Lecture 5
Finish accounting anomalies

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What is the value strategy?

- We buy stocks that, based on the market value of assets relative to accounting value of assets, appear “cheap”
- While the value investor uses a “fundamental” or “intrinsic” value a quant essentially assumes what the market gives them
- There are many formulations of the value strategy
  - Price to earnings
  - Price to dividend
- Based on tests in which we’ve tried many measures, the best one appears to be book to market
  - $\frac{PRC*SHROUT}{BOOK\ VALUE} = \frac{MARKETCAP}{BOOKVALUE}$

Variation 1 – use recent market cap

Use book value from here
Use market cap from here

Typical FY end
December 2007

June 2008

Typical FY end
December 2008

Use book value from here

Use market cap from here

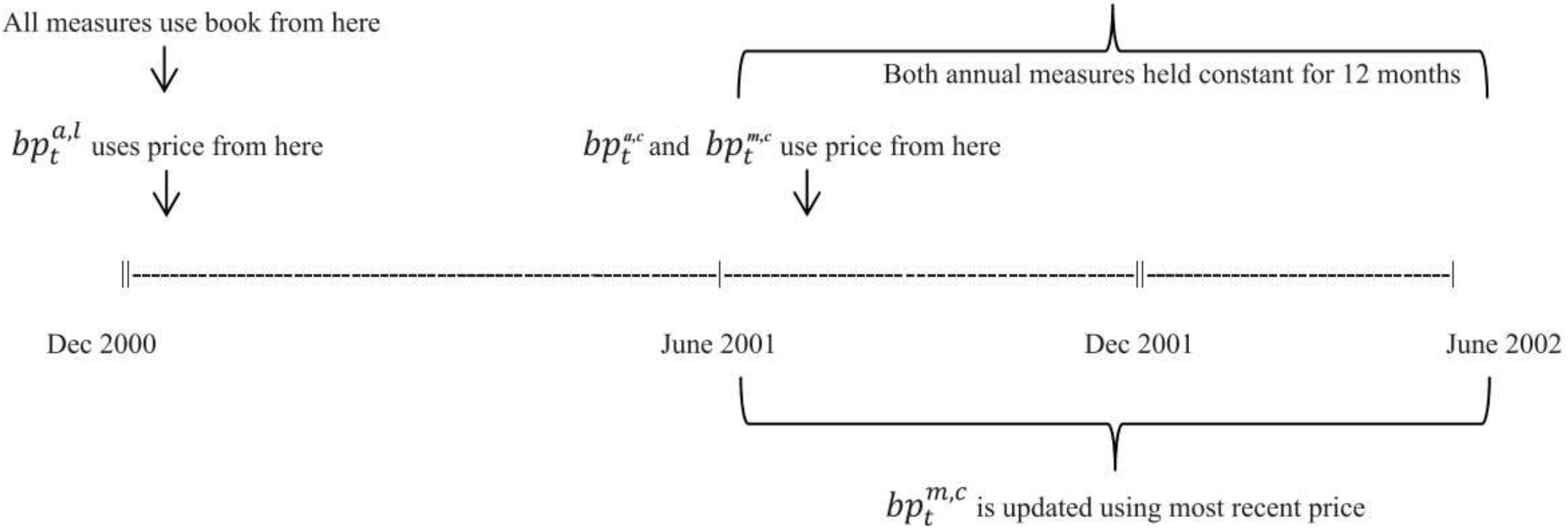
Typical FY end
December 2007

June 2008

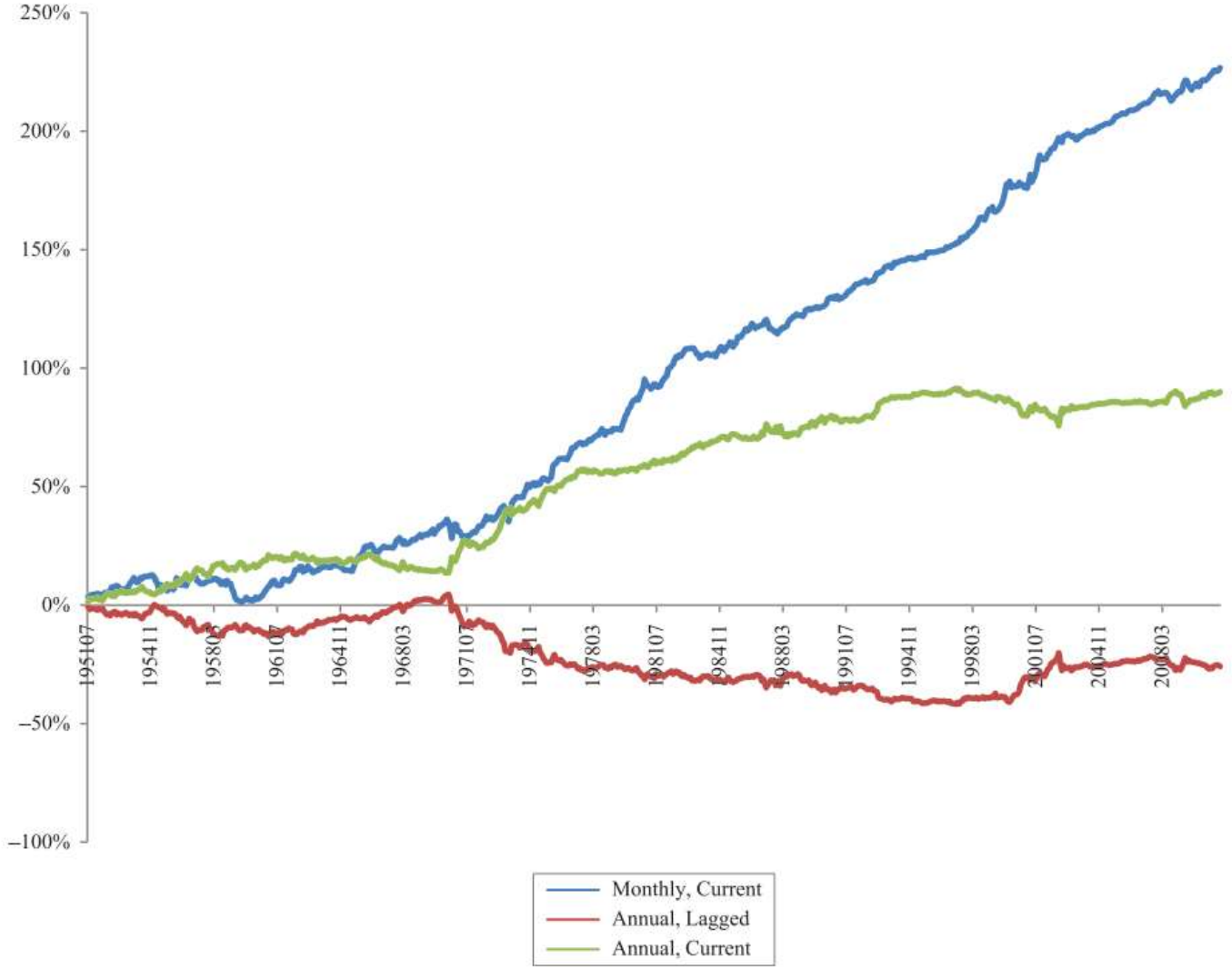
Typical FY end
December 2008

Variation 2 – rebalance more frequently

The Devil in HML's details, α to be had?



