The Economics of Value Investing

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The investment CAPM provides an economic foundation for Graham and Dodd's (1934) *Security Analysis*, without mispricing

- Expected returns vary cross-sectionally, depending on firms' investment, profitability, and expected investment growth
- Many anomaly variables predict investment growth, in the same direction in which these variables predict returns, though the amount of growth predictability is small
- An appealing alternative to the residual income model and the Penman-Reggiani-Richardson-Tuna model for characterizing the cost of capital in the cross section

An economics-based framework for security analysis, reconciling with efficient markets:

- Ou and Penman 1989, Lev and Thiagarajan 1993, Abarbanell and Bushee 1998, Frankel and Lee 1998, Piotroski 2000, Soliman 2008 all subscribe to the Graham-Dodd perspective

The investment policy at the center of security analysis:

- Theory: No essential role for investment in Ohlson 1995; real options in Zhang 2000, Biddle, Chen, and Zhang 2001, with a stylized 3-period model with a constant discount rate
- Empirics: Explore the expected investment growth effect

A voluminous literature applies accounting-based valuation models to estimate the implied cost of capital:

- Claus and Thomas 2001, Gebhardt, Lee, and Swaminathan 2001, Easton 2004
- Botosan 1997, Botosan and Plumlee 2002, Hribar and Jenkins 2004, Hail and Leuz 2006, Pastor, Sinha, and Swaminathan 2008, Lee, Ng, and Swaminathan 2009, Chava and Purnanandam 2010, Chen, Kacperczyk, and Ortiz-Molina 2011, Fama and French 2015
- Easton and Monahan 2005, Guay, Kothari, and Shu 2011, Hou, van Dijk, and Zhang 2012

Inconsistency? Accounting-based valuation models mostly assume a constant discount rate, implying returns are unpredictable

The expected return is not equal to the internal rate of return

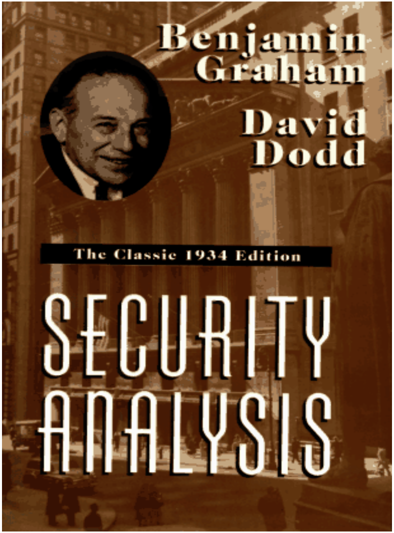
- Helps interpreting the weak evidence of the implied cost of capital in forecasting returns (Hughes, Liu, and Liu 2009)

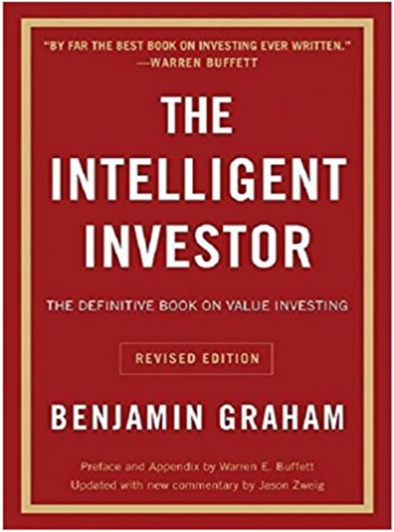
The constant discount rate could presumably vary across firms, but its economic relations with firm characteristics not articulated

- The investment CAPM offers a full-blown theory of the one-period-ahead expected return

Outline

Outline


Benjamin Graham
David Dodd
The Classic 1934 Edition
SECURITY ANALYSIS


"BY FAR THE BEST BOOK ON INVESTING EVER WRITTEN."
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THE INTELLIGENT INVESTOR
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BENJAMIN GRAHAM
Preface and Appendix by Warren E. Buffett
Updated with new commentary by Jason Zweig

Invest in undervalued securities selling well below the intrinsic value

- The intrinsic value is the value that can be justified by the firm's earnings, assets, and other accounting information
- The intrinsic value is distinct from the market value subject to artificial manipulation and psychological distortion

Maintain margin of safety, the intrinsic-market value distance

Security analysis is "concerned with the intrinsic value of the security and more particularly with the discovery of discrepancies between the intrinsic value and the market price (p. 17)"

