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Accounting anomalies and fundamental analysis in practice

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Presentation for Organismo Italiano di Valutazione

Overview

I. What are we talking about?

- Introduce a framework for using accounting (fundamental) information to *forecast* returns

II. What are the key elements of a valid attribute to forecast returns?

III. A case study on 'accruals'

IV. Where to now?

- Attempts to link it all together
- Going beyond equity markets
- Going beyond a 'firm level' focus

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Framework

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Motivating observations

- Fundamentals, such as earnings and cash flows, explain only a small portion of the variation in stock returns (annual horizon).
  - Less than 10% using earnings realizations.
  - Up to 30% including revisions in analysts' short term and long term earnings forecasts.
    - This explanatory power is positively associated with the return horizon decomposed.
- Stock prices respond to events that do not have any direct link to fundamentals:
  - Index changes
  - Initiation/cessation of analyst coverage
  - Glamour/Neglect stocks

A framework for Fundamental Analysis

$$P_t = \sum_{\tau=1}^{\infty} \frac{E_M\left[CF_{t+\tau}\right]}{(1+r_{M,t})^{t+\tau}}$$

- Where
  - P_t = Observed stock price at time t
  - $E_M[CF_{i,t+t}]$ = Consensus market expectation at time t of cash distribution at time t+t
  - $r_{M,t}$ = Market's required rate of return at time t

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So what makes stock prices move?

- The cum-dividend stock price change between period t and t+1 has three components:

1. $E[r_{M,t}]$: The expected return that was priced into the stock at period t ("Expected Return")
2. $d_{t,t+1}\ E_M[CF_{t+t}]$: News causing revisions to the market's cash flow expectations ("Cash Flow News")
3. $d_{t,t+1}\ [r_{M,t}]$: Changes in the market's required rate of return ("Expected Return News")

Richardson, Sloan and You (2011 FAJ)

- Develops empirical proxies for the three components of security returns:

1. "Expected Return"
   - Ohlson (1995) links expected returns to life-time cum-dividend earnings:

$$P_{i,t} \approx \frac{E_{i,t}\left[\sum_{\tau=1}^{T} X_{i,t+\tau} + \sum_{\tau=1}^{T}(1+r_f)^{T-\tau} d_{i,t+\tau}\right]}{(1+r_{i,t})^{T}-1}$$

   - RSY (2011) use a short term approximation:

$$r_{i,t} \approx \frac{E_{i,t}\left[\sum_{\tau=1}^{2} X_{i,t+\tau} \Big/ 2\right]}{P_{i,t}}$$

2. "Cash Flow News"

$$\Delta F_{i,t+1} = \frac{E_{i,t+1}\left[\sum_{\tau=1}^{2} X_{i,t+1+\tau}\right] - E_{i,t}\left[\sum_{\tau=1}^{2} X_{i,t+\tau}\right]}{E_{i,t}\left[\sum_{\tau=1}^{2} X_{i,t+\tau}\right]} + \frac{d_{i,t+1}}{P_{i,t}} - r_{i,t}$$

3. "Expected Return News"
   - The 'bit that is left'

$$R_{i,t+1} = \alpha_{t+1} + \beta_r r_{i,t} + \beta_{\Delta F} \Delta F_{i,t+1} + \varepsilon_{i,t+1}$$

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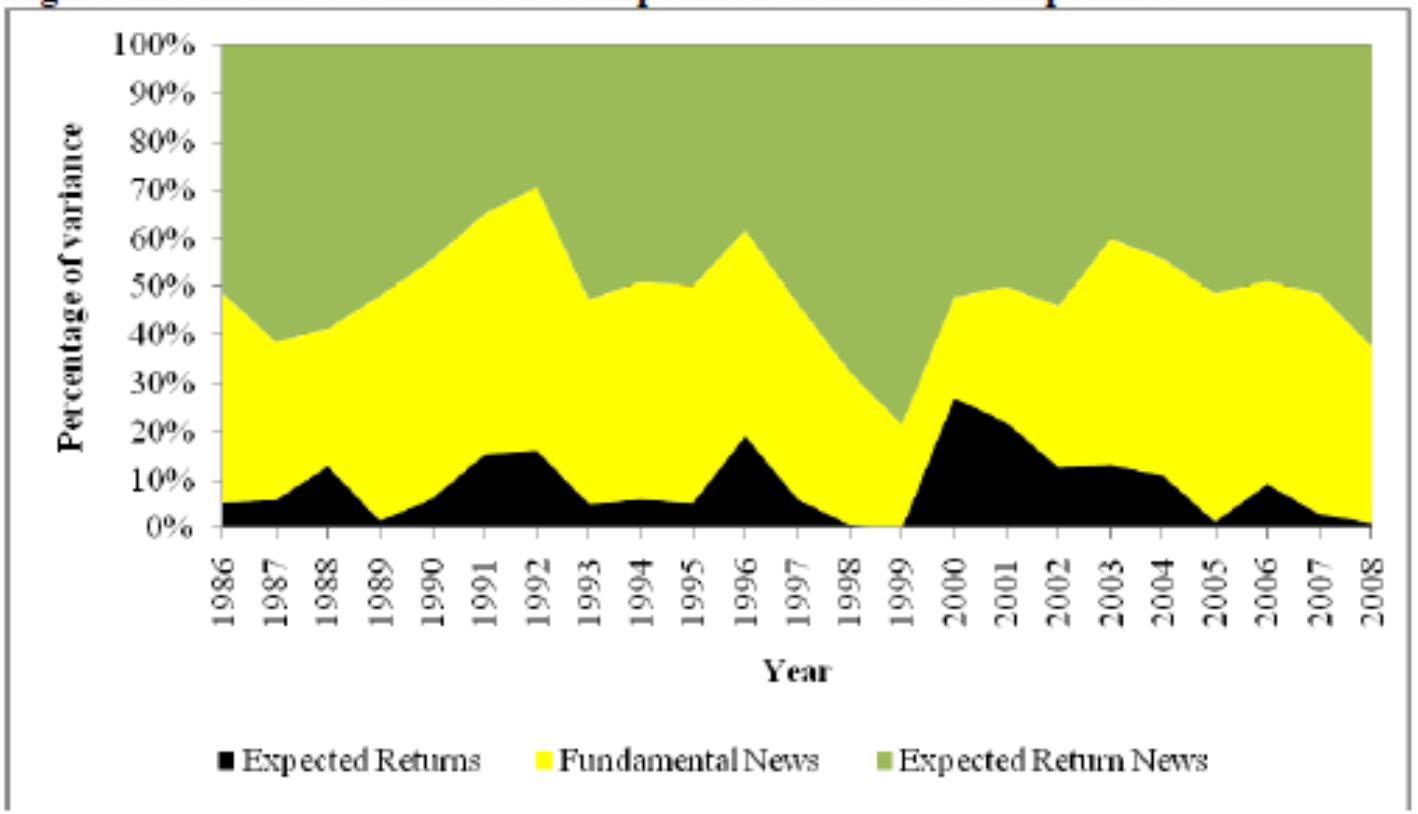
Relative importance of the three components

