A re-examination of analysts' superiority over time-series forecasts

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Summary of slides from the Inaugural CARE Conference

- #1 "Analysts' forecasts are optimistic"
- #2 "Analysts are better than time-series models"
- #3 We think we know how analysts forecast
- #4 "Analysts' forecasts are inefficient"
- #5 Limited evidence on what analysts do with forecasts
- #6 Most research ignores analysts' multi-tasking
- *#7 Analyst data are helpful for capital markets literature*
- #8 "Analysts are dominated by conflicts of interest"
- #9 We may be focusing on their least important activities
- #10 Researchers eschew alternative methodologies

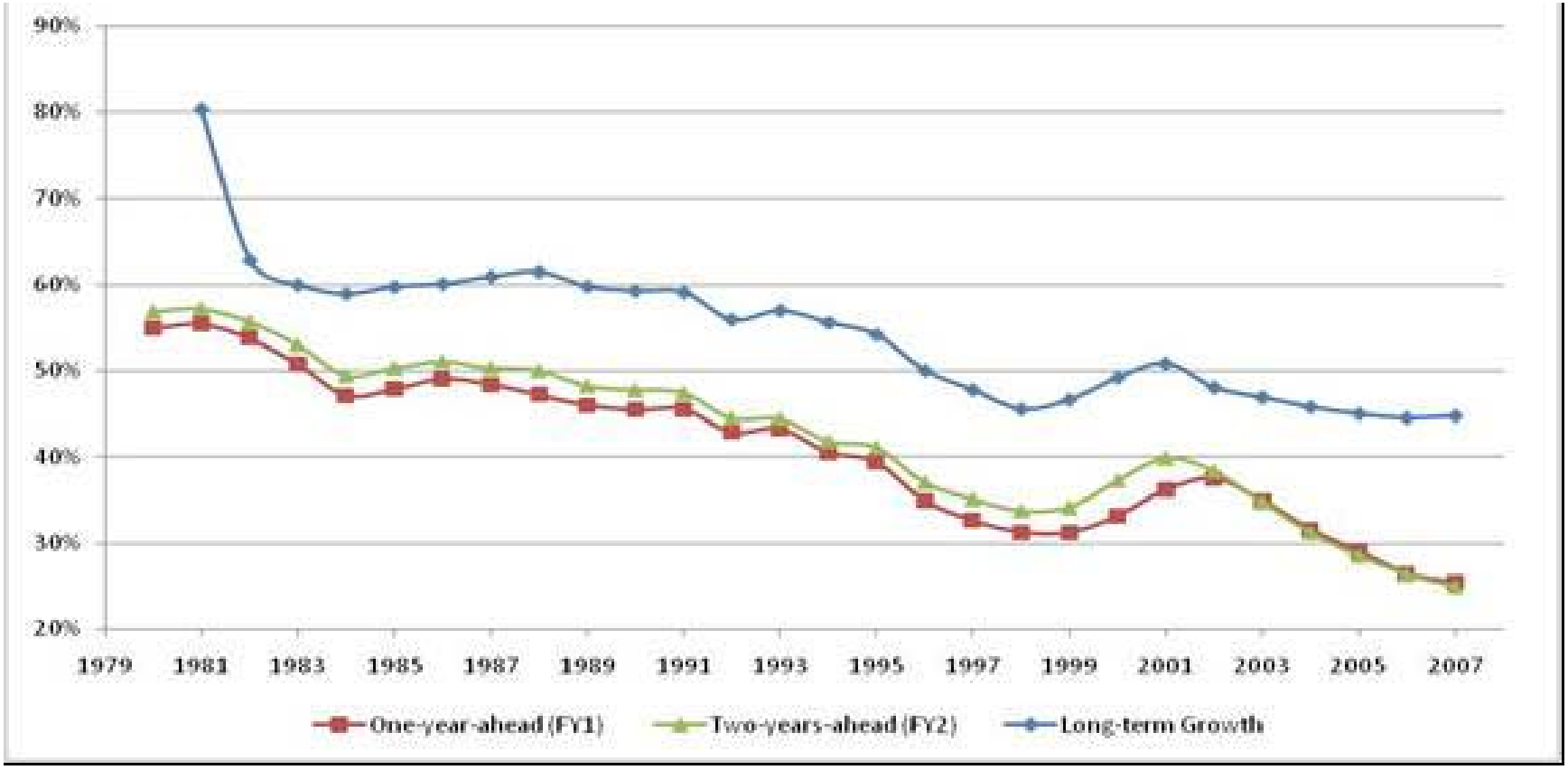