The intelligent investor "would be well advised to devote his attention to the field of undervalued securities—issues, whether bonds or stocks, which are selling well below the levels apparently justified by a careful analysis of the relevant facts (p. 13)"

The Superinvestors of Graham-and-Doddsville

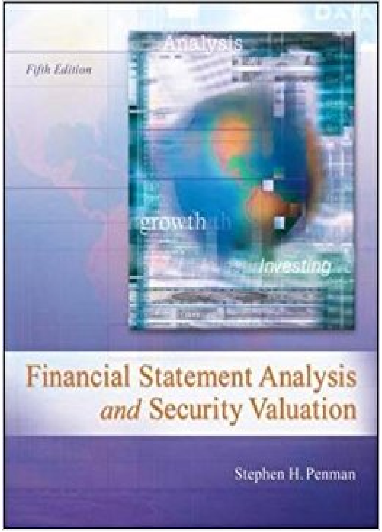
By Warren E. Buffett

"Superinvestor" Warren E. Buffett, who got an A+ from Ben Graham at Columbia in 1951, never stopped making the grade. He made his fortune using the principles of Graham & Dodd's Security Analysis. *Here, in celebration of the fiftieth anniversary of that classic text, he tracks the records of investors who stick to the "value approach" and have gotten rich going by the book.*

"Our Graham & Dodd investors, needless to say, do not discuss beta, the capital asset pricing model or covariance in returns among securities. These are not subjects of any interest to them. In fact, most of them would have difficulty defining those terms (p. 7)"

"Ships will sail around the world but the Flat Earth Society will flourish (p. 15)."

"Rather than taking prices as value benchmarks, 'intrinsic values' discovered from financial statements serve as benchmarks with which prices are compared to identify overpriced and underpriced stocks. Because deviant prices ultimately gravitate to the fundamentals, investment strategies which produce 'abnormal returns' can be discovered by the comparison of prices to these fundamental values (p. 296)."



"Passive investors accept market prices as fair value. Fundamental investors, in contrast, are active investors. They see that price is what you pay, value is what you get. They understand that the primary risk in investing is the risk of paying too much (or selling for too little). The fundamentalist actively challenges the market price: Is it indeed a fair price (p. 210, original emphasis)?"

The first principle of consumption:

$$E_t[M_{t+1} r^S_{it+1}] = 1,$$

in which $r^S_{it+1} = (P_{it+1} + D_{it+1})/P_{it}$ is firm i's stock return, and $M_{t+1} = \rho U'(C_{t+1})/U'(C_t)$ is the stochastic discount factor

Equivalently,

$$E_t[r^S_{it+1}] - r_{ft} = \beta^M_{it} \lambda_{Mt},$$

in which $r_{ft} = 1/E_t[M_{t+1}]$ is the real interest rate, $\beta^M_{it} = -\text{Cov}(r^S_{it+1}, M_{t+1})/\text{Var}(M_{t+1})$ is the consumption beta, and $\lambda_{Mt} = \text{Var}(M_{t+1})/E_t[M_{t+1}]$ is the price of the consumption risk

An individual firm i maximizes the present value of net dividends:

$$P_{it} + D_{it} \equiv \max_{\{I_{it+s}, B_{it+s+1}\}_{s=0}^{\infty}} E_t \left[\sum_{s=0}^{\infty} M_{t+s} D_{it+s} \right],$$

in which

$$D_{it} = (1-\tau)[X_{it}A_{it} - \Phi(I_{it}, A_{it})] - I_{it} + B_{it+1} - r_{it}^{B} B_{it} + \tau\delta A_{it} + \tau(r_{it}^{B} - 1)B_{it}$$

Retaining the Miller-Modigliani 1961 dividend irrelevance

Endogenous investment, differing from Feltham and Ohlson 1995, Ohlson 1995, Ohlson and Juettner-Nauroth 2005

The first principle of investment, $E_t[M_{t+1} r^I_{it+1}] = 1$, in which:

$$r^I_{it+1} = \frac{(1-\tau)\left[X_{it+1} + \frac{a}{2}\left(\frac{I_{it+1}}{A_{it+1}}\right)^2\right] + \tau\delta + (1-\delta)\left[1 + (1-\tau)a\left(\frac{I_{it+1}}{A_{it+1}}\right)\right]}{1 + (1-\tau)a\left(\frac{I_{it}}{A_{it}}\right)}$$

