Beyond EPS

Market response to analyst estimates of Revenue and Cash Flow
(with a focus on European results)

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QWAFAFEW

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Rating Analysts & Improving Stock Market Predictions

Agenda

- Why go beyond EPS? Why Europe?
- Characteristics of Revenue and Cash Flow forecasts
  - Data Density
  - Biases and errors
- Market reaction to EPS, Revenue, and Cash Flow announcements
- Value/Growth differences
- Revenue and Cash Flow revisions for stock selection

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Why go beyond EPS?

- Because the data is there
- And yet it has not been widely exploited by practitioners
- EPS potentially subject to manipulation or estimation errors
  - Management can re-define Pro Forma earnings by excluding non-one-time one-time expenses
  - Revenue estimates are subject to discretion over revenue recognition but not subject to discretion over reclassification of expenses
  - Cash Flow estimates are not subject to accrual estimation errors
- Revenue and Cash Flow may be more “reliable” than EPS even if they are not as “relevant” to the market

Why Europe?

- Because the data is there!
  - Historically good density in Europe for Revenues and Cash Flow
- “Earnings” are ill defined in Europe in particular
  - Varying treatment of goodwill amortization over time and across markets
  - Upcoming IFRS changes are causing confusion over the definition of EPS
  - Result is lower cross sectional (or even cross-analyst!) comparability for EPS than for Revenue or Cash Flow
- Stock selection results are strong in Europe
- We’ll also describe results for North America and Asia
  - Historically lower data density in the U.S. for Revenues and especially Cash Flow; biased towards loss, growth, and tech firms
  - Stock selection results strong in Asia and Canada, weaker in US

Data & Definitions

- Developed Europe
- 1996 – 2004
- large cap: top 1000 by USD market cap
- Data from Thomson Financial and StarMine
- Fiscal year estimates and actuals
- Earnings per share
  - Usually EPS for older data
  - sometimes EBG (before goodwill) for newer data
- Revenue (not per share)
- Cash Flow per share
  - IBES definition is cash flow from operations

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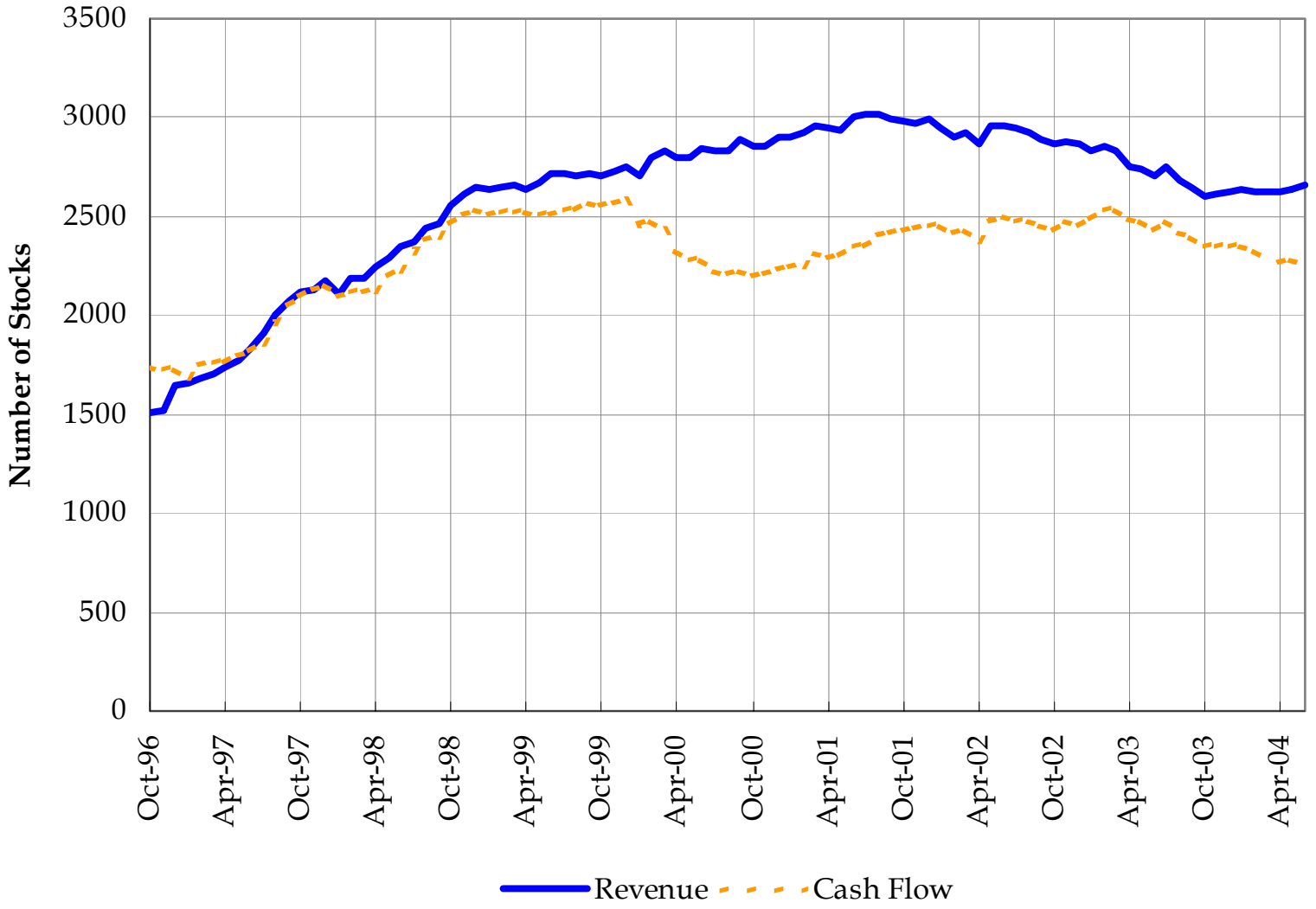
Coverage in Europe is quite good, historically