Summary motivation

- Analysts >> Time-series models is widely accepted

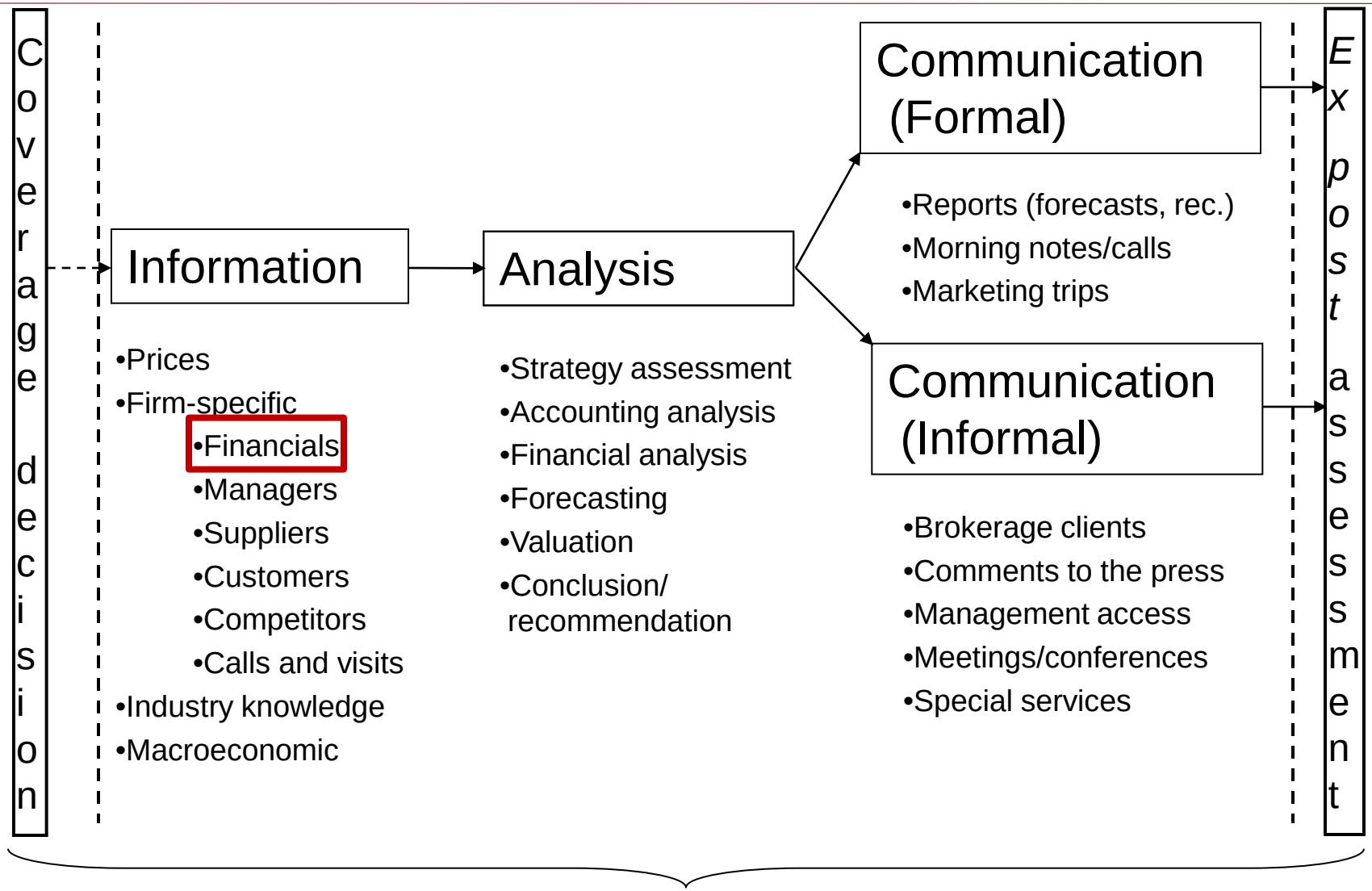
- However, research supporting this view is characterized by:
  - **Tiny samples** relative to current research standards (in capital mkts.)
    - e.g., 50 to a few hundred firms
  - Data demands ⇒ **bias towards large, mature firms**
    - e.g., some studies restrict sample to NYSE, or numerous analysts
    - Analyst following correlated with institutional investment
    - e.g., AF and II interact with firms ⇒ richer information environment (more severe in earlier years)
  - **Economic significance** of differences seems small
    - Collins & Hopwood (1980): 31.7% vs. 32.9%
    - Fried & Givoly (1982): 16 vs. 19%

