

Investment-based Costs of Equity

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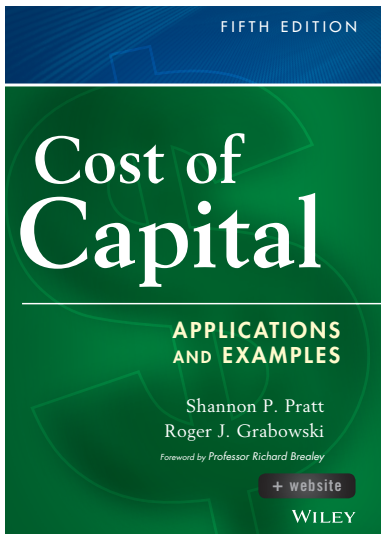
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Fisher AI Retreat

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Question

The cost of equity problem



One of the most foundational in finance and accounting

Used in most applications:
Investment management,
business valuation, capital
budgeting, financing decision

Trillions of dollars involved

The imprecision problem with factor models:

- Fama and French (1997)

Accounting-based implied costs of equity:

- Claus and Thomas (2001); Gebhardt, Lee, and Swaminathan (2001); Easton (2004); Ohlson and Juettner-Nauroth (2005)

The weak association problem with implied costs of equity:

- Easton and Monahan (2005)

The q^5 -characteristics model estimates costs of equity as
out-of-sample forecasts from cross-sectional predictive regressions

Combining slopes from prior 120-month rolling windows with the latest available q^5 characteristics

Size, investment-to-assets, return on equity, and expected growth from our q - and q^5 -factor models (Hou et al. 2021)

A tree sequentially splits stocks based on q^5 -characteristics

Boosting mitigates overfitting by combining many shallow trees

Gradient boosting tends to outperform neural nets in tabular data:

- Grinsztajn, Oyallon, and Varoquaux (2022)
- McElfresh et al. (2023)

LightGBM; 120-month rolling window; 5-fold cross-validation; MSE (MAE, Huber); hyperparameters tuning via grid search

The q^5 -characteristics model competitive in evaluation tests (1977/1–2024/12)

In portfolio sorts, the q^5 -cost of equity (QCE) strongly associated with future returns (the high-minus-low deciles)

h	1m	12m	24m		1m	12m	24m		1m	12m	24m
QCE	1.62	0.81	0.57	ICE	-0.03	0.03	0.04	Q5F	0.13	0.32	0.38
	7.29	4.01	2.93		-0.08	0.10	0.13		0.57	1.57	1.95
GB	1.79	0.88	0.55	GBA	1.59	0.94	0.55	GBH	1.89	1.02	0.55
	7.02	3.89	3.03		4.71	3.45	2.37		6.02	3.73	2.53

The q^5 -characteristics model competitive in evaluation tests (1977/1–2024/12)

In CX regressions, the QCE slopes mostly insignificant from 1

	h	s	ste	$ t_{s=1} $	h	s	ste	$ t_{s=1} $	h	s	ste	$ t_{s=1} $
QCE	1	0.82	0.11	1.63	12	0.63	0.15	2.51	24	0.81	0.13	1.47
ICE	1	0.42	0.17	3.45	12	0.51	0.13	3.80	24	0.49	0.09	5.90
Q5F	1	0.01	0.03	35.38	12	0.00	0.02	42.25	24	0.01	0.01	66.00
GB	1	1.23	0.09	2.51	12	0.80	0.16	1.28	24	0.94	0.14	0.41
GBA	1	0.53	0.11	4.12	12	0.57	0.15	2.85	24	0.53	0.14	3.43
GBH	1	0.95	0.12	0.43	12	0.67	0.16	2.09	24	0.58	0.13	3.18

QCE mitigates greatly the imprecision problem

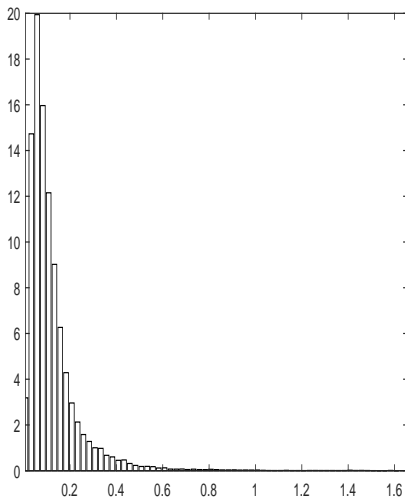
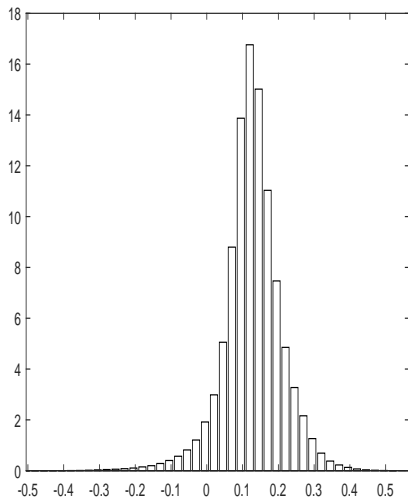
QCE resolves the weak association problem in the cross section

Strong ICE performance in time series predictability

The firm-level QCE distribution weakly left-skewed, whereas the firm-level ICE distribution right-skewed

Properties

Firm-level costs of equity, 12-month QCE vs. ICE (panel skewness: -0.48 vs. 4.16)



The q^5 -characteristics model estimates costs of equity as out-of-sample forecasts from cross-sectional predictive regressions

- Covariances vs. characteristics: Perspectivism
- Structural vs. reduced form: Deleuze
- Data modeling vs. machine learning: Deleuze