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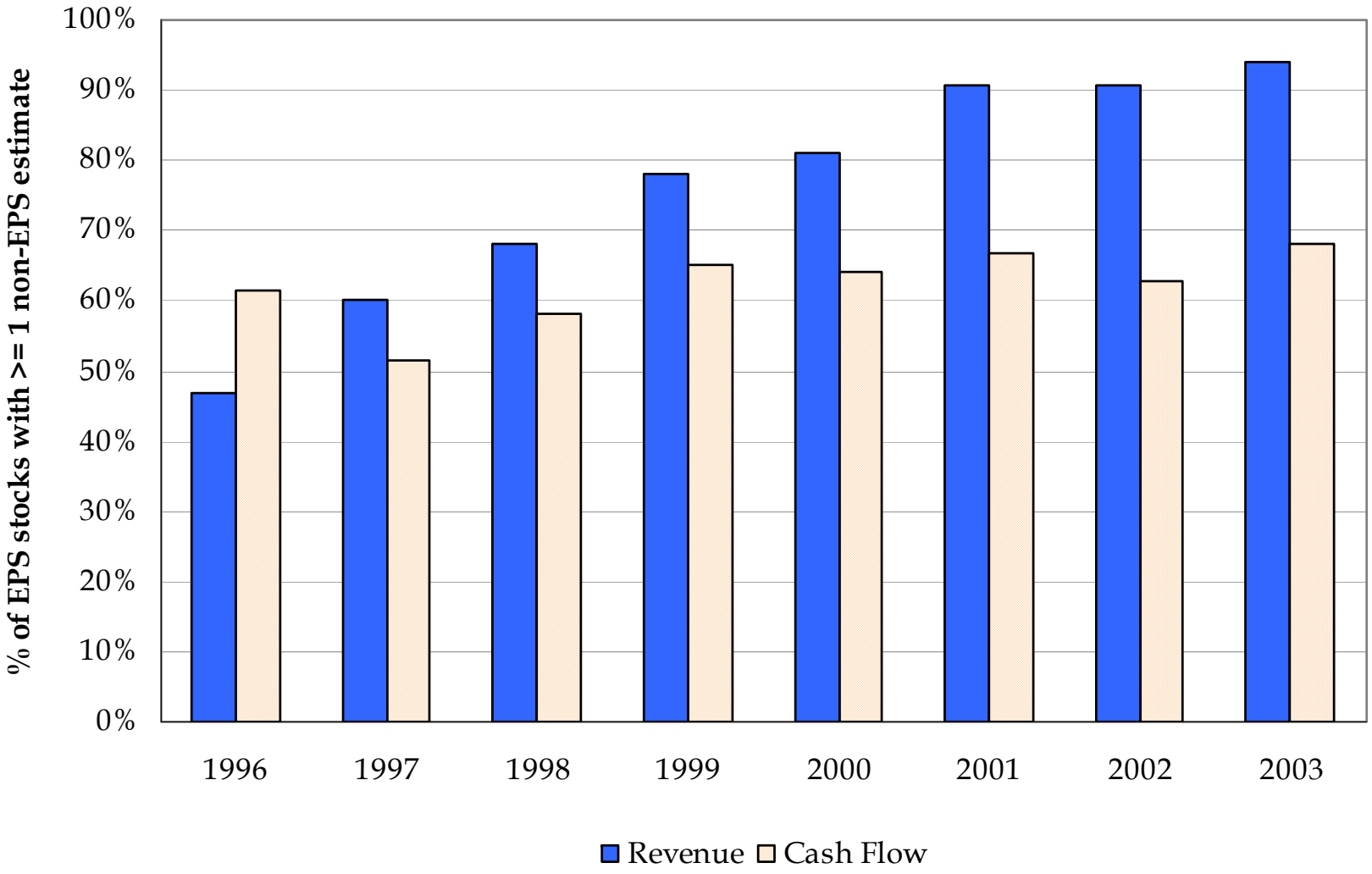
80% (60%) of EPS stocks have at least 1 Revenue (Cash Flow) estimate



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Analysts most accurate on Revenue, least on CF