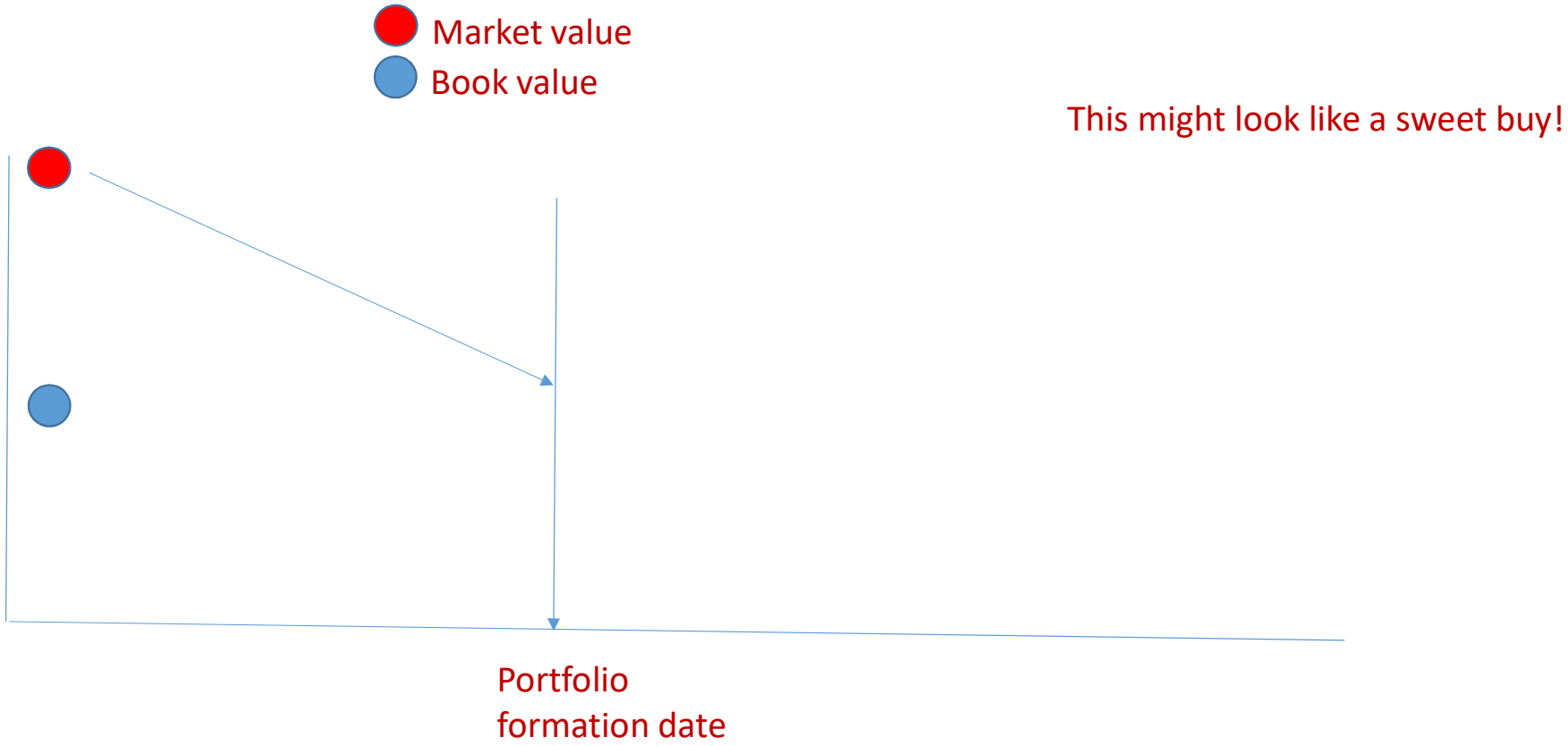
The Devil in HML's details, α to be had?



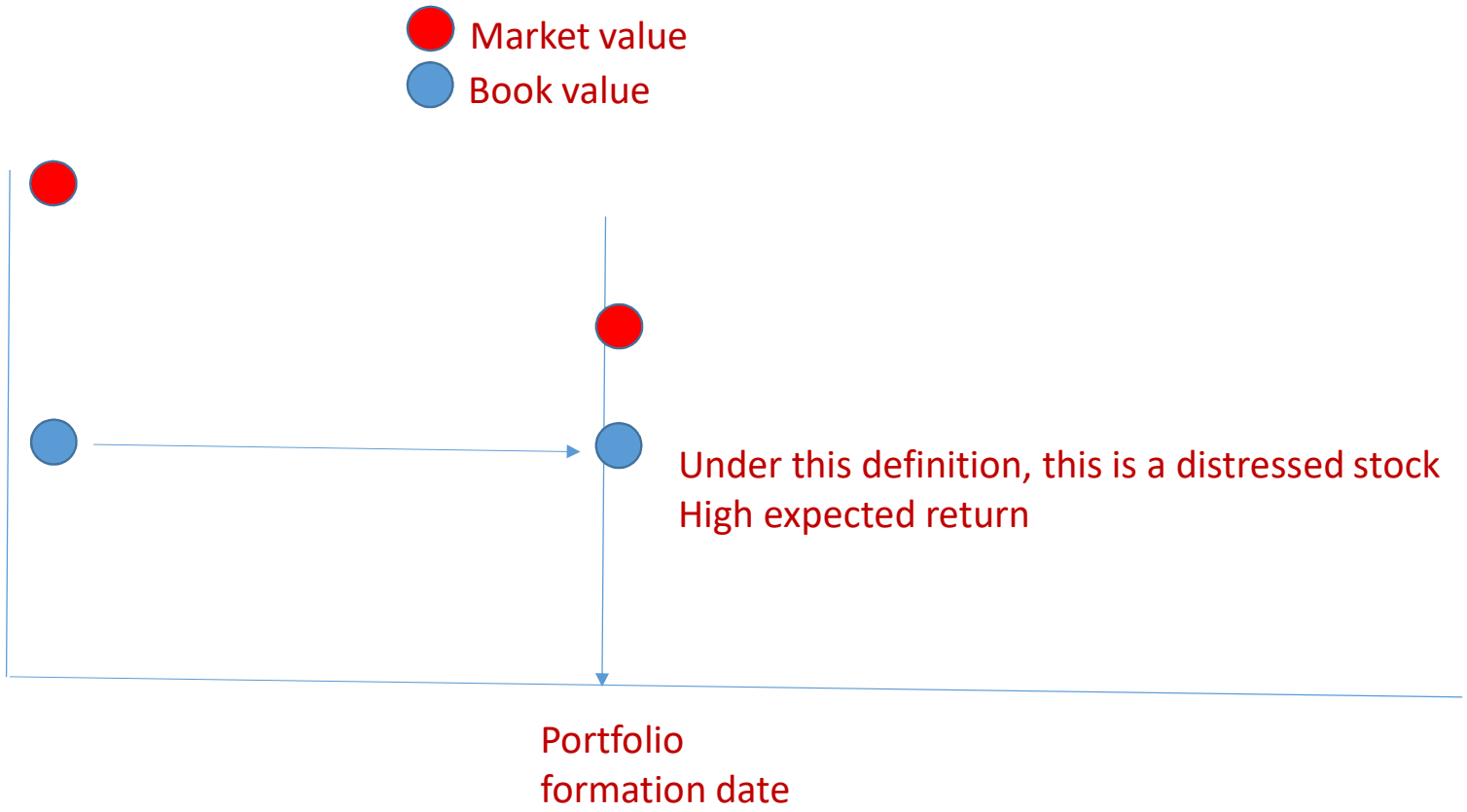
The Devil in HML's details, α to be had?