- Current-day incorporation of analysts' forecasts into research studies
  - Goes beyond **generalizability** of earlier studies
    - e.g., smaller firms underrepresented in early research,
      longer forecast horizons underrepresented
    - ala Bamber, Christensen & Gaver (AOS2000)

Figure 1: Percentage of firms on Compustat/CRSP *without* analyst coverage



Analysts


Coverage decision
Information
•Prices
•Firm-specific
•Financials
•Managers
•Suppliers
•Customers
•Competitors
•Calls and visits
•Industry knowledge
•Macroeconomic
Analysis
•Strategy assessment
•Accounting analysis
•Financial analysis
•Forecasting
•Valuation
•Conclusion/ recommendation
Communication (Formal)
•Reports (forecasts, rec.)
•Morning notes/calls
•Marketing trips
Communication (Informal)
•Brokerage clients
•Comments to the press
•Management access
•Meetings/conferences
•Special services
Ex post assessment
Ability, incentives, integrity/professionalism, responsiveness, etc.

Research question

- Do analysts' forecasts *really* dominate time-series forecasts?
  - When and when not?
    - Covariate 1: Forecast horizon (timing advantage)
    - Covariate 2: Firm age (information advantage)
    - Covariate 3: Firm size " "
    - Covariate 4: Analyst following " "
    - Covariate 5: Magnitude of changes (when analysts stand to add most value)

- Implicit Null: We should see NO significant results

- Conditional on differences in forecast accuracy (in favor of time-series models), do market returns reinforce the primary results?

Observation: Other Evidence re: Experts vs. Time-Series

- Interest rates (Belongia 1987)
- GDP (Loungani 2000)
- Recessions (Fintzen and Stekler 1999)
- Turning points of business cycles (Zarnowitz 1991)
- …

Landscape – 1970s

- Much capital markets research was aimed at understanding the time-series properties of earnings.
  - Ball and Watts 1972, Brooks and Buckmaster 1976, Albrecht et al. 1977, Salamon and Smith 1977, and Watts and Leftwich 1977.

- General Conclusion: Earnings approximate a random walk. Sophisticated time-series models rarely provide an economically significant improvement, and even when they do it comes at high cost.

- *"The ability of random walk models to "outpredict" the identified Box-Jenkins models suggests that the random walk is still a good description of the process generating annual earnings in general, and for individual firms."* Watts and Leftwich (1977, 269)

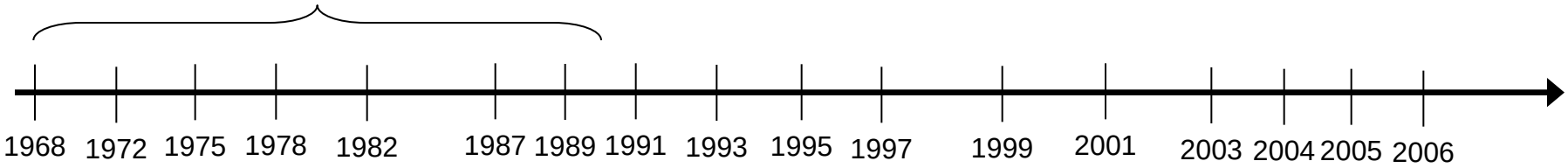
- Brown (1993, 295) declares the issue of whether annual earnings follow a random walk as "*pretty much resolved by the late 1970s.*"