Error = |mean forecast on rept date – actual| / |actual|

Median error of analysts estimates			
Year	Earnings	Revenue	Cash Flow
1996	6.0%	2.5%	12.9%
1997	6.6%	3.7%	10.8%
1998	8.2%	4.7%	16.9%
1999	10.0%	5.6%	27.5%
2000	9.6%	4.0%	18.5%
2001	7.9%	2.5%	17.1%
2002	9.7%	2.0%	20.5%
2003	7.5%	1.6%	19.2%
Overall	**8.1%**	**3.0%**	**17.9%**

Analysts vary least on Revenue, most on CF

CV = (standard deviation of forecasts on rept date) / |actual|

Median Coefficient of Variation of analyst estimates			
Year	Earnings	Revenue	Cash Flow
1996	7.2%	2.7%	9.2%
1997	7.1%	3.6%	10.7%
1998	9.7%	5.6%	18.9%
1999	10.3%	6.4%	19.7%
2000	10.8%	4.9%	16.3%
2001	10.7%	3.6%	15.8%
2002	10.9%	2.9%	13.3%
2003	8.5%	2.2%	12.5%
Overall	**9.5%**	**3.7%**	**14.2%**

Analysts systematically low on EPS and Revenue (i.e., surprises are consistently positive)

Bias = (mean forecast on rept date – actual) / |actual|

Median Bias of analyst estimates			
Year	Earnings	Revenue	Cash Flow
1996	-1.2%	-0.3%	-1.8%
1997	-1.9%	-1.2%	-0.7%
1998	-0.7%	-0.5%	1.4%
1999	-1.4%	-2.2%	7.7%
2000	-0.6%	-1.2%	0.4%
2001	-0.2%	-0.5%	1.0%
2002	-0.1%	0.2%	-5.8%
2003	-2.2%	0.0%	-8.1%
Overall	**-1.0%**	**-0.4%**	**-1.1%**

So, cash flow estimates look different

Measure	Earnings	Revenue	Cash Flow
Error	8.1%	3.0%	17.9%
Variation	-1.0%	-0.4%	-1.1% (inconsistent)
Bias	9.5%	3.7%	14.2%

- Higher level of error
  - Analysts are more accurate on EPS and especially Revenue
- Higher variance of forecasts
  - Analysts agree most on Revenue, least on Cash Flow
- Directional bias of forecasts is inconsistent over time
  - Analysts are consistently low on EPS and Revenue

Why is Cash Flow different?

- Is it harder to forecast? Not inherently: Cash Flow is about as persistent as EPS
  - Autocorrelation of Cash Flow is 0.61
  - 0.58 for Earnings, 0.69 for Revenues
  - Given that accruals smooth earnings, it's surprising that Cash Flow has the same autocorrelation as earnings
- Likely explanation is simply that management guides Revenue and Earnings more heavily
  - There is more agreement among analysts for Revenue and Earnings, possibly due to management guidance
  - Surprises are consistently positive for Revenue and Earnings, possibly due to management guidance

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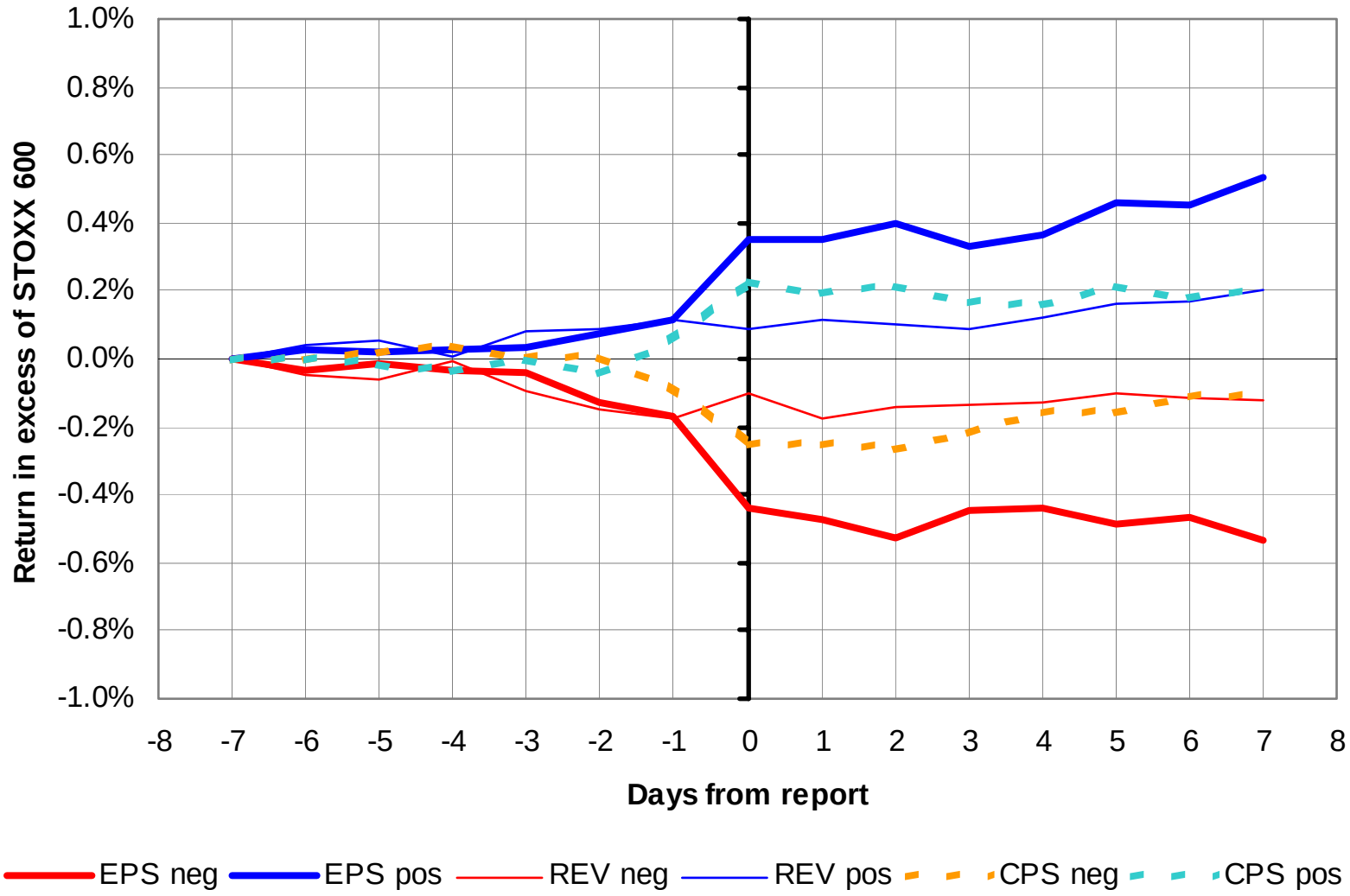
In isolation, EPS surprises seem to have the biggest impact