	U.S.			
	(1)	(2)	(3)	(4)
Refreshing frequency	Annual	Annual	Annual	Monthly
Method to lag price	Lagged	Current	Lagged	Current
Alpha	−0.58	**1.43**	**−1.61**	**3.05**
	(−1.35)	(3.42)	(−2.92)	(5.92)
MKT	0.01	**−0.03**	**−0.02**	−0.01
	(0.93)	(−3.38)	(−2.09)	(−0.82)
SMB	**−0.04**	0.02	**−0.04**	0.01
	(−3.32)	(1.78)	(−2.50)	(0.46)
STR	−0.01	0.02	**−0.07**	**0.08**
	(−1.13)	(1.85)	(−4.19)	(5.58)
UMD	**0.17**	**−0.19**	**0.38**	**−0.43**
	(17.24)	(−21.46)	(26.12)	(−39.28)
HML ^{annual,lagged}		**0.92**		**0.85**
		(70.41)		(53.14)
HML ^{annual,current}	**0.95**			
	(70.41)			
HML ^{monthly,current}			**0.94**	
			(53.14)	
R2	0.89	0.90	0.82	0.89

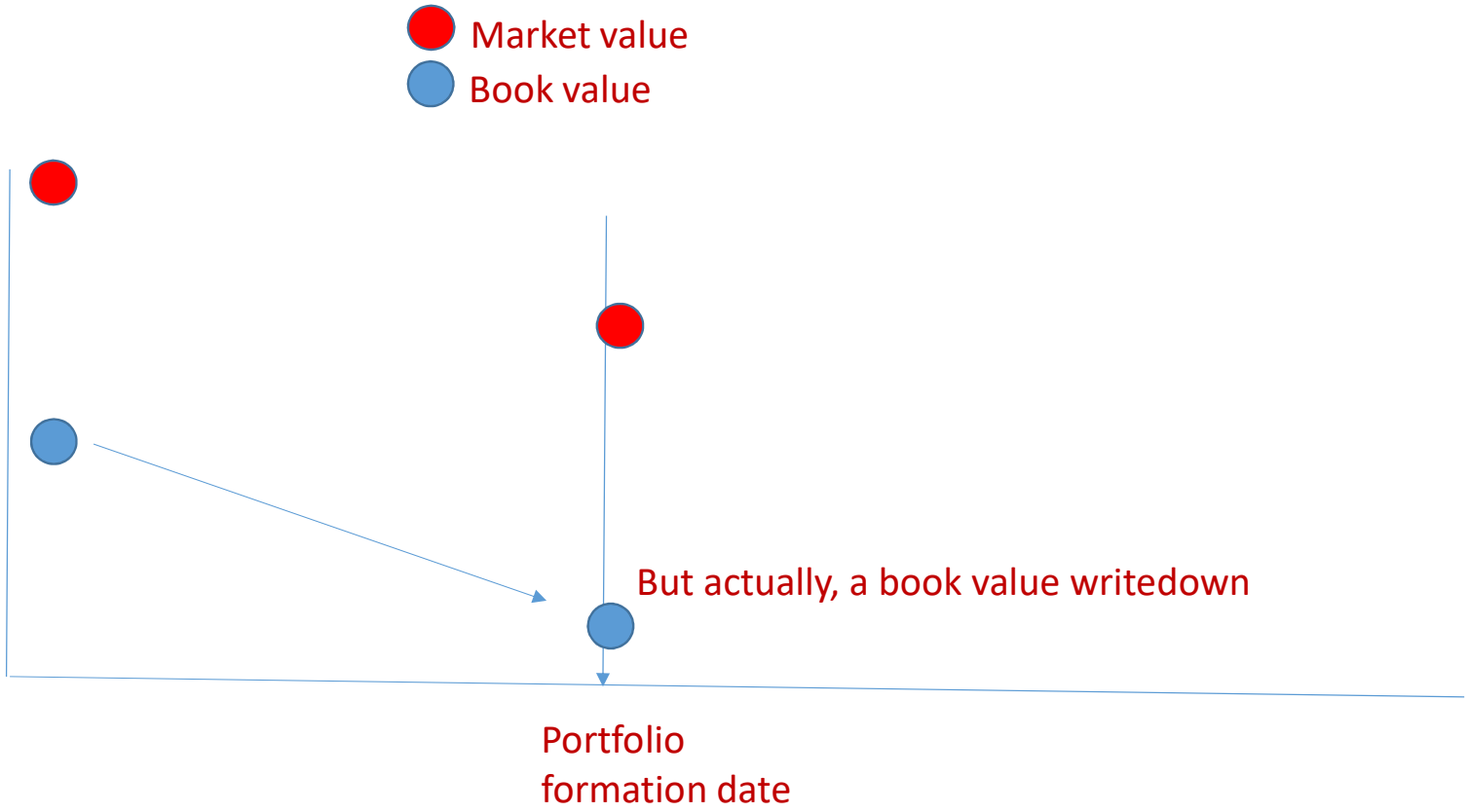
The value trap



If nothing changed about book value, then..



A book value writedown



The value trap

- How can we avoid the value trap?

- In practice, an analyst would read company news closely and adjust book value in real time
  - If there is a factory fire, there's definitely a book value impairment
  - If Rihanna tweets that her followers should delete Snapchat, that's probably not unreasonable to expect to happen

- There are a couple of ways we can imagine book value being tracked in a systematic fashion
  - Analyst coverage could be used
  - Alternative data of some kind may be developed
  - A simple example may be Ravenpack

Avoiding the value trap

- So, it's possible in principle to avoid the value trap if we could now-cast value
  - So, how can we do this?