Richardson, Sloan and You (2011 FAJ)

Figure 1B: Relative Variance Decomposition of Return Components



Relative importance : different horizons

Richardson, Sloan and You (2011 FAJ)

	Fundamentals	Investor Recognition	Combined	Unexplained
Quarterly Returns	9%	18%	22%	78%
Annual Returns	38%	32%	47%	53%
5-Year Returns	57%	38%	62%	38%

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How might accounting information fit into this framework?

- $E[r_{M,t}]$: ex ante expected returns (value).
- $d_{t,t+1}\ E_M[CF_{t+t}]$: changing expectations about future cash flows (quality).

- Link between them.
  - The return decomposition appears to be additive but these components are clearly correlated.
    - This creates a challenge (and hence an opportunity) to measure the pieces.
    - After all, risk is uncertainty about the future path of earnings realizations.

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What are the key elements for a valid attribute to forecast returns?

Richardson, Tuna and Wysocki (JAE 2010)

1. Credible alternative hypothesis
2. Robust predictive ability
3. Additive to known return forecasts
4. Robust to transaction costs
5. Robust to a risk-adjusted analysis
6. Non-price based confirmatory tests

Case Study : Accruals

Does it pass the validity tests?

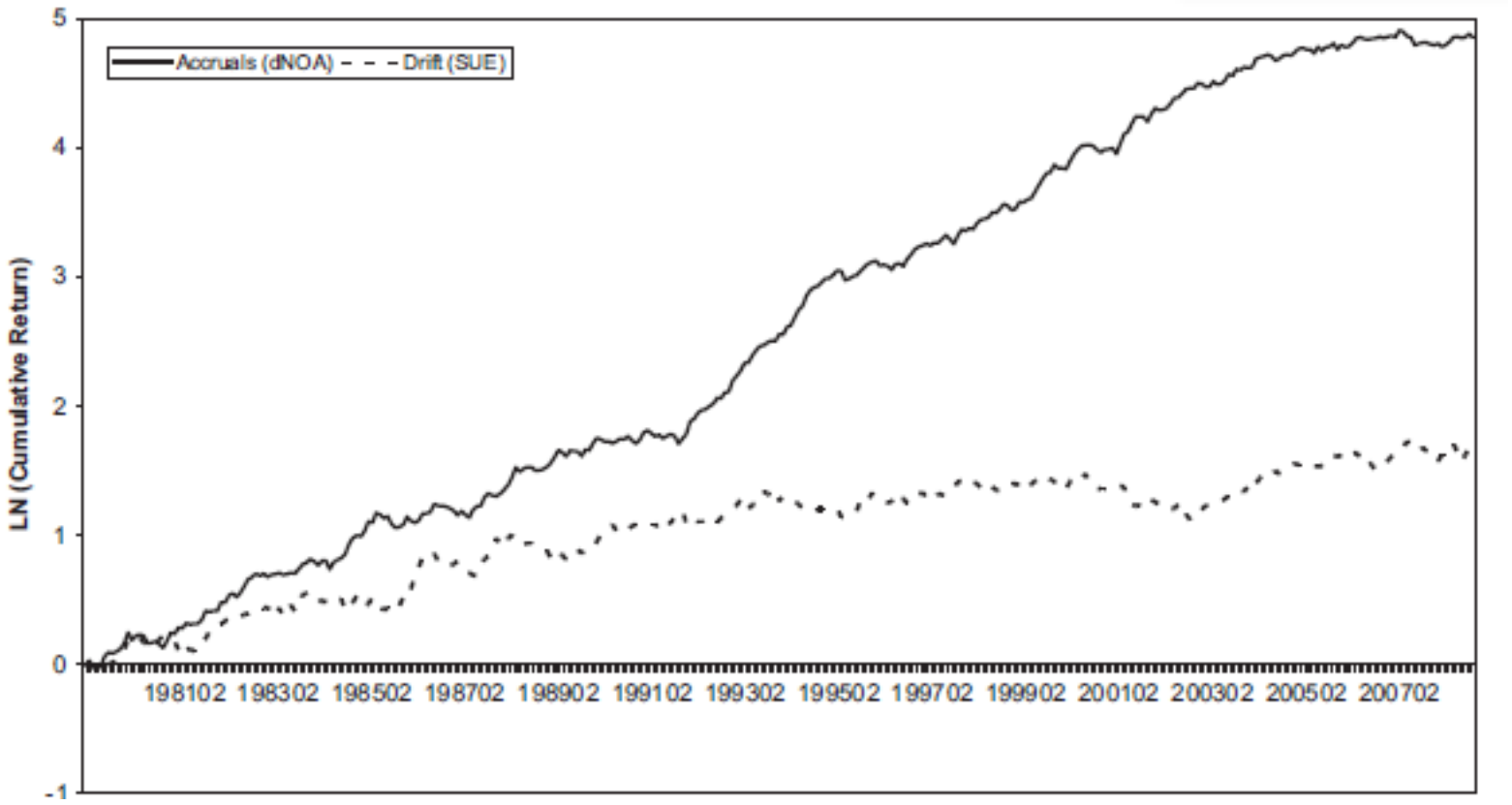
Accruals: Credible alternative hypothesis?

- Yes
- Components of earnings exhibit differential persistence.
  - Earnings = Accruals + Cash Flows
  - Cash flows more persistent than accruals.