Landscape – 1980s

- Newly available analyst data becomes available (i.e., Value-Line, I/B/E/S).
- "Horse-race studies" comparing time-series and analyst forecasts.
- Brown and Rozeff 1978, Fried and Givoly 1982, and Brown et al. 1987a,b
- General Conclusion: Analyst forecasts generally dominate time-series forecasts of earnings. Analyst superiority is attributed to:
  - **Information Advantage**
    - They know all information in TS and more
  - **Timing Advantage**
    - They issue forecasts after the end of the lagged TS

Timeline of Analysts vs. Time-Series Research

Price association



Cragg & Malkiel JF1968
Elton & Gruber MS1972
Barefield & Comiskey JBR1975
Brown & Rozeff JF1978
Fried & Givoly JAE1982
O'Brien JAE1988
O'Brien JAR1990
Stickel JAR1990
Brown IJF1991
Philbrick & Ricks JAR1991
Brown, Griffin, Hagerman, & Zmijewski JAE1987
Sinha, Brown & Das CAR1997
Mikhail, Walther, & Willis JAR1997
Clement JAE1999

Analysts vs. time-series models

Refinements/extensions

Landscape – Today

- Researchers generally regard this literature as having conclusively shown that analysts' forecasts are a superior proxy for earnings expectations.

- Kothari (JAE2001) concludes that
  - The time-series properties of earnings literature is fast becoming extinct because of "the easy availability of a better substitute" which is "available at a low cost in machine-readable form for a large fraction of publicly traded firms." (p. 145)
  - "[C]onflicting evidence notwithstanding, in recent years it is common practice to (implicitly) assume that analysts' forecasts are a better surrogate for market's expectations than time-series forecasts." (p. 153)

Landscape – Today (cont.)

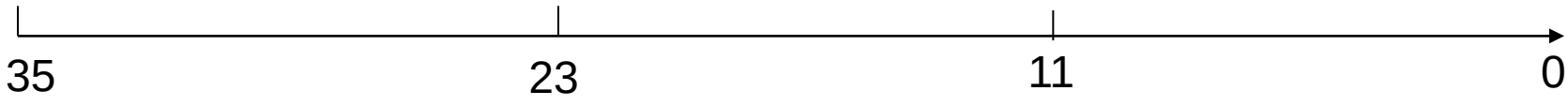
- Random Walk
  - Still descriptive (Lorek, Willinger & Bathke RQFA2008)

- Valuation and cost of capital literature:
  - Researchers use analyst forecasts over some short horizon and then extrapolate to value a perpetuity.
  - Example: Dhaliwal et al. (JAE 2007), Frankel & Lee (JAE1998), etc.
    - One-year-ahead: FY1 (I/B/E/S Consensus forecast)
    - Two-years-ahead: FY2
    - Three-years-ahead: FY3 = FY2 x (1+LTG)
    - Four-years-ahead: FY4 = FY3 x (1+LTG)
    - Five-years-ahead: FY5 = FY4 x (1+LTG)
  - Exceptions: Allee (2009); Hou, Van Dijk and Zhang (2010)

Data

- 1983-2007 (25 years)
- Minimal constraints on data
  - Biggest constraint is presence on *I/B/E/S*
    - EPS forecast, actual EPS, stock price
  - Sales on *Compustat* in year t-1
  - Earnings in year t-1 > 0
    - Hayn (1995): losses less persistent than profits
      $\Rightarrow$ bias results in favor of random walk (but not really)
  - *CRSP* returns for last analysis

- Consensus forecasts in months 0 to -35



Month prior to month in which earnings are announced

EPS_T announced

Forecast errors

- Random Walk
  - Minimizes data demands
  - Performs as well or better than higher order models (consistent w/ Lorek, WIllinger & Bathke RQFA2008)
  - *We aim to do nothing to "help" RW forecasts*

- Forecast of EPS for year T as of t months prior to the month EPS_T announced
  - Analysts: $|(FEPS_{T,t} - EPS_T)| / Price_t$
  - Time-series: $|(EPS_{T-1} - EPS_T)| / Price_t$

	#Forecasts	#Firm-years	#Firms
FY1:	740,070	69,483	10,140
FY2:	611,132	60,170	9,037
FY3:	468,777	46,226	7,070

- Analyst superiority = RWFE – AFE
  - >0 $\Rightarrow$ analysts more accurate than random walk
  - <0 $\Rightarrow$ random walk more accurate than analysts

Table 2 Descriptive Statistics

	Mean	Q1	Median	Q3
Sales	>374	110	374	1,384
BTM	0.58	0.31	0.50	0.75
Age	8.2	4	7	12
# Analysts	7.6	2	5	10

* A hypothetical data requirement of 10 years (as in Fried and Givoly 1982) would eliminate 70% of the observations in our sample).

