathbf{b}_i][\iota\ \mathbf{Z}_t r_{m,t+1}]^T\right] = 0 \qquad (10)$$

$$E\left[[r_{m,t+1} - \mathbf{Z}_t\boldsymbol{\delta}]\mathbf{Z}_t^T\right] = 0 \qquad (11)$$

$$E\left[[\mathbf{Z}_t\mathbf{b}_i - c_i - \varphi_t\mathbf{Z}_t\boldsymbol{\delta}][\iota\ \mathbf{Z}_t\boldsymbol{\delta}]^T\right] = 0 \qquad (12)$$

- What do these represent?

GMM Estimation

What do PZ's moment restrictions represent:

- Equation (10) is the standard time-series restriction for the conditional-CAPM (Cochrane, 2001):

$$r_{i,t+1} = \alpha_i + \mathbf{b}_i(\mathbf{Z'}_t r_{m,t+1}) + \epsilon_{i,t+1}$$

$$\epsilon_{i,t+1} \perp \ \ \{1, \mathbf{Z'}_t r_{m,t+1}\}$$

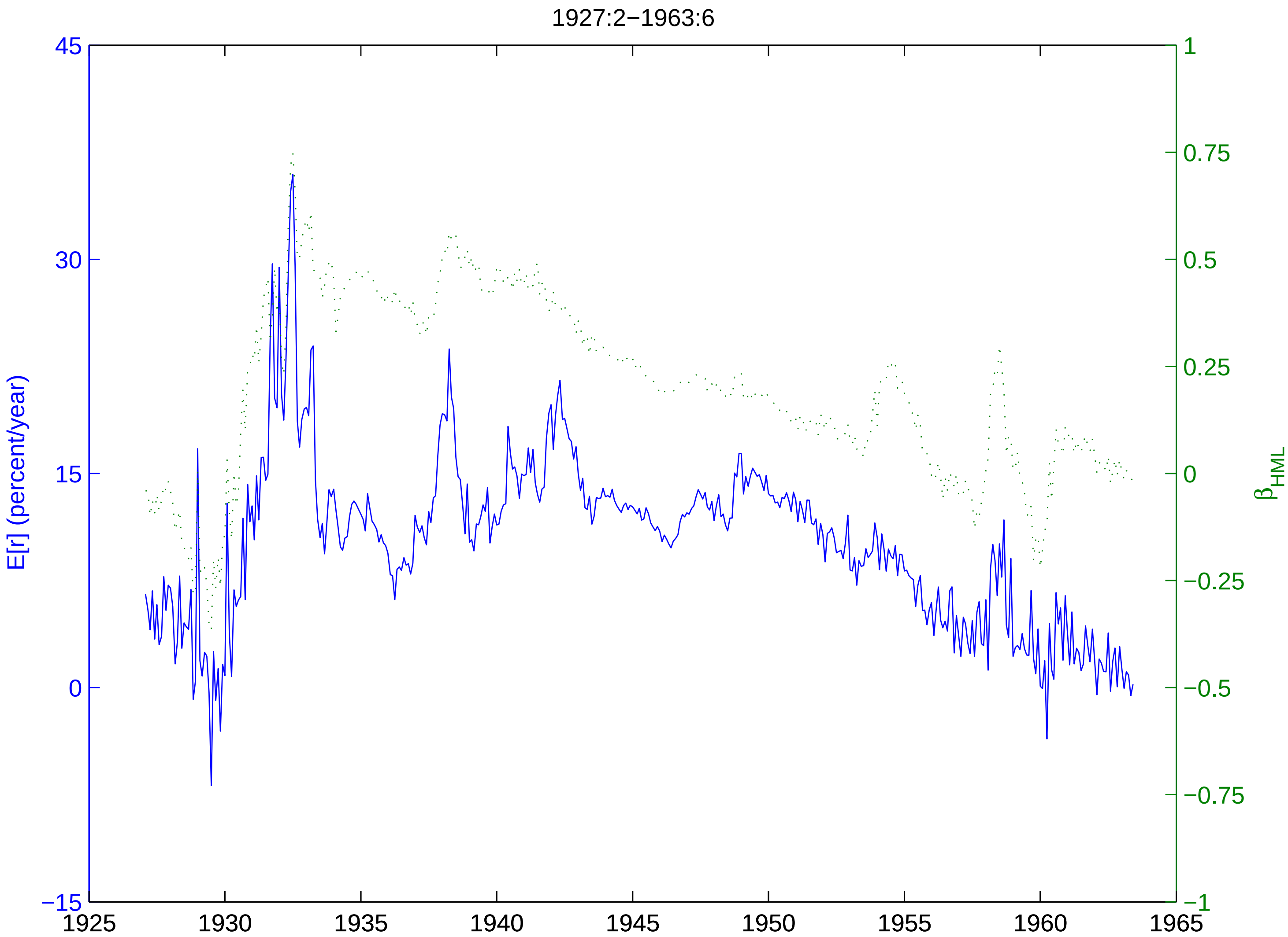
- Equation (11) specifies that $E_t[r_{i,t+1}]$ is linear in the instruments:

$$r_{m,t+1} = \mathbf{Z}_t \boldsymbol{\delta} + u_{i,t+1}$$

- Equation (12) specifies that time-series variation in a stock's beta is linearly related to the market risk premium:

$$\mathbf{Z}_t \mathbf{b}_i = c_i + \varphi_t \mathbf{Z}_t \boldsymbol{\delta}$$

Early Period $E_t[r_{m,t+1}]$ and β_t



Estimation Results

HML Portfolio	1927:02-1963:06 (early)	1963:07-2001:12 (late)
$\bar{r}$	0.37%	0.42%
β^U	0.354	$-$0.286
α^U & (t)	0.06% (0.3)	0.55% (4.32)
α^C & (t)	0.11% (0.7)	0.47% (3.76)
$\rho(\beta_t^C, E_t[r_m])$	79%	73%
$\bar{\beta^C}$	0.201	$-$0.269

- These results are consistent with the Lewellen and Nagel (2003) argument that the conditional CAPM can't explain the value effect (in the later period.)

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

1933:07-1963:06

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

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)

- Also,The conditional α is -0.66 %/month (t =-4.50)

References

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Merton, Robert C., 1973, An intertemporal capital asset pricing model, *Econometrica* 41, 867–887.