The weighted average cost of capital equation (Modigliani-Miller 1958 Propositions II and III):

$$r^I_{it+1} = w_{it}\, r^{Ba}_{it+1} + (1 - w_{it})\, r^S_{it+1},$$

w_{it}: The market leverage, r^{Ba}_{it+1}: After-tax cost of debt

Combining the neoclassical investment model with Modigliani and Miller 1958 yields an asset pricing theory:

$$r^S_{it+1} = r^I_{it+1} + \frac{w_{it}}{1 - w_{it}} \left(r^I_{it+1} - r^{Ba}_{it+1} \right)$$

- Cross-sectionally varying expected returns:
  Investment-to-assets, expected profitability, and expected investment-to-assets growth
- Security analysis in corporate bonds:

$$r^{Ba}_{it+1} = r^I_{it+1} - \frac{1 - w_{it}}{w_{it}} \left(r^S_{it+1} - r^I_{it+1} \right)$$

Complementarity: The consumption CAPM derived from the demand of risky assets, the investment CAPM from supply

- Both the consumption and investment CAPMs hold in equilibrium, delivering identical expected returns

Immune to the aggregation problem, the investment CAPM is more empirically tractable than the consumption CAPM

Marginal q equals average q (Hayashi 1982):

$$P_{it} = \left[1 + (1-\tau)a\left(\frac{I_{it}}{A_{it}}\right)\right]A_{it+1} - B_{it+1}$$

A new valuation function:

$$P_{it} = \frac{(1-\tau)\left[X_{it+1} + \frac{a}{2}\left(\frac{I_{it+1}}{A_{it+1}}\right)^2\right]A_{it+1} + \tau\delta A_{it+1} + (1-\delta)\left[1 + (1-\tau)a\left(\frac{I_{it+1}}{A_{it+1}}\right)\right]A_{it+1}}{w_{it}\, r^{Ba}_{it+1} + (1-w_{it})\, r^{S}_{it+1}} - B_{it+1}$$

- The value-profitability relation is convex

Outline

Dividend discounting model combined with clean surplus relation

Preinreich 1938, Miller and Modigliani 1961, Ohlson 1995:

$$\frac{P_{it}}{Be_{it}} = \frac{\sum_{\tau=1}^{\infty} E[Y_{it+\tau} - \triangle Be_{it+\tau}]/(1+r_i)^{\tau}}{Be_{it}}$$

$$\frac{P_{it}}{Be_{it}} = \frac{\sum_{\tau=1}^{\infty} E[Y_{it+\tau} - r_i Be_{it+\tau}]/(1+r_i)^{\tau}}{Be_{it}}$$

Fama and French 2015 derive three predictions, all else equal:

- A lower P_{it}/Be_{it} means a higher r_i
- A higher $E[Y_{it+\tau}]$ means a higher r_i
- A higher $E[\triangle Be_{it+\tau}]/Be_{it}$ means a lower r_i

Fama and French 2015: “Most asset pricing research focuses on short-horizon returns—we use a one-month horizon in our tests. If each stock's short-horizon expected return is positively related to its internal rate of return—if, for example, the expected return is the same for all horizons—the valuation equation (p. 2)...”

Estimate the implied costs of capital for SMB, HML, RMW, and CMA, and compare with their one-period-ahead average returns

Gebhardt, Lee, and Swaminathan 2001:

$$P_t = Be_t + \sum_{\tau=1}^{11} \frac{(E_t[\text{Roe}_{t+\tau}] - \text{ICC}) \times Be_{t+\tau-1}}{(1+\text{ICC})^{\tau}} + \frac{(E_t[\text{Roe}_{t+12}] - \text{ICC}) \times Be_{t+11}}{\text{ICC} \times (1+\text{ICC})^{11}}$$

Easton 2004:

$$P_t = \frac{E_t[Y_{t+2}] + \text{ICC} \times E_t[D_{t+1}] - E_t[Y_{t+1}]}{\text{ICC}^2}$$

Claus and Thomas 2001:

$$P_t = Be_t + \sum_{\tau=1}^{5} \frac{(E_t[\text{Roe}_{t+\tau}] - \text{ICC}) \times Be_{t+\tau-1}}{(1+\text{ICC})^{\tau}} + \frac{(E_t[\text{Roe}_{t+5}] - \text{ICC}) \times Be_{t+4} \times (1+g)}{(\text{ICC} - g) \times (1+\text{ICC})^5}$$