- Stock market ***did*** not appear to understand this relation. Why?
  1. Mis-understanding of accounting distortions (likely)
  2. Over-investment/hubris (likely)
  3. Diminishing marginal returns to new investment (possible)

Accruals: Robust predictive power?

- Yes



Accruals: Additive to known return forecasts?

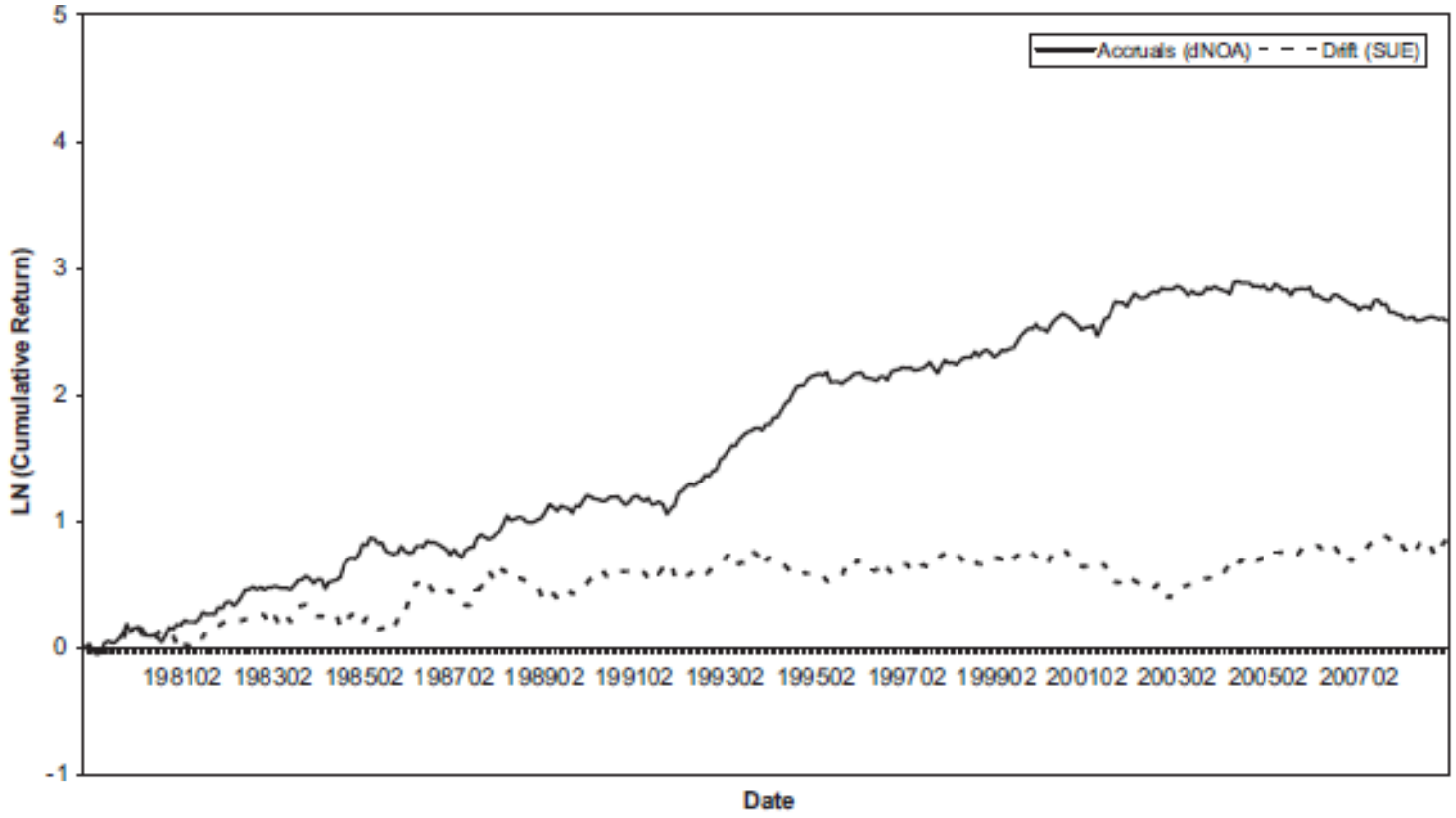
- Yes (but caveat).
  - See appendix B of Richardson, Tuna and Wysocki (2010)

- There are many (deterministically) related concepts floating around all of which are associated with future returns:
  1. Working Capital Accruals
  2. Total Accruals
  3. Change in Net Operating Assets
  4. Balance Sheet Bloat
  5. Investing activities
  6. Financing activities

- Know what it is you are measuring and why!

Accruals: Robust to transaction costs?

- Yes, but lately?



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Accruals: Robust to risk?

- Yes, but someone please define risk ☺
- Stephen Penman may have something to say about this later…

Table 3
Ex post return analysis (Fama-French) of accrual anomaly.

Panel A: ΔNOA returns

$R_t^{\Delta NOA} = \alpha + \beta^{MKT} R_t^{MKT} + \beta^{SMB} SMB_t + \beta^{HML} HML_t + \varepsilon_t$

	Before transaction costs	After transaction costs	Linear weights	Equal weight (extreme deciles)	Value weight (extreme deciles)
α	0.0139 (8.26)	0.0074 (4.25)	0.0240 (3.09)	0.0151 (2.99)	0.0065 (2.93)
β^{MKT}	0.0016 (0.04)	−0.0136 (−0.32)	0.2174 (1.15)	0.1877 (1.53)	0.0336 (0.63)
β^{SMB}	−0.0341 (−0.61)	−0.0243 (−0.42)	0.2245 (0.87)	0.1402 (0.84)	−0.0157 (−0.21)
β^{HML}	0.1248 (1.99)	0.1397 (2.13)	0.1730 (0.59)	0.1427 (0.76)	0.0637 (0.77)
Sharpe ratio	1.51	0.78	0.57	0.55	0.54
Adjusted R^2	0.0111	0.0151	−0.0020	0.0008	−0.0060