- Can we forecast the value trap?
  - Optional assignment 3

Behavioral vs rational stories

- There are always two camps – behavioral and rational

- Behavioral stories suggest investors must not price a stock appropriately. Some ingredients include
  - Investors misinterpret fundamentals
  - There is a reversal to the returns
  - there is never really severely challenging drawdown to the strategy

- Rational stories provide a model that explains why these strategies work

Ball, Gerakos, Linnainmaa, Nikolaev (2019), JFE

- Book value of equity consists of two economically different components: retained earnings and contributed capital.
  - **Retained earnings-to-market predicts the cross section of average returns in U.S. and international data and subsumes book-to-market.** Contributed capital-to-market has no predictive power.

Ball, Gerakos, Linnainmaa, Nikolaev (2019), JFE

Panel B: Regressions using reported book value of equity

	Regression			
Regressor	(1)	(2)	(3)	(4)
log(ME)	−0.07	−0.09	−0.08	−0.07
	(−1.75)	(−2.40)	(−2.23)	(−2.02)
$r_{1,1}$	−3.12	−3.20	−3.18	−3.21
	(−7.18)	(−7.50)	(−7.44)	(−7.50)
$r_{12,2}$	0.83	0.82	0.83	0.82
	(4.37)	(4.37)	(4.42)	(4.37)
log(Reported BE/ME)	0.24	0.05	0.35	0.22
	(3.49)	(0.70)	(4.53)	(3.61)
log(RE/ME)		0.18		
		(4.67)		
log(CC/ME)			−0.13	
			(−4.32)	
log(AOCI/ME)				0.01
				(0.96)
Indicator variables				
RE ≤ 0		−0.56		
		(−2.76)		
CC ≤ 0			0.26	
			(2.80)	
AOCI ≤ 0				−0.05
				(−0.57)
Pseudo t-value for joint sig. of add'l regressors		4.27	3.91	0.54
Avg. Adj. R^2	5.36%	6.00%	5.73%	5.72%

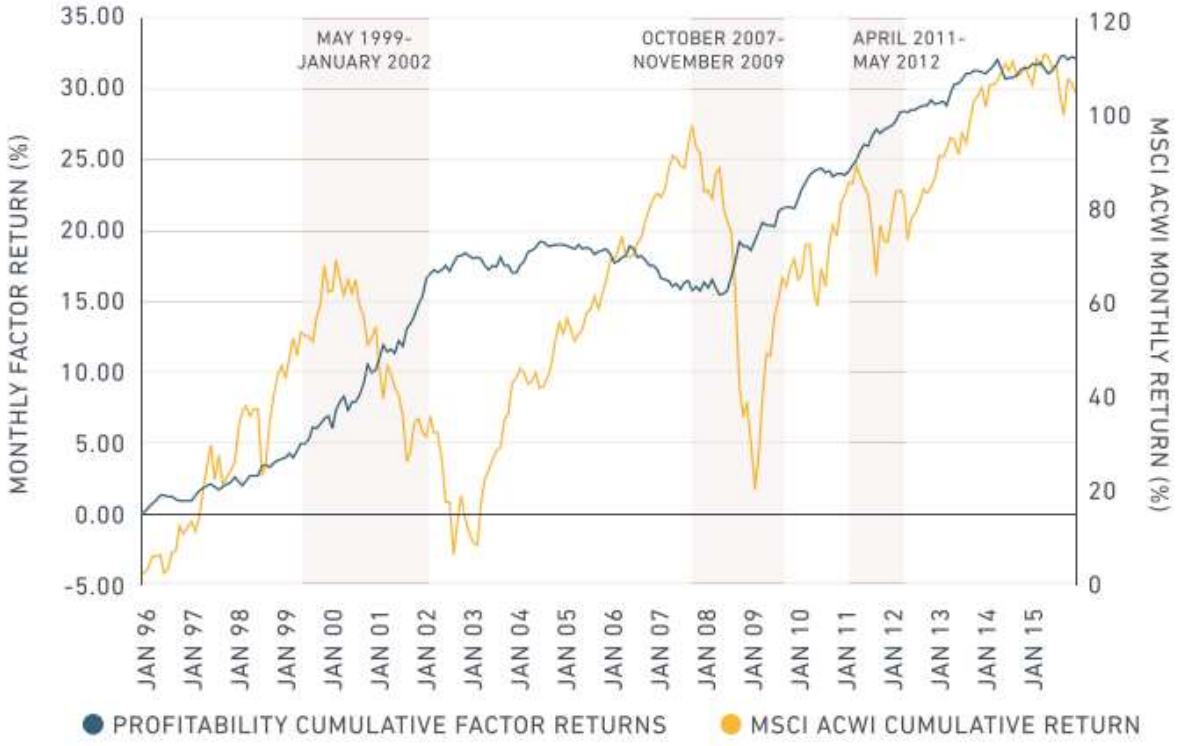
Value is significant

Control for RE/ME → BE/ME no longer significant

Gross profitability – MSCI version

EXHIBIT 2:

CUMULATIVE RETURNS OF THE PROFITABILITY FACTOR AND MSCI ACWI (1996-2015)



Source: MSCI

What is gross profitability

- Gross profitability is a hot trading strategy

- AQR, Dimensional Fund Advisers, etc. have adopted this strategy

- It is a high capacity strategy that improves the traditional value strategy

What is gross profitability (GP)?

$$\frac{REVT - COGS}{ASSETS}$$

This is the value of the firm

earnings Change in book equity

$$M_t = \sum_{\tau=0}^{\infty} \frac{\mathbf{E}_t[Y_{t+\tau} - dB_{t+\tau}]}{(1+r)^{\tau}},$$

Required rate of returns

➢ "Holding all else equal, higher valuations imply lower expected returns, while higher expected earnings imply higher expected returns. That is, value firms should outperform growth firms, and profitable firms should outperform unprofitable firms."