Scaling and winsorizing

$$Error = \left| \frac{(\text{Actual} - \text{Predicted})}{|\text{Actual}|} \right|$$

% > 1.00

Months Prior to RDQE	Analysts Forecasts Errors	Random Walk Errors
1 Month (Mature Firms)	2.90%	10.50%
1 Month	5.20%	14.20%
11 Months	16.50%	14.60%
23 Months	22.60%	19.70%
35 Months	29.50%	26.20%

**The 1.00 cut-off was reasonable in earlier studies. Fried and Givoly (1982) report that only 0.5% of their observations have scaled forecast errors that are greater than 1.00.

Table 2 Descriptive Statistics (i.e., Forecast– Actual)

Panel C: Signed Forecast Errors

	Mean	**Median**	**Q1**	**Q3**
Signed Random Walk Errors				
11 Months	0.0086	-0.0055	-0.0153	0.0108
23 Months	0.0033	-0.0091	-0.0260	0.0150
35 Months	-0.0038	-0.0124	-0.0363	0.0166
Signed Analysts' Forecasts Errors				
11 Months	0.0194	0.0028	-0.0041	0.0209
23 Months	0.0272	0.0090	-0.0049	0.0391
35 Months	0.0332	0.0162	-0.0047	0.0541

Table 3 – Main Results
Analysts' forecast superiority, Full sample

FY1			FY2			FY3		
Months Prior	Firm-years	Analyst Superiority	Months Prior	Firm-years	Analyst Superiority	Months Prior	Firm-years	Analyst Superiority
0	32,723	0.0245	12	29,072	0.0120	24	21,944	0.0072
1	66,224	0.0236	13	55,447	0.0106	25	41,766	0.0055
2	66,104	0.0227	14	56,659	0.0095	26	42,827	0.0044
3	65,794	0.0212	15	56,575	0.0081	27	42,941	0.0033
4	65,458	0.0182	16	56,023	0.0063	28	42,588	0.0019
5	65,158	0.0155	17	55,360	0.0049	29	42,272	0.0007
6	64,787	0.0131	18	54,458	0.0037	30	41,753	(0.0000) NS
7	64,361	0.0102	19	53,195	0.0022	31	40,952	(0.0012)
8	63,869	0.0081	20	51,832	0.0012	32	40,137	(0.0020)
9	63,200	0.0064	21	49,745	0.0004	33	38,925	(0.0027)
10	62,103	0.0041	22	46,501	(0.0006)	34	36,836	(0.0035)
11	60,289	0.0025	23	42,124	(0.0011)	35	33,789	(0.0040)

Analyst are more accurate than RW by 25 basis-pts

RW is more accurate than Analysts by 40 basis-pts

Table 4 – Analysts' forecast superiority and firm age

Panel A: FY1 – 11 months prior to RDQE

Firm Age	Firm-years	Analysts'Superiority	RW Forecast Error	Analysts' Forecast Error
1	2,534	0.0007	0.0534	0.0527
2	6,321	0.0015	0.0405	0.0391
3	5,867	0.0005	0.0382	0.0378
4	5,109	0.0005	0.0379	0.0374
5+	40,335	0.0033	0.0301	0.0268

Panel B: FY2 – 23 months prior to RDQE

Firm Age	Firm Years	Analysts' Superiority	RW Forecast Error	Analysts' Forecast Error
1	1,413	(0.0102)	0.0628	0.0730
2	3,969	(0.0072)	0.0528	0.0599
3	3,810	(0.0048)	0.0511	0.0559
4	3,404	(0.0028)	0.0472	0.0500
5+	29,447	0.0008	0.0396	0.0388