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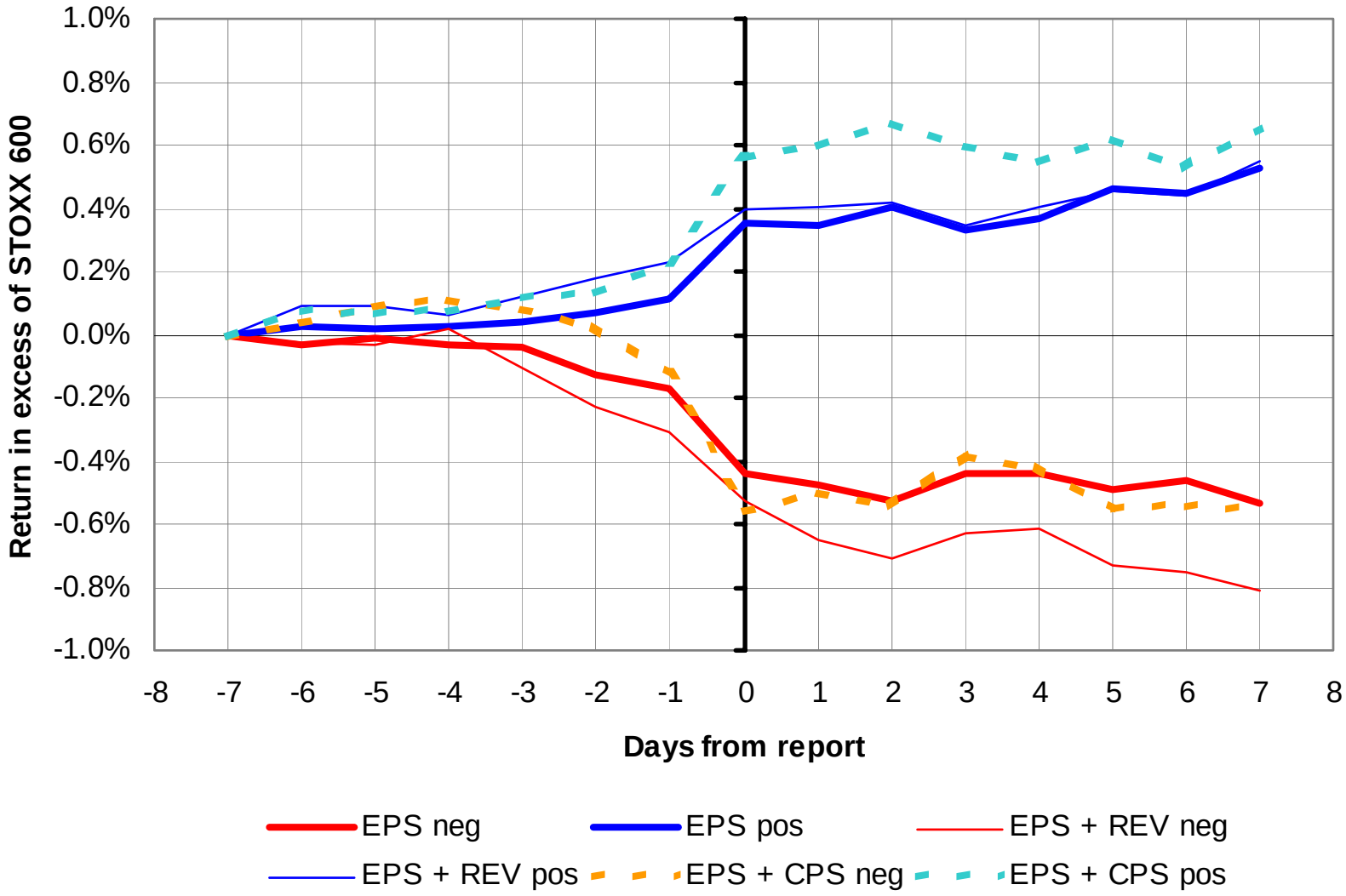
EPS surprises which are also Revenue or Cash Flow surprises seem to have a bigger impact