Gross profitability

- "Holding all else equal, higher valuations imply lower expected returns, while higher expected earnings imply higher expected returns. That is, value firms should outperform growth firms, and profitable firms should outperform unprofitable firms."

surplus investments investments Book value

$$M_t = (S_t - X_t) - dB_t + \frac{\mathbf{E}_t\left[M_{t+1} \middle| X = X_t, dB = dB_t\right]}{1+r}. \qquad (2)$$

- **Fama and French (2006) test the profitability/expected return relation with mixed results.** Their cross-sectional regressions suggest that earnings is related to average returns in the manner predicted, but their portfolio tests suggest that profitability adds little or nothing to the prediction of returns provided by size and book-to-market. These empirical tests, however, employ current earnings as a simple proxy for future profitability. **A deeper examination of equation (1) suggests that this proxy is p**"

Gross profitability

- It is strongly associated with prices today, both directly through its inclusion of the right hand side of (3), and indirectly because profitability is highly persistent, and thus a component of prices tomorrow. It is consequently economic profitability, not earnings, that is related to expected returns. Conditional on economic profitability, higher valuations imply lower expected stock returns, while conditional on valuations, greater economic profitability implies higher expected stock returns. That is, value firms should outperform growth firms, and profitable firms should outperform unprofitable firms, where "profitable" here means firms that generate large economic profits, not those with high earnings.

surplus investments investments Book value

$$M_t = (S_t - X_t) - dB_t + \frac{\mathbf{E}_t\left[M_{t+1} \middle| X = X_t, dB = dB_t\right]}{1+r}. \qquad (2)$$

Gross profitability – portfolio sort alpha

		Alphas and three-factor loadings				Portfolio characteristics			
Portfolio	r^e	α	MKT	SMB	HML	GP/A	B/M	ME	n
Panel A: Portfolios sorted on gross profits-to-assets									
Low	0.31	−0.18	0.94	0.04	0.15	0.10	1.10	748	771
	[1.65]	[−2.54]	[57.7]	[1.57]	[5.87]				
2	0.41	−0.11	1.03	−0.07	0.20	0.20	0.98	1,100	598
	[2.08]	[−1.65]	[67.5]	[−3.13]	[8.51]				
3	0.52	0.02	1.02	−0.00	0.12	0.30	1.00	1,114	670
	[2.60]	[0.27]	[69.9]	[−0.21]	[5.42]				
4	0.41	0.05	1.01	0.04	−0.24	0.42	0.53	1,114	779
	[1.94]	[0.83]	[70.6]	[1.90]	[−11.2]				
High	0.62	0.34	0.92	−0.04	−0.29	0.68	0.33	1,096	938
	[3.12]	[5.01]	[58.3]	[−2.03]	[−12.3]				
High–low	0.31	0.52	−0.03	−0.08	−0.44				
	[2.49]	[4.49]	[−0.99]	[−2.15]	[−10.8]				

Some correlation between profitability and ME

		Alphas and three-factor loadings				Portfolio characteristics			
Portfolio	r^e	α	MKT	SMB	HML	GP/A	B/M	ME	n
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						0.30	1.00	1,114	670
						0.42	0.53	1,114	779
						0.68	0.33	1,096	938
						0.43	0.25	1,914	965
						0.31	0.54	1,145	696
						0.26	0.79	849	640
						0.21	1.12	641	655
						0.21	5.47	367	703

Double sort strategies do pretty well

	Dependent variable									
	HML|GP			PMU|BM			HML		PMU	
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Intercept	0.54	0.23	0.23	0.48	0.48	0.51	0.40	−0.07	0.32	0.02
	[5.01]	[4.55]	[4.52]	[5.35]	[5.23]	[5.54]	[3.25]	[−1.31]	[3.30]	[0.57]
MKT			−0.03			−0.07				
			[−2.37]			[−3.24]				
SMB			0.05			0.03				
			[2.86]			[1.12]				
HML		0.77	0.77		0.02	−0.01				
		[45.4]	[43.0]		[0.51]	[−0.26]				
HML|GP								1.04		−0.33
								[47.6]		[−22.7]
PMU|BM								−0.18		0.98
								[−6.73]		[57.2]
Adj. R^2		78.4%	78.7%		0.0%	1.4%		79.9%		85.8%

Gross profitability – Fama MacBeth

	Slope coefficients ($\times 10^2$) and [test-statistics] from regressions of the form $r_{tj} = \beta' \mathbf{x}_{tj} + \epsilon_{tj}$						
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Straight profitability variables							
Gross profitability	0.75			0.69	0.62		0.61
	[5.49]			[5.22]	[4.63]		[4.59]
Earnings		0.22		0.08		−0.02	−0.07
		[0.84]		[0.31]		[−0.06]	[−0.27]
Free cash flow			0.27		0.20	0.39	0.33
			[2.28]		[1.64]	[3.17]	[2.67]
log(B/M)	0.35	0.30	0.26	0.34	0.30	0.27	0.31
	[5.98]	[4.97]	[4.59]	[5.54]	[5.17]	[4.48]	[5.05]
log(ME)	−0.09	−0.12	−0.13	−0.11	−0.11	−0.13	−0.11
	[−2.29]	[−3.24]	[−3.20]	[−2.78]	[−2.80]	[−3.34]	[−2.92]
$r_{1,0}$	−5.57	−5.49	−5.52	−5.64	−5.66	−5.56	−5.70
	[−13.8]	[−13.7]	[−13.7]	[−14.1]	[−14.1]	[−13.9]	[−14.3]
$r_{12,2}$	0.76	0.78	0.78	0.74	0.74	0.76	0.73
	[3.87]	[4.02]	[4.02]	[3.80]	[3.80]	[3.93]	[3.74]
Panel B: Profitability variables demeaned by industry							
Gross profitability	1.00			0.94	0.94		0.92
	[8.99]			[9.75]	[8.38]		[8.39]
Earnings		0.28		0.04		0.09	0.02
		[1.86]		[0.15]		[0.51]	[0.13]
Free cash flow			0.16		0.09	0.25	0.21
			[2.54]		[1.23]	[3.30]	[2.54]
log(B/M)	0.35	0.32	0.30	0.33	0.34	0.31	0.34
	[5.57]	[5.40]	[5.13]	[5.15]	[5.33]	[5.12]	[5.30]
log(ME)	−0.09	−0.11	−0.11	−0.10	−0.10	−0.11	−0.10
	[−2.19]	[−2.65]	[−2.64]	[−2.62]	[−2.31]	[−2.69]	[−2.35]
$r_{1,0}$	−5.63	−5.50	−5.52	−5.67	−5.66	−5.53	−5.67
	[−13.2]	[−13.5]	[−13.5]	[−13.4]	[−13.2]	[−13.6]	[−13.3]
$r_{12,2}$	0.76	0.78	0.78	0.75	0.75	0.77	0.74
	[3.66]	[3.98]	[3.95]	[3.63]	[3.63]	[3.92]	[3.61]

Gross profitability – Fama MacBeth

Independent variable	(1)
Panel A: Straight profitability variables	
Gross profitability	0.75
	[5.49]
Earnings	
Free cash flow	
log(B/M)	0.35
	[5.98]
log(ME)	−0.09
	[−2.29]
$r_{1,0}$	−5.57
	[−13.8]
$r_{12,2}$	0.76
	[3.87]
Panel B: Profitability variables demeane	
Gross profitability	1.00
	[8.99]
Earnings	
Free cash flow	
log(B/M)	0.35
	[5.57]
log(ME)	−0.09
	[−2.19]
$r_{1,0}$	−5.63
	[−13.2]
$r_{12,2}$	0.76
	[3.66]