Ohlson and Juettner-Nauroth 2005:

$$\text{ICC} = A + \sqrt{A^2 + \frac{E_t[Y_{t+1}]}{P_t} \times (g - (\gamma - 1))}$$

in which

$$\begin{aligned} A &\equiv \frac{1}{2}\left((\gamma - 1) + \frac{E_t[D_{t+1}]}{P_t}\right) \\ g &\equiv \frac{1}{2}\left(\frac{E_t[Y_{t+3}] - E_t[Y_{t+2}]}{E_t[Y_{t+2}]} + \frac{E_t[Y_{t+5}] - E_t[Y_{t+4}]}{E_t[Y_{t+4}]}\right) \end{aligned}$$

Comparison with the Residual Income Model

ICC is not the one-period-ahead expected return, IBES earnings forecasts, 1979–2015

	AR	ICC	Diff	AR	ICC	Diff
		GLS			Easton	
SMB	1.75	0.87	0.88	1.87	2.52	−0.65
[t]	0.87	4.56	0.44	0.97	14.63	−0.34
HML	3.26	3.50	−0.23	3.16	3.30	−0.14
[t]	1.48	18.39	−0.11	1.37	7.31	−0.06
RMW	3.75	−1.18	4.93	4.43	−3.29	7.72
[t]	2.59	−8.32	3.49	2.70	−9.42	4.60
CMA	3.34	0.64	2.70	3.46	2.45	1.00
[t]	2.69	4.69	2.26	2.95	7.80	0.94
		CT			OJ	
SMB	1.79	1.10	0.69	1.94	0.67	1.27
[t]	0.89	6.79	0.35	0.97	4.43	0.65
HML	3.38	0.06	3.32	2.23	0.70	1.53
[t]	1.50	0.17	1.46	1.03	3.55	0.70
RMW	3.71	0.34	3.37	4.11	−0.03	4.14
[t]	2.64	2.20	2.42	3.36	−0.17	3.36
CMA	3.31	0.08	3.23	3.03	0.07	2.96
[t]	2.71	0.58	2.65	2.59	0.42	2.53

Comparison with the Residual Income Model

ICC is not the expected return, cross-sectional earnings forecasts, 1967–2015

	AR	ICC	Diff	AR	ICC	Diff
		GLS			Easton	
SMB	2.85	1.53	1.32	2.85	5.05	−2.20
[t]	1.38	4.02	0.66	1.42	6.90	−1.17
HML	3.49	5.55	−2.06	3.41	7.22	−3.81
[t]	1.88	26.60	−1.14	1.81	14.99	−1.96
RMW	3.37	−1.44	4.81	3.89	−3.67	7.57
[t]	2.60	−6.58	3.86	2.60	−10.35	4.79
CMA	3.59	1.61	1.99	4.28	4.06	0.22
[t]	3.01	9.13	1.72	4.10	11.39	0.20
		CT			OJ	
SMB	2.92	2.73	0.19	3.90	3.21	0.69
[t]	1.41	4.23	0.09	2.00	5.32	0.37
HML	3.28	3.64	−0.36	2.97	4.72	−1.75
[t]	1.76	15.76	−0.19	1.72	17.96	−1.00
RMW	3.17	−0.00	3.18	3.31	−1.59	4.90
[t]	2.94	−0.01	2.95	3.30	−5.72	4.60
CMA	3.26	1.52	1.74	3.72	2.10	1.62
[t]	2.82	11.24	1.46	3.07	10.62	1.35

Fama and French 2015 argue a lower P_{it}/Be_{it} means a higher r_i, and a higher $E[\triangle Be_{it+\tau}]/Be_{it}$ means a lower r_i

- But HML is redundant once CMA is included

Consistent with the investment CAPM:

$$1+(1-\tau)a\frac{I_{it}}{A_{it}}=\frac{P_{it}}{A_{it+1}}$$

marginal cost of investment = marginal q

This economics-based investment-value linkage allows us to replace HML with the investment factor in the q-factor model

Comparison with the Residual Income Model

The relation between expected investment and expected return tend to be positive

Does a higher $E[\triangle Be_{it+\tau}]/Be_{it}$ mean a lower r_i?