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Measuring Unexpected financial results

- Take the mean forecast on the day of report
- Unexpected Earnings (**UE**)
  = (EPS – mean EPS forecast) / |mean EPS forecast|
- Similarly for Revenue (**UR**) and Cash Flow (**UC**)
- Similarly for Expense (**UX**) = Revenue – Earnings
- Similarly for Accruals (**UA**) = Earnings – Cash Flow
- Note that we will flip the sign on Unexpected Expense
  - Since lower than expected Expenses are good
- But not on Unexpected Accruals
  - Since we expect the market not to fully realize the differential persistence of accruals vs. cash flow, per Sloan (1996)
- Note that “expected” Expense and Accruals are *imputed*

Measuring market reactions

- Returns from 7 calendar days before announcement to 7 calendar days after
- Excess Return (ER) = Return relative to STOXX 600 Index
- Rank both returns and Unexpected Results variables for more robust regressions
- Five regressions:

$$ER = \alpha + \Sigma\ \beta i * Ui$$

- i in {(E),(R),(C),(R,X),(C,A)}

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Results of the five regressions

Regression	Variables	Coefficient	Parameter Estimate	T stat
R1	Earnings only	β_E	0.055	4.84
R2	Revenue only	β_R	0.029	2.16
R3	Cash Flow Only	β_C	0.027	1.82
R4	Revenue	β_R	0.062	2.19
	Cost savings	β_X	0.037	1.31
R5	Cash Flow from Operations	β_C	0.032	1.04
	Working capital accruals	β_A	0.005	0.16

Interpreting the regressions (1)

Regression	Variables	Coefficient	Parameter Estimate	T stat
R1	Earnings only	β_E	0.055	4.84
R2	Revenue only	β_R	0.029	2.16
R3	Cash Flow Only	β_C	0.027	1.82

- The market reacts more to Earnings when measured in isolation
- But it still reacts in the expected direction for Revenues and Cash Flow

Interpreting the regressions (2)

Regression	Variables	Coefficient	Parameter Estimate	T stat
R4	Revenue	β_R	0.062	2.19
	Cost savings	β_X	0.037	1.31

- Revenue-driven earnings surprises are more valuable than cost savings-driven earnings surprises
- The market understands that sales changes are more persistent (and less subject to manipulation) than expense changes

Interpreting the regressions (3)

Regression	Variables	Coefficient	Parameter Estimate	T stat
R5	Cash Flow from Operations	β_C	0.032	1.04
	Working capital accruals	β_A	0.005	0.16

- Cash flow surprises are “fully valued”, accruals surprises are not
- i.e., the market understands *to some degree* the relative persistence and reliability of cash flows versus accruals
- Somewhat surprising given the existence of the accrual anomaly
- However, accruals actually *anti*-persist and the market treats them as if they are simply *non*-persistent
- Therefore this finding does not contradict Sloan (1996)

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Regression results by Value/Growth

			Growth		Value	
Regression	**Variables**	**Coefficient**	**Parameter Estimate**	**T stat**	**Parameter Estimate**	**T stat**
R1	Earnings only	β_E	0.050	3.11	0.049	2.80
R2	Revenue only	β_R	0.026	1.34	0.030	1.63
R3	Cash Flow Only	β_C	0.008	0.38	0.040	1.93
R4	Revenue	β_R	0.084	2.29	(0.017)	(0.38)
	Cost savings	β_X	0.068	1.84	(0.051)	(1.14)
R5	Cash Flow from Operations	β_C	(0.015)	(0.39)	0.071	1.40
	Working capital accruals	β_A	(0.030)	(0.74)	0.032	0.66

Interpreting the Value/Growth regressions

- Earnings and Revenue surprises are as valuable among Value as among Growth stocks
- Cash Flow surprises appear to be important only among Value stocks, not Growth stocks
  - This may be why the accrual anomaly is stronger for growth stocks: the market ignores the differential persistence of cash flow vs. accruals in the short term among growth stocks
- Revenue surprises more important than Cost Savings surprises for Growth stocks, but not for Value
  - Growth stock investors want revenue growth regardless of costs

Implications for practitioners – announcements

- Looking beyond EPS makes sense
- Forecasts of (market reaction to) likely earnings surprises can be improved by looking at where the earnings surprise is coming from
  - Is the surprise supported by revisions?
  - Is the surprise supported by cash flows?