Fama French five-factor

- After all of this evidence, Fama and French (2015) revise their three factor model
  - Motivated by Novy Marx (2012) document profitability is strongly related to average return
  - Aharoni, Grundy and Zeng (2013) documenting a weaker but reliable relation between investment and average return (alongside other papers)

- Adding these two factors, they see how much additional cross-sectional pricing power

Fama French five-factor

$$CMA = 1/2\,(Small\ Conservative + Big\ Conservative) - 1/2\,(Small\ Aggressive + Big\ Aggressive).$$

$$HML = 1/2\,(Small\ Value + Big\ Value) - 1/2\,(Small\ Growth + Big\ Growth).$$

$$RMW = 1/2\,(Small\ Robust + Big\ Robust) - 1/2\,(Small\ Weak + Big\ Weak).$$

$$SMB = 1/3\,(SMB_{(B/M)} + SMB_{(OP)} + SMB_{(INV)}).$$

Quality Minus Junk

- Economic question: “Do the highest quality firms command the highest price, so that these firms can finance operations and invest?”
- Another AQR paper – Asness, frazzini, and Pedersen (2013)
  - Publsihed in the Journal of Financial Economics eventually
- Strategy: buy high quality firms and short low quality firms

Quality Minus Junk

- To define firms that should be “high quality”, they look at the Gordon Growth model
  - $\frac{P}{B} = profitability * \frac{payout}{r-g}$

- How do we define any of these?
  - Let’s try a lot of metrics and combine them…

- There are four pillars
  - Profitabilityt
  - Growth
  - Safety
  - payout

Quality minus Junk

$$Profitability = z\left(z_{gpoa} + z_{roe} + z_{roa} + z_{cfoa} + z_{gmar} + z_{acc}\right)$$

Quality minus Junk

$$Profitability = z\left(z_{gpoa} + z_{roe} + z_{roa} + z_{cfoa} + z_{gmar} + z_{acc}\right)$$

$$Growth = z\left(z_{\Delta gpoa} + z_{\Delta roe} + z_{\Delta roa} + z_{\Delta cfoa} + z_{\Delta gmar} + z_{\Delta acc}\right) \quad (3)$$

Quality minus Junk

$$Profitability = z(z_{gpoa} + z_{roe} + z_{roa} + z_{cfoa} + z_{gmar} + z_{acc})$$

$$Growth = z(z_{\Delta gpoa} + z_{\Delta roe} + z_{\Delta roa} + z_{\Delta cfoa} + z_{\Delta gmar} + z_{\Delta acc}) \quad (3)$$

$$Safety = z(z_{bab} + z_{ivol} + z_{lev} + z_{o} + z_{z} + z_{evol}) \quad (4)$$

Quality minus Junk

$$Profitability = z(z_{gpoa} + z_{roe} + z_{roa} + z_{cfoa} + z_{gmar} + z_{acc})$$

$$Growth = z(z_{\Delta gpoa} + z_{\Delta roe} + z_{\Delta roa} + z_{\Delta cfoa} + z_{\Delta gmar} + z_{\Delta acc}) \quad (3)$$

$$Safety = z(z_{bab} + z_{ivol} + z_{lev} + z_{o} + z_{z} + z_{evol}) \quad (4)$$

$$Payout = z(z_{eiss} + z_{diss} + z_{npop}) \quad (5)$$

Quality minus Junk

$$Profitability = z(z_{gpoa} + z_{roe} + z_{roa} + z_{cfoa} + z_{gmar} + z_{acc})$$

$$Growth = z(z_{\Delta gpoa} + z_{\Delta roe} + z_{\Delta roa} + z_{\Delta cfoa} + z_{\Delta gmar} + z_{\Delta acc}) \quad (3)$$

$$Safety = z(z_{bab} + z_{ivol} + z_{lev} + z_{o} + z_{z} + z_{evol}) \quad (4)$$

$$Payout = z(z_{eiss} + z_{diss} + z_{npop}) \quad (5)$$

$$QMJ = \frac{1}{2}(Small\ Quality + Big\ Quality) - \frac{1}{2}(Small\ Junk + Big\ Junk)$$

$$= \underbrace{\frac{1}{2}(Small\ Quality - Small\ Junk)}_{QMJ \text{ in small stocks}} + \underbrace{\frac{1}{2}(Big\ Quality - Big\ Junk)}_{QMJ \text{ in big stocks}} \quad (7)$$

Sampl

Table I
Summary Statistics

This table shows summary statistics as of June of each year. The sample includes all U.S. common stocks (CRSP "shrcd" equal to 10 or 11) and all global stocks ("tcpi" equal to 0) in the merged CRSP/Xpressfeed global databases.

Country	Total number of stocks	Average number of stocks	Firm size (Billion-USD)	Weight in global portfolio	Start Year	End Year
Australia	2,142	660	0.63	0.018	1986	2012
Austria	126	56	0.70	0.002	1990	2012
Belgium	231	91	2.37	0.009	1990	2012
Canada	1,901	541	1.08	0.022	1982	2012
Switzerland	343	135	4.06	0.023	1986	2012
Germany	1,492	596	3.01	0.061	1989	2012
Denmark	227	85	1.08	0.004	1986	2012
Spain	212	82	4.48	0.014	1986	2012
Finland	202	83	1.66	0.005	1986	2012
France	1,088	397	2.85	0.044	1986	2012
United Kingdom	3,312	1,103	1.83	0.095	1986	2012
Greece	239	132	0.48	0.002	1995	2012
Hong Kong	1,351	516	1.21	0.026	1989	2012
Ireland	106	38	1.58	0.002	1987	2012
Israel	284	97	0.64	0.003	1995	2012
Italy	356	129	2.37	0.018	1986	2012
Japan	3,856	1,988	1.29	0.202	1986	2012
Netherlands	250	109	4.70	0.021	1986	2012
Norway	429	120	0.96	0.004	1986	2012
New Zealand	176	69	1.26	0.003	1990	2012
Portugal	92	38	1.96	0.002	1990	2012
Singapore	860	353	0.60	0.009	1990	2012
Sweden	677	203	1.35	0.012	1986	2012
United States	19,356	3,594	1.31	0.399	1951	2012