Reformulating the residual income model with $E_t[r_{it+1}]$:

$$P_{it} = \frac{E_t[Y_{it+1} - \triangle Be_{it+1}] + E_t[P_{it+1}]}{1 + E_t[r_{it+1}]},$$

$$\frac{P_{it}}{Be_{it}} = \frac{E_t\left[\frac{Y_{it+1}}{Be_{it}}\right] - E_t\left[\frac{\triangle Be_{it+1}}{Be_{it}}\right] + E_t\left[\frac{P_{it+1}}{Be_{it+1}}\left(1 + \frac{\triangle Be_{it+1}}{Be_{it}}\right)\right]}{1 + E_t[r_{it+1}]},$$

$$\frac{P_{it}}{Be_{it}} = \frac{E_t\left[\frac{Y_{it+1}}{Be_{it}}\right] + E_t\left[\frac{\triangle Be_{it+1}}{Be_{it}}\left(\frac{P_{it+1}}{Be_{it+1}} - 1\right)\right] + E_t\left[\frac{P_{it+1}}{Be_{it+1}}\right]}{1 + E_t[r_{it+1}]}.$$

A positive $E[\triangle Be_{it+\tau}]/Be_{it}$-$E_t[r_{it+1}]$ relation consistent with Lettau and Ludvigson 2002, Fama and French 2006

Comparison with the Residual Income Model

Past investment does not forecast future investment, annual cross-sectional regressions of future book equity growth on past asset growth (book equity growth), 1963–2015

		$\frac{\triangle Be_{it+\tau}}{Be_{it+\tau-1}} = \gamma_0 + \gamma_1 \frac{\triangle A_{it}}{A_{it-1}} + \epsilon_{t+\tau}$					$\frac{\triangle Be_{it+\tau}}{Be_{it+\tau-1}} = \gamma_0 + \gamma_1 \frac{\triangle Be_{it}}{Be_{it-1}} + \epsilon_{t+\tau}$				
τ	#firms	γ_0	$t(\gamma_0)$	γ_1	$t(\gamma_1)$	R^2	γ_0	$t(\gamma_0)$	γ_1	$t(\gamma_1)$	R^2
1	3,106	0.09	14.57	0.22	14.38	0.05	0.09	13.14	0.21	8.64	0.06
2	2,844	0.10	14.57	0.10	7.58	0.01	0.10	14.65	0.10	5.23	0.02
3	2,624	0.10	14.98	0.06	6.25	0.01	0.10	14.91	0.06	4.09	0.01
4	2,429	0.10	16.19	0.05	5.47	0.00	0.10	16.20	0.05	3.73	0.00
5	2,256	0.10	15.03	0.04	3.41	0.00	0.10	16.04	0.03	1.91	0.00
6	2,099	0.10	15.26	0.05	4.57	0.00	0.10	15.01	0.03	2.24	0.00
7	1,955	0.10	15.45	0.04	4.39	0.00	0.10	15.58	0.03	2.69	0.00
8	1,821	0.09	15.36	0.03	3.98	0.00	0.10	15.65	0.01	1.60	0.00
9	1,697	0.09	15.28	0.03	3.45	0.00	0.10	15.42	0.01	1.19	0.00
10	1,584	0.09	14.57	0.04	4.50	0.00	0.09	14.77	0.02	2.17	0.00

Consistent with the lumpy investment literature in economics (Dixit and Pindyck 1994, Doms and Dunne 1998, Whited 1998)

Outline

Building on Easton, Harris, and Ohlson 1992, PRRT work with:

$$\begin{aligned} E_t[r^S_{it+1}] &= E_t\left[\frac{P_{it+1} + D_{it+1} - P_{it}}{P_{it}}\right] \\ &= \frac{E_t[Y_{it+1}]}{P_{it}} + E_t\left[\frac{(P_{it+1} - Be_{it+1}) - (P_{it} - Be_{it})}{P_{it}}\right] \end{aligned}$$

The expected change in the market-minus-book equity linked to the expected earnings growth (Shroff 1995)

Mark-to-market:

$$P_{it} = Be_{it} \quad \Rightarrow \quad E_t[r^S_{it+1}] = \frac{E_t[Y_{it+1}]}{P_{it}}$$

No earnings growth:

$$P_{it+1} - Be_{it+1} = P_{it} - Be_{it} \quad \Rightarrow \quad E_t[r^S_{it+1}] = \frac{E_t[Y_{it+1}]}{P_{it}}$$

Growth related to risk and return:

- Ohlson and Juettner-Nauroth 2005: The expected return as a weighted average of the forward earnings yield and book-to-market (a proxy for the expected earnings growth)

Penman and Zhang 2012: Accounting conservatism expenses R&D and advertising, inducing high expected earnings growth