Accruals: Non-price based confirmatory tests

- Yes

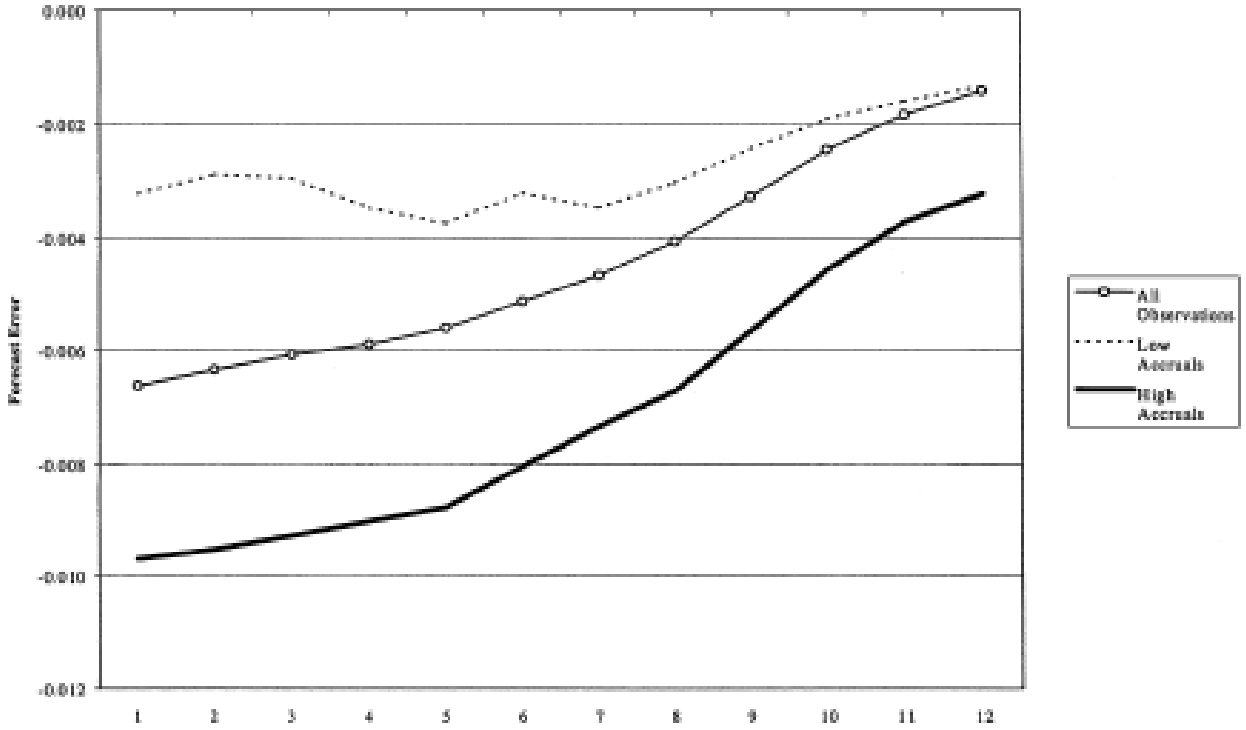

FIG. 2.—Analyst forecast errors for deciles of accruals portfolios in the 12 months following the previous year's earnings announcement.[a]

Is the approach still useful?:

Hey it stopped working in the last few years...

This time it is different...

A short (cynical) history of scientific (but fundamentally driven) investing

Pre 1980s: prehistoric times

1980s: birth of a new investing discipline

1990s: steady growth, rudely interrupted by .com boom

2000-2007: bubble grows and bursts

2008-2009: out of favor and overcapacity

2010: survival of the fittest

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Some *casual* phrases

'Quantamental' (Macquarie)

'Fundatative' (Citi conference 2009)

Adapters vs. Stickers (Bob Jones 2009)

Shades of gray between 'quantitative' and 'fundamental'

- Returns are still returns:
  - The drivers have not, and will not, change.
  - Maybe in relative terms, and in your ability to forecast them:
    - Initial expectations
    - Cash Flow News
    - Discount Rate News