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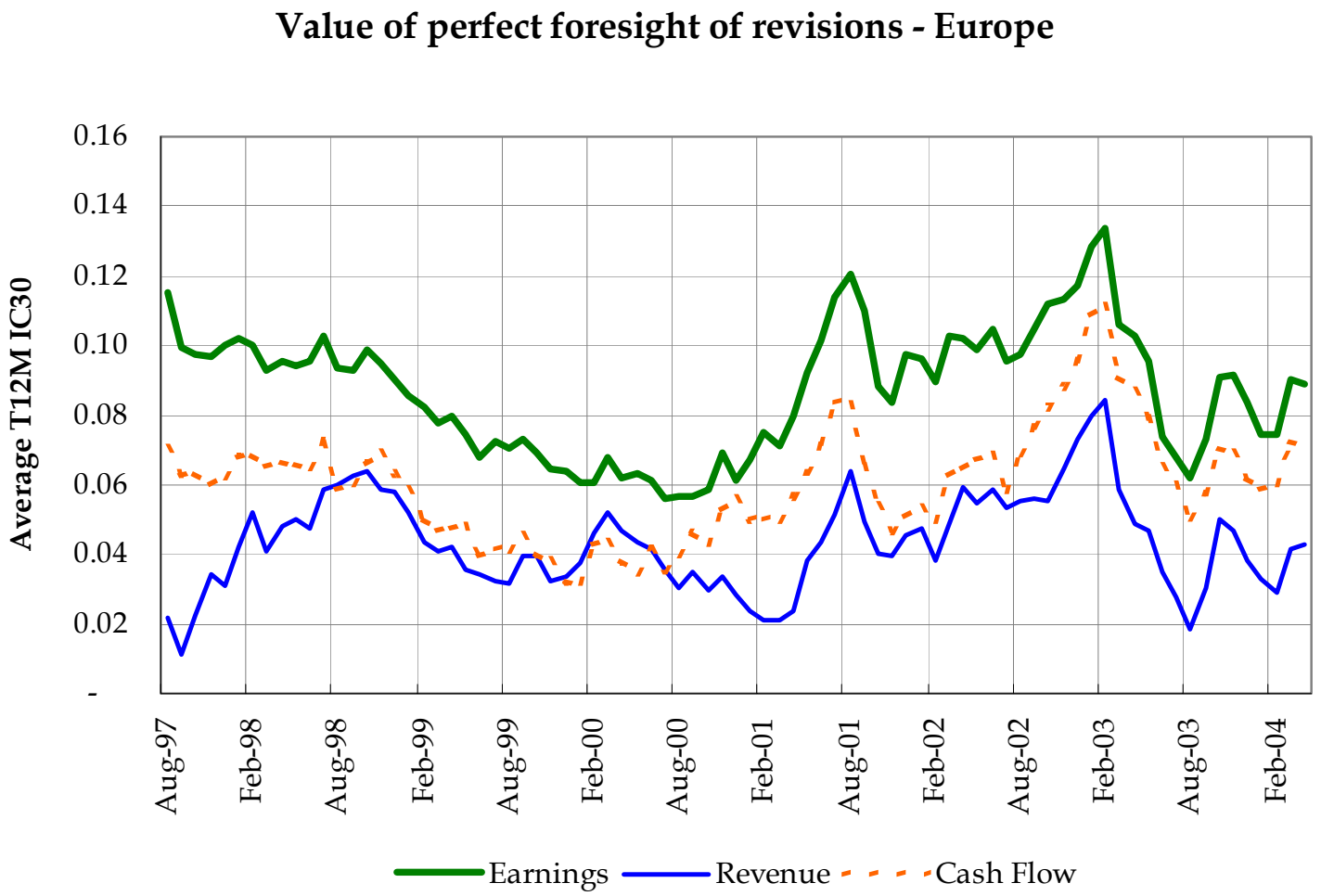
What about revisions?

- The market appears to react to unexpected levels of reported Earnings, Revenue, and Cash Flow
- The market understands to some degree the relative importance of the components of earnings
- What about short-term *changes* in estimates of Revenue and Cash Flow
- We ran a perfect foresight test to determine whether the market prices estimate revisions
  - Suppose we have perfect knowledge of next month's change in estimates and in prices
  - Take 1-month % change in mean estimates for each measure
  - Rank correlation (IC) with *contemporaneous* 1-month returns

Revisions in a given month correlate to stock price changes in that month for all 3 measures



	Earnings	Revenue	Cash Flow
Average IC	0.089	0.042	0.062
T(IC)	11.20	5.94	9.48

The reaction is robust across European markets

	IC of revisions of:		
Country	Earnings	Revenue	Cash Flow
Austria	0.037	0.058	0.047
Belgium	0.124	0.069	0.103
Denmark	0.135	0.061	0.109
Finland	0.195	0.088	0.183
France	0.090	0.034	0.059
Greece	0.056	0.051	(0.064)
Germany	0.064	0.027	0.031
Ireland	0.105	(0.048)	0.033
Italy	0.072	0.016	0.032
United Kingdom	0.120	0.045	0.044
Netherlands	0.076	0.034	0.065
Norway	0.092	0.027	0.080
Portugal	0.052	0.047	0.140
Spain	0.074	0.038	0.064
Switzerland	0.100	0.068	0.099
Sweden	0.110	0.054	0.038