Penman and Reggiani 2013: Deferring earnings recognition raises the expected earnings growth, connected to risk (uncertainty)

Penman and Zhu 2014: Many anomaly variables forecast the forward earnings yield and two-year-ahead earnings growth in the cross section, in the same direction of forecasting returns

Penman and Zhang 2016: Under conservative accounting, a lower Roe implies higher risk and a higher expected return

Penman and Zhu 2016: Regress future returns on variables connected to expected earnings growth to estimate costs of capital

Both models study the one-period-ahead expected return, as opposed to the internal rate of return in the residual income model

The one-period-ahead expected earnings and expected growth as the key drivers of the expected return:

- Earnings scaled with the market equity in PRRT, but book assets in the investment CAPM
- Expected earnings growth in PRRT, but expected investment growth in the investment CAPM

The PRRT model uses accounting insights to link the expected market-minus-book equity change to the expected earnings growth

- The investment CAPM uses the investment-value linkage to substitute, analytically, capital gain with investment growth

The PRRT model still has the market equity, the investment CAPM is more "fundamental" per the investment-value linkage

Accounting conservatism implies a negative Roe-expected return relation, but the investment CAPM implies a positive relation

The PRRT model picks earnings yield to proxy for the forward earnings yield, and book-to-market to proxy for the expected earnings growth to explain the cross section of expected returns

The investment CAPM focuses on investment-to-assets, profitability, and expected investment growth

Factor spanning tests to evaluate relative performance

Complementarity with the PRRT Model

Factor spanning tests indicate a stronger explanatory power of the q-factor model, explaining the PRRT factors, 1967–2015

	m	α_q	β_{MKT}	β_{ME}	$\beta_{\mathrm{I/A}}$	β_{Roe}	R^2
f_{ME}	0.24	0.09	0.01	0.88	−0.19	−0.09	0.91
	1.85	2.11	0.96	44.45	−4.77	−3.17	
f_{EP}	0.25	−0.01	−0.12	−0.12	0.40	0.34	0.38
	1.97	−0.11	−3.61	−1.74	4.60	4.33	
f_{BM}	0.16	0.06	−0.07	0.01	0.74	−0.31	0.47
	1.43	0.72	−2.59	0.16	12.38	−4.81	
		α_C	β_{MKT}	β_{SMB}	β_{HML}	β_{UMD}	R^2
f_{ME}		0.02	0.03	0.93	0.05	−0.02	0.92
		0.50	2.47	74.18	1.93	−1.14	
f_{EP}		0.18	−0.12	−0.25	0.41	0.05	0.46
		1.96	−4.83	−4.34	8.17	1.12	
f_{BM}		−0.06	−0.05	0.07	0.70	−0.02	0.71
		−0.93	−2.93	3.47	22.00	−1.21	

Complementarity with the PRRT Model

Factor spanning tests indicate a stronger explanatory power of the q-factor model, the PRRT four-factor regressions, 1967–2015

	m	α_P	β_{MKT}	β_{ME}	β_{EP}	β_{BM}	R^2
SMB	0.21	0.01	−0.02	0.97	−0.07	−0.01	0.92
	1.59	0.16	−1.35	41.62	−2.37	−0.38	
HML	0.34	0.05	0.06	0.06	0.43	0.89	0.82
	2.53	0.84	3.42	2.12	9.22	37.49	
UMD	0.69	0.86	−0.20	−0.02	0.00	−0.41	0.07
	3.82	4.82	−2.47	−0.14	0.01	−3.23	
r_{ME}	0.31	0.03	0.00	1.00	0.08	0.09	0.90
	2.34	0.76	0.14	42.80	2.15	3.96	
$r_{I/A}$	0.41	0.36	−0.06	−0.06	0.10	0.39	0.45
	4.88	5.72	−3.76	−1.96	1.86	12.93	
r_{Roe}	0.57	0.61	−0.05	−0.17	0.39	−0.45	0.39
	5.36	7.78	−1.68	−3.75	5.40	−9.04	