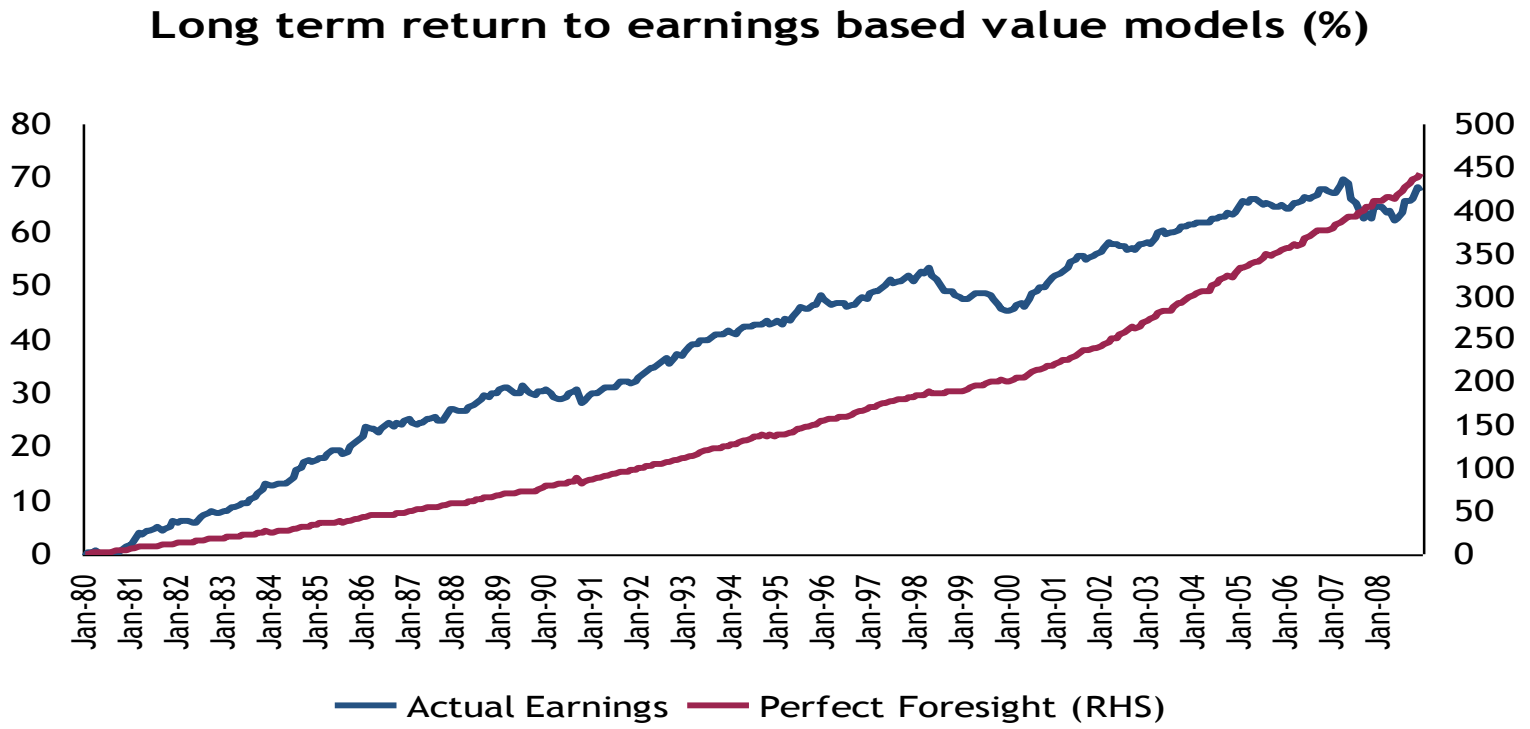
But there are some key differences

1. Much easier to be systematic about investing.
   - Large inflows.
   - Lots of data vendors.
   - IT improvements.

2. Price discovery is getting quicker

3. Cross sectional dispersion and volatility still exist
   - Need to be smarter.

Remember: knowledge of fundamentals is always important



1. Note the scale difference.
2. While fundamentals can be less relevant at certain points in time (slide 9), it can also be the case that fundamentals are harder to forecast at certain points in time.

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Where to now?

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Searching for a framework

- Current academic and practitioner approaches to combining the many related return forecasting attributes can be improved.
  - Some approaches worth mentioning:
    - Fama and French (2006) Profitability, investment and returns
    - Fama and French (2008) Dissecting anomalies
    - Penman and Zhang (2006) Modelling sustainable earnings and E/P with financial statement information

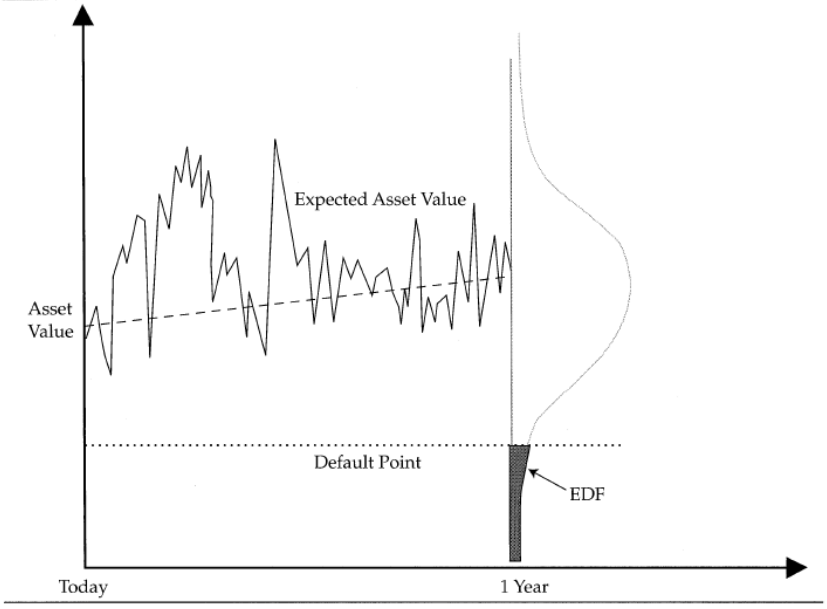
Going beyond equity markets

Correia, Richardson and Tuna (2012)

- Return forecasting in credit markets.
  - This has become easier with the development of credit markets and machine readable data:

$$PD_{i,t} = \Pr[-\frac{\ln\frac{V_{A_{i,t}}}{X_{i,t}} + (\mu_i - \frac{\sigma^2_{A_{i,t}}}{2})t}{\sigma_{A_{i,t}}\sqrt{t}} \geq \varepsilon_{i,t}]$$

Figure 1. Illustration: Frequency Distribution of Asset Value at Horizon and Probability of Default



Note: The distance from the expected asset value to default is three standard deviations.

Going beyond equity markets

Correia, Richardson and Tuna (2012)

$$CS_{i,t} = -\frac{1}{T}\ln[1-(1-R_{i,t})CQDF_{i,t}]$$

$$CQDF_{i,t} = N[N^{-1}[CPD_{i,t}]+\lambda\sqrt{r_{i,t}^2}\sqrt{T}]$$

Compare actual spread (CS) to model implied spread (CS*).

When CS > CS*:

Market believes the issuer is risky than you think it is:

You go LONG that issuer (sell CDS protection or buy bond)

When CS < CS*:

Market believes the issuer is less risky than you think it is:

You go SHORT that issuer (buy CDS protection or sell (short) the bond)

All ***relative*** in the cross-section. Repeat every month.

Going beyond equity markets

Correia, Richardson and Tuna (2012)

Table 8 Ex post return analysis (Fama–French)

$$R_t^{CRV} = \alpha + \beta^{dRP} dRP_t + \beta^{dTS} dTS_t + \beta^{dVIX} dVIX_t + \beta^{dIP} dIP_t + \beta^{MKT} R_t^{MKT} + \beta^{SMB} SMB_t + \beta^{HML} HML_t + \beta^{MOM} MOM_t + \varepsilon_t \quad (15)$$