Very high expected returns that are persistent

Panel A: Long Sample U.S., 1956 - 2012		P1 (Low)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (High)	P10 - P1	P10 - P1 t-stat
Quality	t	-1.38	-0.71	-0.39	-0.15	0.05	0.25	0.46	0.69	1.00	1.56	**2.94**	47.46
Quality	t + 12M	-0.60	-0.29	-0.14	0.00	0.14	0.29	0.45	0.63	0.86	1.31	**1.92**	37.42
Quality	t + 36M	-0.33	-0.12	-0.05	0.05	0.15	0.27	0.40	0.54	0.74	1.16	**1.49**	33.01
Quality	t + 60M	-0.16	-0.02	0.04	0.09	0.16	0.22	0.35	0.46	0.68	1.04	**1.20**	20.68
Quality	t + 120M	-0.09	0.00	0.03	0.07	0.09	0.21	0.30	0.38	0.62	0.89	**0.98**	20.70
Profit	t + 120M	-0.37	-0.19	-0.10	0.05	0.12	0.18	0.29	0.35	0.59	1.08	**1.44**	20.74
Growth	t + 120M	-0.23	-0.19	-0.13	-0.12	-0.10	-0.12	-0.02	0.11	0.11	0.34	**0.57**	6.10
Safety	t + 120M	-0.28	-0.15	-0.03	0.08	0.15	0.21	0.35	0.49	0.63	0.67	**0.95**	9.68
Payout	t + 120M	0.12	0.29	0.28	0.29	0.38	0.39	0.49	0.49	0.56	0.61	**0.49**	17.31

Panel B: Broad Sample Global, 1956 -		P1 (Low)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (High)	H-L	H-L t-stat
Quality	t	-1.45	-0.79	-0.45	-0.19	0.04	0.25	0.47	0.72	1.04	1.62	**3.07**	42.28
Quality	t + 12M	-0.59	-0.29	-0.14	0.01	0.13	0.27	0.44	0.60	0.85	1.28	**1.87**	39.05
Quality	t + 36M	-0.30	-0.13	-0.05	0.06	0.13	0.23	0.36	0.48	0.70	1.07	**1.37**	44.95
Quality	t + 60M	-0.10	0.00	0.04	0.10	0.13	0.20	0.32	0.42	0.61	0.93	**1.03**	35.22
Quality	t + 120M	-0.08	-0.01	0.07	0.07	0.10	0.19	0.27	0.36	0.52	0.75	**0.82**	35.47
Profit	t + 120M	-0.28	-0.08	0.00	0.10	0.14	0.23	0.34	0.37	0.53	0.90	**1.19**	22.77
Growth	t + 120M	-0.19	-0.16	-0.15	-0.14	-0.12	-0.09	-0.07	0.00	0.09	0.18	**0.37**	6.40
Safety	t + 120M	-0.22	-0.14	-0.09	0.02	0.06	0.11	0.20	0.32	0.50	0.52	**0.74**	13.59
Payout	t + 120M	0.17	0.28	0.35	0.31	0.42	0.42	0.49	0.48	0.51	0.57	**0.40**	8.15

CAPM four factor alpha

	Panel A: Long Sample (U.S., 1956 - 2012)					Panel B: Broad Sample (Global, 1986 - 2012)				
	QMJ	Profitability	Safety	Growth	Payout	QMJ	Profitability	Safety	Growth	Payout
Excess Returns	**0.40** (4.38)	**0.27** (3.81)	**0.23** (2.06)	0.12 (1.63)	**0.31** (3.37)	**0.38** (3.22)	**0.34** (3.30)	0.19 (1.33)	0.02 (0.24)	**0.38** (3.41)
CAPM-alpha	**0.55** (7.27)	**0.33** (4.78)	**0.42** (4.76)	0.08 (1.06)	**0.46** (6.10)	**0.52** (5.75)	**0.43** (4.61)	**0.34** (3.07)	0.02 (0.18)	**0.49** (5.29)
3-factor alpha	**0.68** (11.10)	**0.45** (7.82)	**0.59** (8.68)	**0.20** (3.32)	**0.43** (6.86)	**0.61** (7.68)	**0.53** (6.11)	**0.50** (5.40)	0.14 (1.92)	**0.44** (5.17)
4-factor alpha	**0.66** (10.20)	**0.53** (8.71)	**0.57** (7.97)	**0.38** (6.13)	**0.21** (3.43)	**0.45** (5.50)	**0.49** (5.34)	**0.39** (4.00)	**0.29** (3.91)	**0.19** (2.26)
MKT	**-0.25** (-17.02)	**-0.11** (-8.08)	**-0.34** (-20.77)	**0.05** (3.35)	**-0.20** (-14.47)	**-0.24** (-14.36)	**-0.16** (-8.33)	**-0.28** (-13.74)	0.00 (-0.06)	**-0.18** (-10.50)
SMB	**-0.38** (-17.50)	**-0.21** (-10.21)	**-0.41** (-17.00)	**-0.05** (-2.53)	**-0.30** (-14.82)	**-0.33** (-9.46)	**-0.20** (-5.07)	**-0.31** (-7.48)	**-0.18** (-5.62)	**-0.23** (-6.58)
HML	**-0.12** (-5.03)	**-0.28** (-12.16)	**-0.23** (-8.50)	**-0.44** (-18.81)	**0.39** (16.68)	-0.01 (-0.31)	**-0.16** (-3.95)	**-0.22** (-5.23)	**-0.38** (-11.62)	**0.36** (9.89)
UMD	0.02 (0.82)	**-0.07** (-3.80)	0.01 (0.64)	**-0.17** (-8.55)	**0.21** (10.79)	**0.15** (5.54)	0.03 (1.01)	**0.10** (3.07)	**-0.14** (-5.64)	**0.24** (8.57)
Sharpe Ratio	0.58	0.51	0.27	0.22	0.45	0.62	0.63	0.26	0.05	0.66
Information Ratio	1.46	1.25	1.14	0.88	0.49	1.16	1.13	0.84	0.83	0.48
Adjusted R2	0.57	0.37	0.63	0.40	0.60	0.60	0.34	0.58	0.35	0.52

All components contribute

Panel C: The price of each quality component by size decile

	Long Sample (U.S., 1956 - 2012)									
Size decile	P1 (small)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (large)
Profitability	**0.21**	**0.28**	**0.30**	**0.34**	**0.34**	**0.38**	**0.41**	**0.37**	**0.39**	**0.37**
	(16.29)	(26.56)	(24.91)	(23.12)	(23.53)	(24.43)	(30.61)	(21.61)	(24.01)	(13.66)
Growth	**0.07**	**0.08**	**0.10**	**0.11**	**0.12**	**0.13**	**0.12**	**0.14**	**0.14**	**0.18**
	(7.49)	(7.31)	(7.05)	(8.18)	(9.23)	(7.97)	(8.04)	(8.22)	(7.23)	(6.54)
Safety	**-0.09**	**-0.05**	**-0.07**	**-0.07**	-0.01	**-0.05**	**-0.04**	-0.01	-0.03	**-0.13**
	(-6.68)	(-4.30)	(-5.35)	(-5.63)	(-0.51)	(-4.76)	(-2.30)	(-0.80)	(-1.48)	(-7.01)
Payout	**-0.12**	**-0.15**	**-0.14**	**-0.11**	**-0.14**	**-0.11**	**-0.10**	**-0.08**	**-0.08**	**-0.07**
	(-8.98)	(-13.87)	(-13.67)	(-13.70)	(-16.66)	(-9.65)	(-9.70)	(-5.82)	(-6.49)	(-5.00)
Size	**0.38**	**0.20**	**0.18**	**0.21**	**0.19**	**0.18**	**0.30**	**0.34**	**0.25**	**0.46**
	(20.23)	(9.87)	(12.30)	(11.40)	(14.00)	(12.76)	(18.12)	(11.62)	(7.23)	(11.57)
Ret(t-12,t)	**0.28**	**0.32**	**0.31**	**0.29**	**0.29**	**0.29**	**0.28**	**0.29**	**0.28**	**0.23**
	(26.74)	(27.15)	(26.65)	(23.94)	(23.72)	(23.40)	(19.52)	(17.75)	(16.28)	(12.43)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE										
Average R2	0.27	0.30	0.32	0.34	0.36	0.35	0.40	0.40	0.38	0.35