Outline

Prior work examines investment and profitability

- Hou, Xue, and Zhang 2015
- See also Fama and French 2015

The expected investment growth effect unexplored

Testing the Expected Investment Growth Effect

Cross-sectional statistics, the full sample, 1/1967–12/2015

	mean	std	5%	25%	50%	75%	95%
Sue	22.11	175.55	−246.34	−47.79	18.75	97.18	301.99
R^6	6.78	32.37	−38.46	−13.23	3.10	21.35	65.60
Ivff	2.88	1.98	0.84	1.53	2.35	3.60	6.84
Roe	0.56	8.99	−13.69	−0.17	2.28	4.14	8.64
log(Bm)	−0.46	0.77	−1.87	−0.94	−0.40	0.07	0.72
I/A	15.84	34.67	−17.47	−0.34	8.07	20.41	76.81
Oa	−3.51	11.02	−20.13	−8.51	−3.78	1.00	14.19
Rdm	7.55	9.77	0.42	1.74	4.11	9.17	27.23
Log(Me)	4.84	1.87	1.98	3.47	4.70	6.10	8.16
Ep	1.03	21.22	−32.68	0.43	6.22	9.77	16.85
Cop	12.71	12.89	−9.26	6.22	13.07	19.95	33.08
Abr	0.25	8.00	−12.78	−3.84	0.03	4.09	13.92
Ilr	0.96	3.67	−5.06	−1.40	0.96	3.29	7.06
Nop	0.61	8.67	−14.53	−0.49	1.12	3.89	10.22
Dac	−0.24	9.30	−15.50	−4.33	−0.16	3.91	14.75
Nsi	3.60	10.23	−4.38	−0.10	0.54	3.02	23.88

Testing the Expected Investment Growth Effect

Univariate cross-sectional regressions of τ-quarter-ahead investment-to-assets changes, the full sample, weighted least squares, 1/1973–12/2015

τ		Sue	R^6	Ivff	Roe	log(Bm)	I/A	Oa	Rdm
1	Slope	0.14	0.73	0.34	0.26	−0.10	0.11	−0.11	0.24
	t	2.33	3.70	0.58	2.07	−0.68	0.17	−0.90	1.56
2	Slope	0.17	0.91	0.03	−0.29	−0.05	0.27	−0.15	0.48
	t	2.84	6.35	0.05	−1.74	−0.23	0.34	−1.19	2.41
3	Slope	0.12	0.55	−0.25	−0.09	0.08	0.13	−0.02	0.57
	t	2.11	2.89	−0.46	−0.51	0.49	0.15	−0.11	2.78
4	Slope	0.20	0.65	−0.21	0.32	0.18	−0.43	−0.12	0.65
	t	3.46	5.05	−0.28	2.10	0.98	−0.56	−1.09	3.08
8	Slope	0.13	0.18	−0.82	−0.07	0.44	−0.30	−0.26	0.79
	t	1.85	1.06	−1.36	−0.43	2.57	−0.34	−1.58	3.56
12	Slope	−0.02	−0.11	−0.77	−0.39	0.55	−0.64	−0.11	0.88
	t	−0.42	−0.56	−1.16	−2.18	3.29	−0.73	−0.93	3.39

Testing the Expected Investment Growth Effect

Univariate cross-sectional regressions of τ-quarter-ahead investment-to-assets changes, the full sample, weighted least squares, 1/1973–12/2015

τ		log(Me)	Ep	Cop	Abr	Ilr	Nop	Dac	Nsi
1	Slope	0.06	−0.50	0.15	0.17	0.02	−0.07	−0.20	−0.16
	t	0.56	−0.69	1.38	2.48	0.11	−0.12	−1.14	−1.20
2	Slope	0.17	−0.66	0.13	0.26	0.40	−0.14	−0.24	−0.21
	t	1.56	−0.66	1.18	3.28	2.36	−0.24	−1.46	−1.63
3	Slope	0.23	−0.38	0.24	0.36	0.24	1.16	0.04	−0.30
	t	2.41	−0.45	2.68	5.20	2.81	1.82	0.22	−2.24
4	Slope	0.20	−0.42	0.17	0.31	0.21	0.33	−0.16	−0.39
	t	2.60	−0.45	1.57	4.99	2.54	0.84	−1.32	−2.90
8	Slope	0.34	−0.17	0.12	0.14	0.10	0.02	−0.30	−0.43
	t	2.95	−0.19	1.12	1.99	1.17	0.02	−1.28	−2.93
12	Slope	0.35	−0.11	−0.01	0.07	0.07	0.91	−0.08	−0.52
	t	3.07	−0.12	−0.08	0.97	0.88	2.41	−0.60	−3.43

To what extent can the predictability of future investment growth be exploited in the form of trading strategies?