Cash Flow and Revenue revisions have *incremental* pricing implications over EPS

We ran Fama-McBeth rank regressions on *contemporaneous* 1-month stock price response to EPS, Revenue, and Cash Flow revisions (perfect foresight)

$$\text{Rank(returns(t))} = \alpha + \beta_{EPS} * \text{Rank(Revision}_{EPS}\text{(t))} + \beta_{REV} * \text{Rank(Revision}_{REV}\text{(t))} + \beta_{CPS} * \text{Rank(Revision}_{CPS}\text{(t))}$$

Rank of revisions of:	Median Parameter	T statistic
Earnings	0.088	11.20
Revenue	0.020	2.85
Cash Flow	0.027	5.98

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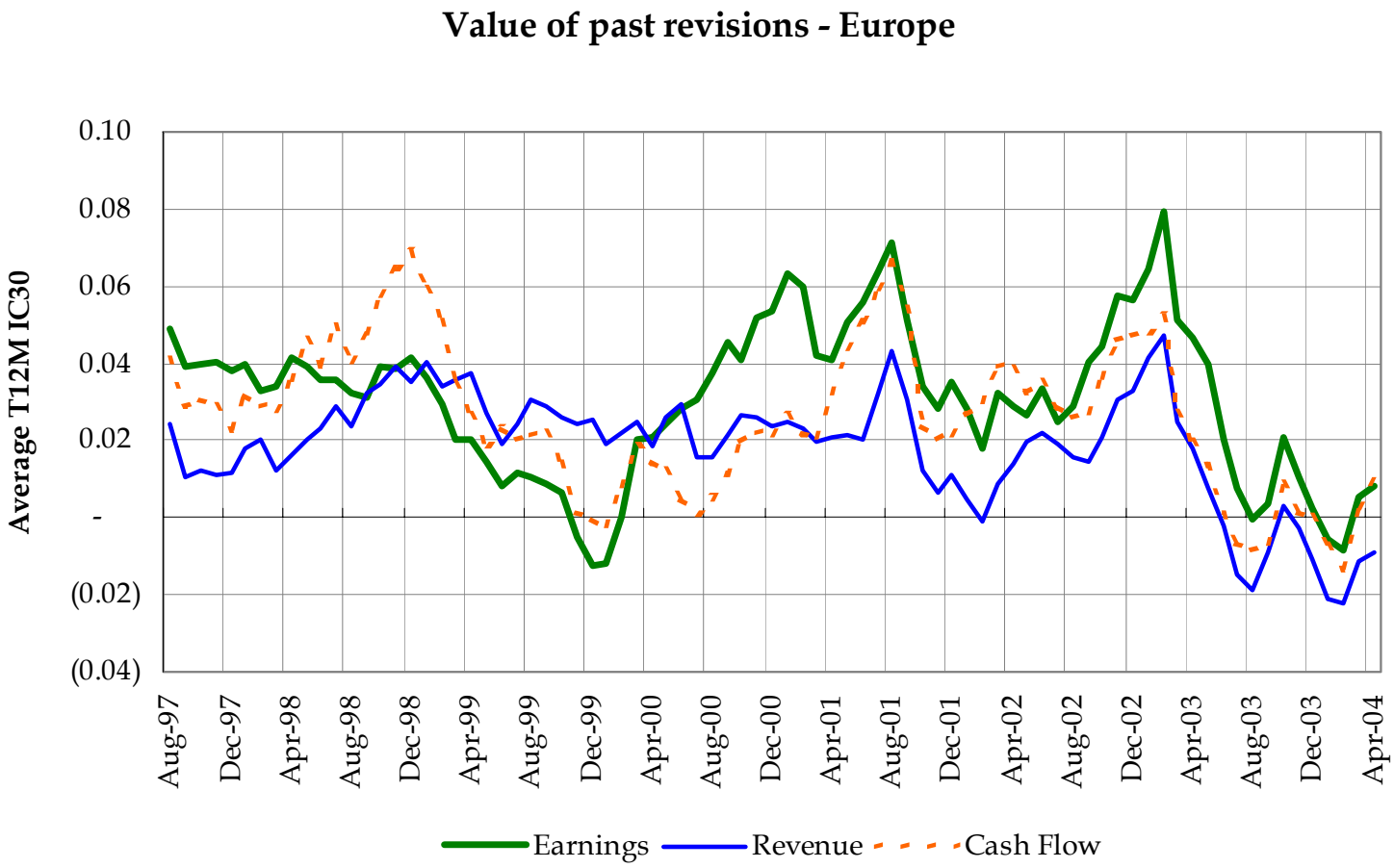
All three revision types exhibit serial correlation

- So the market reacts to changes in expectations of all three measures
  - Individually and in combination
- There is serial correlation in all of the revision measures
  - Analysts exhibit herding behavior
  - Not surprisingly in light of our earlier findings, serial correlation is lower for cash flow (less guidance)

Month over month serial correlation of revisions	
Earnings	0.25
Revenue	0.19
Cash Flow	0.12