	$CRV_{i,t}^{D2D}$	$CRV_{i,t}^{BCM-BOTH}$	$CRV_{i,t}^{BS}$	$CRV_{i,t}^{EDF}$
α	0.0045 (7.7)	0.0058 (7.85)	0.0080 (8.99)	0.0043 (5.22)
β^{dRP}	0.0110 (3.38)	0.0134 (3.25)	−0.0053 (−1.08)	0.0336 (7.32)
β^{dTS}	0.0068 (1.67)	0.0089 (1.73)	0.0134 (2.18)	0.0021 (0.36)
β^{dVIX}	0.0002 (1.15)	0.0001 (0.42)	−0.0006 (−1.89)	0.0003 (0.94)
β^{dIP}	−1.0267 (−5.35)	−0.7956 (−3.27)	−0.3283 (−1.13)	−0.6461 (−2.39)
β^{MKT}	−0.0008 (−4.78)	−0.0007 (−3.33)	0.0000 (−0.07)	−0.0012 (−5.29)
β^{SMB}	−0.0002 (−0.94)	0.0000 (0.07)	−0.0002 (−0.94)	−0.0003 (−1.36)
β^{HML}	−0.0007 (−3.72)	−0.0004 (−1.73)	−0.0005 (−1.98)	−0.0008 (−3.19)
β^{MOM}	0.0000 (−0.08)	0.0003 (2.31)	0.0001 (0.48)	0.0004 (2.71)
Sharpe ratio	2.19	2.23	2.55	1.48
Adjusted R^2	0.51	0.38	0.10	0.64

Going beyond the firm level

1. There are always 'macro' events impacting the markets
   - The implication that this has for the decision usefulness of fundamental analysis for stock return prediction is **not** immediately clear.
2. Incorporating 'macro' views will be become increasingly common
   - Conditioning
     - Firm specific exposures to macro driver
   - Trading baskets
3. Firms are linked to each other as well as to macro-economic drivers
   - Customer-Supplier
   - Competitors
   - Explicit investments

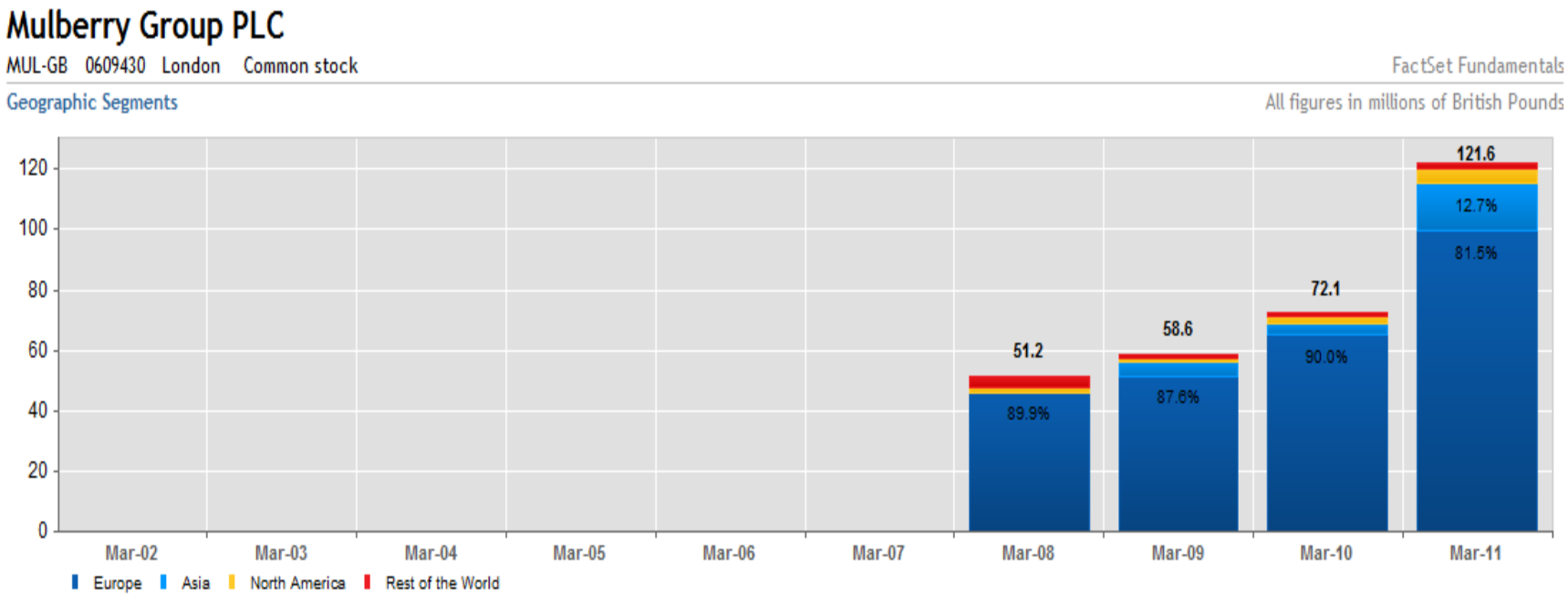
Going beyond the firm level

Li, Richardson and Tuna (2012)

Mulberry Group PLC (MUL-GB) **£19.15** Next Rpt Date: 29-Feb-12 Key Statistics FactSet Fundamentals / FactSet Estimates

Business Description

Mulberry Group Plc designs, manufactures and retails fashion accessories and clothing. It operates in two divisions: Retail division and Design division. The Retail division segment includes sale of Mulberry branded fashion accessories. The Design division segment includes brand management, marketing, product design, manufacture, sourcing and distribution for the Mulberry brand. The company was founded in 1971 and is headquartered in Bath, UK.