Fama-macebth

Panel A: The Price of Quality

	Long Sample (U.S. , 1956 - 2012)				Broad Sample (Global, 1986 - 2012)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Quality	**0.32**	**0.19**	**0.32**	**0.20**	**0.24**	**0.10**	**0.22**	**0.09**
	(22.47)	(15.94)	(23.92)	(13.94)	(23.33)	(17.20)	(24.39)	(15.54)
Size		**0.31**		**0.30**		**0.29**		**0.31**
		(19.19)		(27.08)		(17.71)		(20.91)
Ret(t-12,t)		**0.27**		**0.28**		**0.27**		**0.28**
		(21.36)		(26.50)		(18.60)		(22.54)
Industry FE	No	No	Yes	Yes	No	No	Yes	Yes
Country FE					Yes	Yes	Yes	Yes
Average R2	0.12	0.31	0.11	0.30	0.06	0.25	0.05	0.26

Fama-Macbeth by component

Panel B: The Price of Each Quality Component

	Long Sample (U.S., 1956 - 2012)					Broad Sample (Global, 1986 - 2012)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Profitability	**0.41** (26.19)				**0.30** (23.64)	**0.29** (33.76)				**0.19** (31.37)
Growth		**0.38** (31.18)			**0.11** (12.25)		**0.28** (35.02)			**0.08** (12.67)
Safety			**0.14** (9.95)		**-0.08** -(11.38)			**0.11** (8.19)		**-0.10** -(12.59)
Payout				**-0.10** -(11.11)	**-0.13** -(18.41)				**-0.06** -(4.69)	**-0.10** -(11.23)
Size					**0.28** (26.22)	Size factor				**0.31** (21.67)
Ret(t-12,t)					**0.28** (28.69)	mmomentum				**0.28** (23.33)
Industry FE	No	No	No	No	Yes	No	No	No	No	Yes
Country FE						Yes	Yes	Yes	Yes	Yes
Average R2	0.18	0.15	0.03	0.01	0.40	0.09	0.08	0.02	0.01	0.31

Quality minus Junk

Panel A: Long Sample U.S., 1956 - 2012	P1 (Low)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (High)	H-L
Excess return	0.15	0.36	0.38	**0.39**	**0.45**	**0.45**	**0.57**	**0.47**	**0.58**	**0.61**	**0.47**
	(0.55)	(1.56)	(1.90)	(2.04)	(2.51)	(2.60)	(3.42)	(2.75)	(3.48)	(3.68)	(2.80)
CAPM alpha	**-0.53**	**-0.24**	**-0.15**	**-0.12**	-0.02	-0.01	**0.13**	0.01	**0.14**	**0.18**	**0.71**
	(-4.62)	(-2.85)	(-2.25)	(-2.01)	(-0.33)	(-0.18)	(2.41)	(0.23)	(2.71)	(2.86)	(4.92)
3-factor alpha	**-0.67**	**-0.38**	**-0.25**	**-0.21**	-0.08	-0.06	**0.12**	0.01	**0.16**	**0.29**	**0.97**
	(-7.83)	(-5.47)	(-4.47)	(-4.11)	(-1.44)	(-1.09)	(2.26)	(0.12)	(3.37)	(5.24)	(9.02)
4-factor alpha	**-0.56**	**-0.42**	**-0.26**	**-0.29**	**-0.14**	**-0.12**	0.04	-0.05	**0.19**	**0.41**	**0.97**
	(-6.24)	(-5.73)	(-4.26)	(-5.39)	(-2.37)	(-2.22)	(0.68)	(-1.08)	(3.62)	(7.10)	(8.55)
Beta	1.28	1.22	1.08	1.09	1.03	1.01	0.97	1.00	0.95	0.90	-0.38
Sharpe Ratio	0.07	0.21	0.25	0.27	0.33	0.35	0.46	0.37	0.46	0.49	0.37
Information Ratio	-0.90	-0.82	-0.61	-0.77	-0.34	-0.32	0.10	-0.15	0.52	1.02	1.23
Adjusted R2	0.90	0.91	0.92	0.93	0.90	0.91	0.91	0.93	0.92	0.90	0.60

Panel B: Broad Sample Global, 1986 - 2012	P1 (Low)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (High)	H-L
Excess return	-0.03	0.35	0.43	0.38	0.52	0.46	**0.57**	**0.52**	**0.61**	**0.65**	**0.68**
	(-0.08)	(1.01)	(1.42)	(1.25)	(1.85)	(1.74)	(2.29)	(2.08)	(2.54)	(2.78)	(3.22)
CAPM alpha	**-0.61**	-0.20	-0.06	-0.12	0.07	0.03	0.17	0.11	**0.22**	**0.28**	**0.89**
	(-3.20)	(-1.19)	(-0.42)	(-0.90)	(0.53)	(0.25)	(1.52)	(1.05)	(2.05)	(2.44)	(5.00)
3-factor alpha	**-0.73**	**-0.33**	-0.18	**-0.24**	-0.02	-0.04	0.10	0.11	**0.24**	**0.39**	**1.12**
	(-4.14)	(-2.08)	(-1.33)	(-1.98)	(-0.17)	(-0.35)	(0.92)	(0.98)	(2.17)	(3.49)	(7.68)
4-factor alpha	**-0.46**	-0.24	-0.09	-0.23	0.01	-0.04	0.10	0.11	**0.23**	**0.47**	**0.93**
	(-2.49)	(-1.44)	(-0.63)	(-1.75)	(0.06)	(-0.36)	(0.91)	(0.95)	(1.97)	(3.96)	(6.06)
Beta	1.14	1.12	1.00	1.03	0.94	0.91	0.85	0.87	0.82	0.78	-0.36
Sharpe Ratio	-0.01	0.20	0.27	0.24	0.36	0.33	0.44	0.40	0.49	0.53	0.62
Information Ratio	-0.53	-0.30	-0.13	-0.37	0.01	-0.08	0.19	0.20	0.41	0.84	1.28
Adjusted R2	0.79	0.80	0.81	0.84	0.81	0.82	0.82	0.82	0.80	0.79	0.56