- Therefore past revisions "forecast" future revisions
  - So a stock selection measure based on past revisions may have actionable value

Trailing revisions are valuable for stock selection



	Earnings	Revenue	Cash Flow
Average IC	0.031	0.018	0.027
T(IC)	3.67	2.83	3.65

Finer slices of European revision ICs

Group	Earnings	Revenue	Cash Flow	Notes
Top 1500	0.026	0.018	0.023	
Top 500	0.003	0.011	0.016	*Revenue & Cash Flow add most value for large cap*
Next 1000	0.032	0.018	0.032	*but are strongest for smaller stocks (as with*
Micro Cap	0.034	0.016	0.032	*earnings revisions)*
Country Neutral	0.026	0.018	0.023	*No big country bet effects*
U.K	0.001	0.004	0.004	*Weaker results in the U.K.*
France	0.022	0.007	0.026	*Stronger results in Continental Europe*
Germany	0.030	0.002	0.030	*(as with earnings revisions)*
1997	0.022	0.008	0.001	
1998	0.048	0.038	0.063	
1999	(0.008)	0.016	(0.006)	*Looks like there is some diversification benefit*
2000	0.051	0.013	0.027	*from looking beyond EPS*
2001	0.036	0.005	0.025	
2002	0.046	0.026	0.040	
2003	(0.011)	0.011	(0.009)	
1 month holding	0.026	0.018	0.023	*Revenue and Cash Flow revisions seem somewhat*
6 months	0.053	0.032	0.038	*shorter term than EPS revisions*
12 months	0.075	0.038	0.045	

Cash Flow and Revenue revisions have *incremental* stock selection value over EPS

We repeat our Fama-McBeth regressions, but using *trailing* revisions rather than contemporaneous revisions

$$\text{Rank(returns(t))} = \alpha + \beta_{EPS} * \text{Rank(Revision}_{EPS}\text{(t-1))} + \beta_{REV} * \text{Rank(Revision}_{REV}\text{(t-1))} + \beta_{CPS} * \text{Rank(Revision}_{CPS}\text{(t-1))}$$

Rank of trailing revisions of:	Median Parameter	T statistic
Earnings	0.016	2.60
Revenue	0.014	1.47
Cash Flow	0.012	2.71

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Combining earnings and non-earnings revisions

- Annualized returns to quintile portfolios
- Note that cross sectional correlation between any pair of the three revision measures is around 0.3

	Quintile		
Measure	Bottom	Top	Spread
Earnings	0.4%	11.6%	**11.2%**
Revenue	2.7%	6.1%	**3.4%**
Cash Flow	0.9%	9.7%	**8.8%**
Earnings and Revenue	-2.5%	14.2%	**16.8%**
Earnings and Cash Flow	-3.9%	14.9%	**18.8%**
Earnings, Revenue, Cash Flow	-3.8%	16.9%	**20.7%**

Non-EPS revisions look promising in most global regions

- ICs for top 1000 stocks in each region

Region	Earnings	Revenue	Cash Flow
Developed Europe	0.031	0.018	0.027
North America	0.014	(0.004)	0.010
U.S.	0.012	(0.005)	0.006
Canada	0.078	0.028	0.018
Developed Asia/Pacific	0.039	0.021	0.026
Emerging Markets	0.031	0.015	0.018

- Results are promising in all regions except U.S.
  - Canadian results are actually quite strong
  - Note that North America CF history is limited
- European and Asian results are consistent over time, most countries, and sectors
  - As expected, results are stronger yet for small cap stocks
  - Results are stronger in down markets than up markets

Non-EPS revisions: why is the U.S. weak?

- Large and Mid Cap US results have been remarkably weak
- But the history is very limited in the U.S.
  - U.S. Cash Flow history begins in earnest only in 2003
  - U.S. Revenue history goes back farther (2000)
  - Revenue sample is biased heavily towards recent years, loss firms, tech, and large cap growth, since this is where I/B/E/S collected U.S. revenue estimates [demand for alternatives when E is negative]
  - Other regions do not exhibit these biases
- Earnings revisions have also been weak over the time period and stock set (2000-2004, large cap growth) for which there are non-EPS estimates
- With the broader coverage now available, non-EPS revisions may (?) work going forward in the U.S.

Implications for practitioners – revisions

- The market looks beyond EPS
- Yet Revenue and Cash Flow revisions appear to be relatively under-exploited by (non-U.S.) quantitative managers
- Cash Flow and Revenue revisions appear to have had value for stock selection
  - But not in the U.S. (for the time period we examined)
- The value appears to be complementary to earnings revisions' value

Other findings on individual non-EPS estimates

- We can make a better composite Revenue or Cash Flow estimate by emphasizing historically accurate and more timely analysts
- The difference between the re-weighted composite and an equally-weighted mean is predictive of future estimate revisions for all measures
  - i.e., smart analysts lead the pack and their estimates are predictive
  - This difference correlates to subsequent excess returns in all markets except the U.S.
- Forecasted P/E, P/S, E/S ratios improve a bit if we focus on better analysts
  - Marginally better returns to earnings yield, sales yield, net margins
  - We haven't tried P/CF yet

Thank you!

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