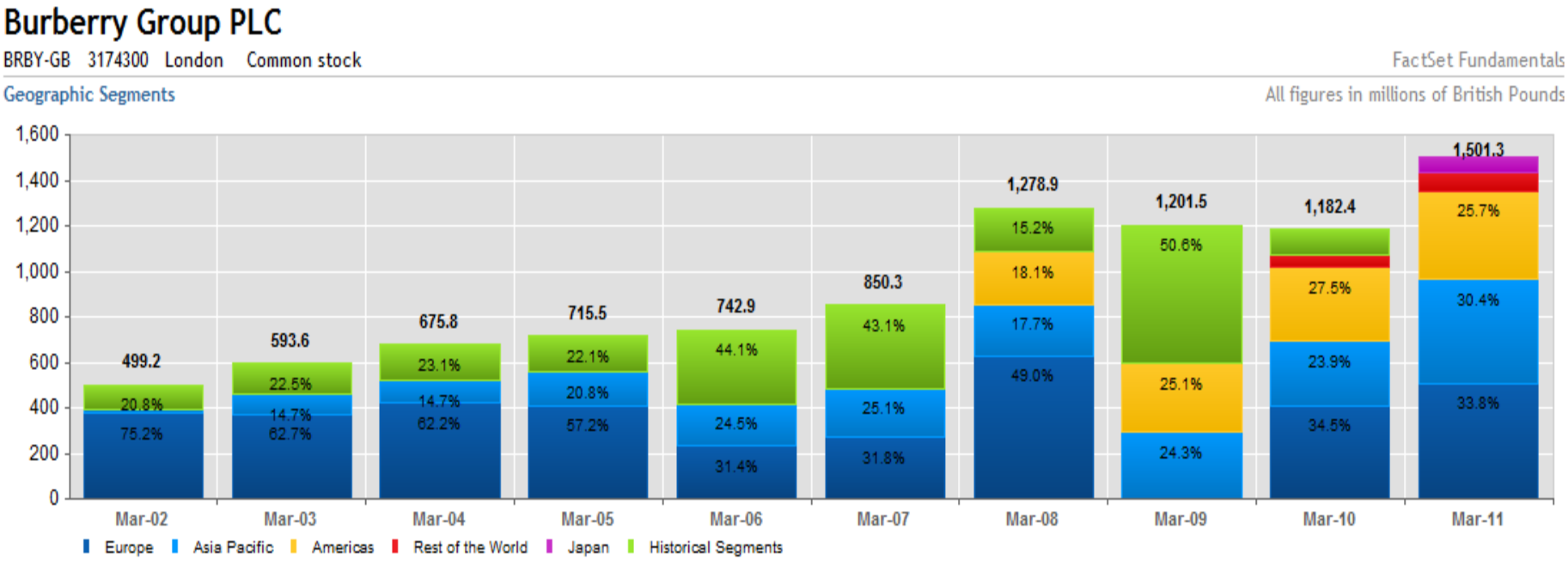
Going beyond the firm level

Li, Richardson and Tuna (2012)

Burberry Group PLC (BRBY-GB) **£14.53** Next Rpt Date: 29-Feb-12 Key Statistics FactSet Fundamentals / FactSet Estimates

Business Description

Burberry Group Plc designs, sources, manufactures and distributes apparel and accessories through its own retail stores and via its wholesale customers. It also licenses third parties to manufacture and distribute products using the Burberry brand. It operates in the United Kingdom, France, Germany, Italy, Switzerland, in the United States, Australia, Hong Kong, Japan, Korea, Malaysia, Singapore and Taiwan. The company was founded in 1856 and is headquartered in London, the United Kingdom.



Going beyond the firm level

Li, Richardson and Tuna (2012)

Table 7
Ex Post Return Analysis

$$HEDGE_t = \alpha + \beta_1 MKT_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \beta_5 dRP_t + \beta_6 dTS_t + \beta_7 dIP_t + e_t \quad (6)$$

	HEDGE returns based on $MACRO_t^{CE}$				*HEDGE* returns based on $MACRO_t^{MSCI}$			
	I	**II**	**III**	**IV**	**I**	**II**	**III**	**IV**
α	0.0100	0.0118	0.0118	0.0117	0.0121	0.0118	0.0119	0.0113
	(2.30)	*(2.67)*	*(2.62)*	*(2.57)*	*(3.33)*	*(3.20)*	*(3.18)*	*(3.04)*
β_1	0.0025	0.0022	0.0022	-0.0043	0.0023	0.0021	0.0020	-0.0036
	(2.84)	*(2.50)*	*(2.37)*	*(-0.19)*	*(3.08)*	*(2.80)*	*(2.57)*	*(-0.20)*
β_2		-0.0007	-0.0007	0.0220		0.0032	0.0033	0.0497
		(-0.33)	*(-0.34)*	*(0.85)*		*(1.95)*	*(1.90)*	*(2.33)*
β_3		-0.0032	-0.0031	-0.6871		-0.0011	-0.0011	-0.4531
		(-2.03)	*(-1.94)*	*(-1.15)*		*(-0.82)*	*(-0.83)*	*(-0.92)*
β_4			0.0001	0.0025			-0.0001	0.0023
			(0.08)	*(2.36)*			*(-0.16)*	*(2.71)*
β_5				-0.0010				0.0032
				(-0.44)				*(1.73)*
β_6				-0.0031				-0.0010
				(-1.88)				*(-0.75)*
β_7				0.0004				0.0002
				(0.40)				*(0.29)*
Adj. R^2	0.045	0.059	0.052	0.047	0.054	0.077	0.071	0.092
Sharpe	0.65	0.76	0.74	0.73	0.94	0.91	0.90	0.86

Going beyond the firm level

Momente, Reggiani and Richardson (2013)

	AGRIC.	MINES	UTIL	CONSTR.	MANUF.	WSALE	RETAIL	TRANS.	INFO	FIN	BUS SRVC	SOCIAL	ARTS	OTH SRVC.	GOVT
AGRIC.	0.310	0.002	0.000	0.012	0.627	0.001	0.008	0.000	0.000	0.007	0.004	0.002	0.018	0.001	0.008
MINES	0.004	0.035	0.243	0.042	0.600	0.002	0.003	0.007	0.003	0.008	0.004	0.005	0.004	0.002	0.038
UTIL	0.029	0.025	0.002	0.020	0.321	0.025	0.066	0.020	0.023	0.097	0.043	0.082	0.077	0.025	0.144
CONSTR.	0.008	0.043	0.047	0.004	0.080	0.007	0.020	0.029	0.035	0.364	0.033	0.017	0.018	0.017	0.277
MANUF.	0.017	0.007	0.004	0.096	0.551	0.018	0.026	0.027	0.023	0.025	0.030	0.047	0.032	0.015	0.084
WSALE	0.026	0.007	0.004	0.071	0.483	0.072	0.040	0.023	0.020	0.043	0.029	0.051	0.035	0.016	0.080
RETAIL	0.004	0.005	0.002	0.507	0.116	0.014	0.032	0.030	0.009	0.115	0.027	0.034	0.028	0.056	0.021
TRANS.	0.018	0.010	0.059	0.044	0.233	0.075	0.076	0.181	0.033	0.039	0.063	0.028	0.021	0.019	0.101
INFO	0.001	0.004	0.004	0.027	0.107	0.029	0.034	0.020	0.291	0.085	0.143	0.053	0.027	0.025	0.151
FIN	0.019	0.015	0.006	0.022	0.058	0.028	0.060	0.031	0.033	0.422	0.094	0.089	0.035	0.046	0.042
BUS SRVC	0.002	0.012	0.008	0.046	0.204	0.054	0.049	0.031	0.061	0.112	0.153	0.067	0.043	0.023	0.134
SOCIAL	0.022	0.000	0.003	0.005	0.004	0.010	0.044	0.002	0.010	0.005	0.013	0.451	0.010	0.037	0.384
ARTS	0.002	0.002	0.020	0.022	0.090	0.024	0.030	0.028	0.101	0.133	0.217	0.073	0.101	0.034	0.123
OTH SRVC.	0.007	0.002	0.004	0.091	0.119	0.040	0.044	0.034	0.048	0.163	0.130	0.077	0.048	0.036	0.156
GOVT	0.004	0.002	0.005	0.004	0.046	0.085	0.085	0.149	0.047	0.088	0.080	0.126	0.091	0.033	0.155