Form cross-sectional forecasts of changes in quarterly I/A:

- Multiple regressions with all 16 anomaly variables
- Multiple regressions with only anomaly variables significant in univariate regressions for each horizon

Cross-sectional forecasts are noisy: Even with all 16 variables, R^2 varies from 13.2% to 15.6% in the full sample with WLS, and from 6.7% to 8.8% in the all-but-micro sample with OLS

Testing the Expected Investment Growth Effect

Deciles on expected quarterly I/A changes estimated with all 16 variables, NYSE breakpoints with value-weighted returns, July 1976–December 2015

τ		Low	2	3	4	5	6	7	8	9	High	H−L
1	m	0.49	0.70	0.68	0.59	0.62	0.65	0.63	0.53	0.59	1.02	0.53
	t_m	1.48	2.67	3.17	2.86	3.03	3.27	3.18	2.50	2.54	3.45	1.81
	α_q	0.25	0.33	0.25	0.03	0.07	−0.02	−0.12	−0.23	−0.23	0.20	−0.06
	t_q	1.12	2.08	1.90	0.30	0.67	−0.19	−1.52	−2.62	−2.14	1.01	−0.14
2	m	0.56	0.78	0.70	0.76	0.83	0.65	0.52	0.65	0.63	1.11	0.54
	t_m	1.62	2.59	2.63	3.09	3.35	2.77	2.19	2.68	2.47	3.40	1.84
	α_q	0.43	0.41	0.22	0.22	0.35	−0.02	−0.34	−0.15	−0.10	0.54	0.11
	t_q	1.58	2.14	1.30	1.71	2.53	−0.16	−3.06	−1.15	−0.70	2.09	0.25
3	m	0.28	0.90	0.78	0.70	0.70	0.64	0.83	0.68	0.54	0.98	0.70
	t_m	0.86	3.14	2.88	2.59	2.76	2.52	3.39	2.83	2.06	3.53	2.93
	α_q	0.04	0.51	0.46	0.27	0.18	0.02	0.26	−0.01	−0.20	0.27	0.23
	t_q	0.21	3.03	3.06	1.79	1.35	0.18	1.74	−0.04	−1.27	1.35	0.76

Testing the Expected Investment Growth Effect

Deciles on expected quarterly I/A changes estimated with all 16 variables, NYSE breakpoints with value-weighted returns, July 1976–December 2015

τ		Low	2	3	4	5	6	7	8	9	High	H−L
4	m	0.35	0.78	0.66	0.69	0.93	0.56	0.60	0.81	0.66	0.87	0.51
	t_m	1.08	2.60	2.32	2.63	3.84	2.34	2.27	3.54	2.59	3.15	2.38
	α_q	0.12	0.37	0.34	0.19	0.35	−0.07	0.05	0.14	−0.04	0.39	0.27
	t_q	0.67	2.24	1.75	1.43	2.74	−0.65	0.42	1.04	−0.27	2.20	1.20
8	m	0.38	0.83	0.84	0.62	0.73	0.90	0.86	0.62	0.64	0.86	0.49
	t_m	1.01	2.44	2.89	2.21	2.80	3.35	3.40	2.58	2.80	3.92	1.61
	α_q	0.13	0.52	0.40	−0.18	0.14	0.48	0.28	0.01	−0.06	0.26	0.13
	t_q	0.63	3.02	2.73	−1.07	0.80	2.67	1.71	0.07	−0.51	2.06	0.51
12	m	0.86	0.73	0.66	0.89	0.82	1.02	0.80	0.78	0.88	0.69	−0.17
	t_m	2.49	2.16	2.21	3.18	3.18	3.77	3.14	3.12	3.71	2.96	−0.67
	α_q	0.24	0.22	0.14	0.08	0.08	0.24	0.06	0.14	0.12	0.12	−0.12
	t_q	1.26	1.22	0.85	0.52	0.42	1.24	0.40	0.91	0.90	0.95	−0.49

Cross-sectionally varying expected returns, depending on firms' investment, profitability, and expected investment growth

Empirically, many anomaly variables predict investment growth, in the same direction in which these variables predict returns, but the amount of growth predictability is small

The investment CAPM offers an appealing alternative to the residual income model and the Penman-Reggiani-Richardson-Tuna (2017) model in characterizing the cost of capital

An economics-based framework for security analysis, without contradicting efficient markets

The investment policy at the center of security analysis

A new perspective on the implied cost of capital from the investment CAPM:

- The existing measure is an estimate of the internal rate of return, not the one-period-ahead expected return