Going beyond the firm level

Momente, Reggiani and Richardson (2013)

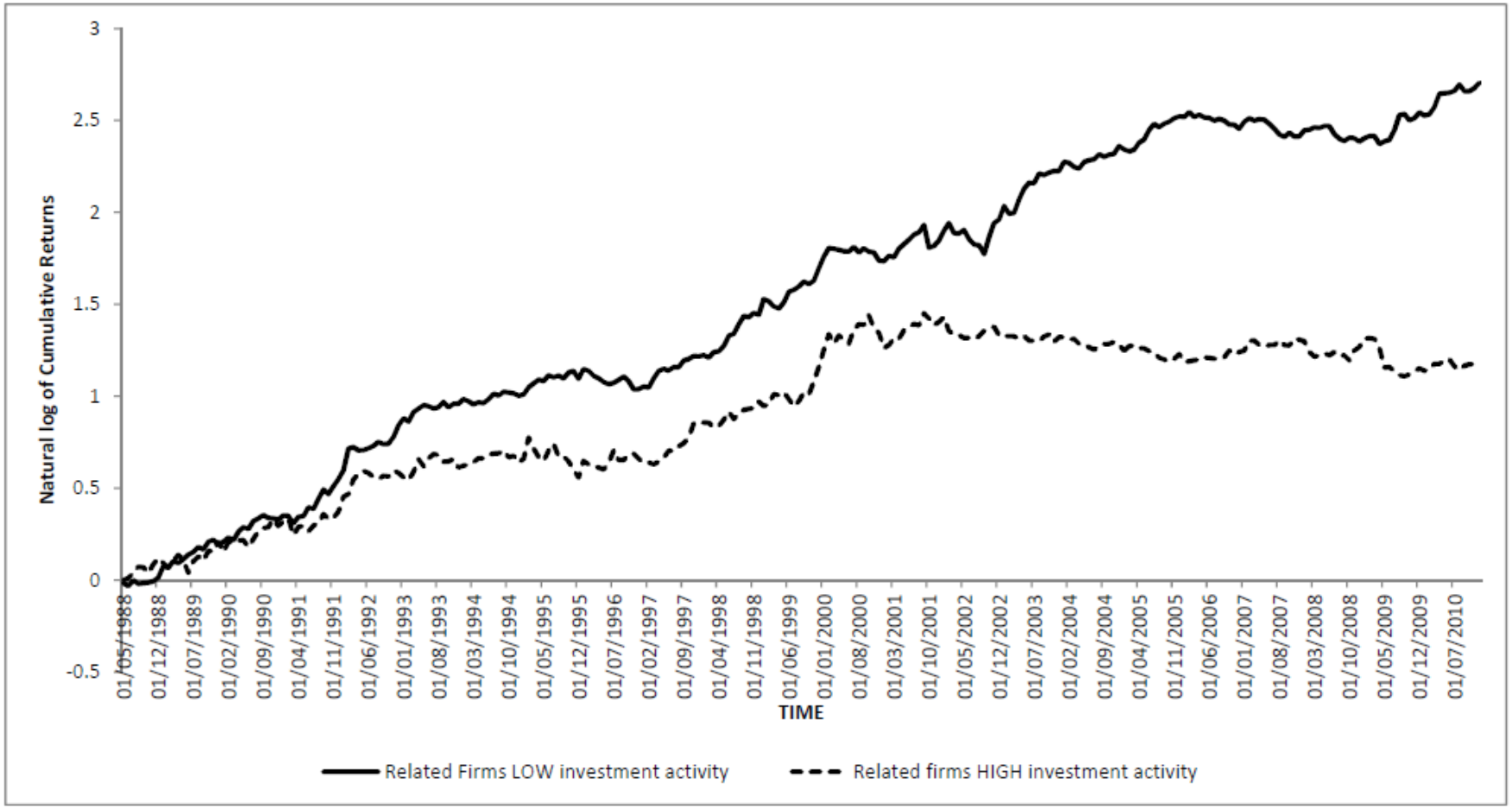


Figure 1: Cumulative Returns associated with inventory growth. Each month firms are sorted into four equal sized portfolios based on the growth in net operating assets (ΔNOA) of related forms. Then, within each group firms are further sorted in four equal sized groups based on their own inventory growth (ΔINV). The bold line plots the returns to a portfolio that takes long (short) positions in firms in the bottom (top) quartile of ΔINV within the top quartile of ΔNOA based on related firms. The dashed line plots the returns to a portfolio that takes long (short) positions in firms in the bottom (top) quartile of ΔINV within the bottom quartile of ΔNOA based on related firms.

Conclusion

- Accounting information has been and will continue to be an important component to any security return forecasting exercise.
- There are lots of smart people doing similar things.
- Easy to find results in historical data when not as many people were trolling through.
  - Increasing skepticism of back tests.
- Need to sharpen our forecasting. Simplistic measures are getting priced more quickly.
  - Maybe academics are assisting the price discovery process ☺