Panel C: FY3 – 35 months prior to RDQE

Firm Age	Firm Years	Analysts' Superiority	RW Forecast Error	Analysts' Forecast Error
1	1,119	(0.0186)	0.0735	0.0871
2	2,954	(0.0147)	0.0647	0.0785
3	3,011	(0.0084)	0.0604	0.0670
4	2,794	(0.0060)	0.0584	0.0618
5+	23,868	(0.0012)	0.0498	0.0488

Table 5: Partitions for size and analyst following

Panel A: Small Firms

FY1			FY2				FY3		
Months Prior	**Firm-years**	**Analysts' Superiority**	**Months Prior**	**Firm-years**	**Analysts' Superiority**		**Months Prior**	**Firm-years**	**Analysts' Superiority**
0	6,897	0.0256	12	5,786	0.0085		24	3,067	0.0007
1	13,845	0.0252	13	10,871	0.0074		25	6,006	(0.0023)
2	13,737	0.0242	14	11,087	0.0060		26	6,192	(0.0040)
3	13,535	0.0225	15	10,885	0.0045		27	6,114	(0.0054)
4	13,396	0.0191	16	10,574	0.0020		28	5,968	(0.0074)
5	13,175	0.0162	17	10,204	0.0004	NS	29	5,836	(0.0086)
6	13,009	0.0132	18	9,799	(0.0012)		30	5,626	(0.0096)
7	12,815	0.0098	19	9,299	(0.0026)		31	5,366	(0.0106)
8	12,607	0.0071	20	8,759	(0.0040)		32	5,055	(0.0119)
9	12,341	0.0052	21	8,023	(0.0055)		33	4,707	(0.0131)
10	11,906	0.0023	22	6,987	(0.0066)		34	4,152	(0.0151)
11	11,314	(0.0003)	23	5,804	(0.0078)		35	3,521	(0.0167)

Table 5: Partitions for size and analyst following

Panel B: Low Analyst Following

FY1				FY2				FY3			
Months Prior	Firm-years	Analysts' Superiority		Months Prior	Firm-years	Analysts' Superiority		Months Prior	Firm-years	Analysts' Superiority	
0	9,089	0.0314		12	8,001	0.0110		24	8,634	0.0063	
1	18,744	0.0311		13	14,945	0.0102		25	16,197	0.0036	
2	18,704	0.0289		14	15,648	0.0085		26	16,784	0.0022	
3	18,557	0.0267		15	15,890	0.0066		27	16,848	0.0005	NS
4	18,422	0.0224		16	16,055	0.0043		28	16,672	(0.0014)	
5	18,265	0.0185		17	16,138	0.0027		29	16,489	(0.0030)	
6	18,104	0.0151		18	16,319	0.0008	NS	30	16,180	(0.0035)	
7	18,062	0.0109		19	16,646	(0.0009)		31	15,556	(0.0051)	
8	17,880	0.0080		20	16,901	(0.0022)		32	14,941	(0.0063)	
9	17,636	0.0058		21	17,310	(0.0032)		33	13,992	(0.0074)	
10	17,113	0.0026		22	17,924	(0.0041)		34	12,501	(0.0087)	
11	16,264	0.0000	NS	23	18,185	(0.0045)		35	10,544	(0.0099)	

Table 6: Partitions by magnitude of change in EPS

Panel A: The 33% of Forecasts with the Least Extreme Forecasted Change in EPS

FY1			FY2			FY3		
Months Prior	Firm-years	Analysts' Superiority	Months Prior	Firm-years	Analysts' Superiority	Months Prior	Firm-years	Analysts' Superiority
0	10,915	0.0025	12	9,679	0.0174	24	7,305	0.0140
1	22,093	0.0026	13	18,472	0.0156	25	13,910	0.0124
2	22,053	0.0025	14	18,881	0.0143	26	14,268	0.0115
3	21,954	0.0023	15	18,845	0.0125	27	14,300	0.0106
4	21,842	0.0020	16	18,654	0.0106	28	14,185	0.0097
5	21,743	0.0018	17	18,439	0.0087	29	14,075	0.0085
6	21,620	0.0016	18	18,139	0.0074	30	13,907	0.0078
7	21,481	0.0014	19	17,721	0.0058	31	13,645	0.0071
8	21,324	0.0013	20	17,260	0.0051	32	13,382	0.0065
9	21,110	0.0012	21	16,561	0.0041	33	12,968	0.0061
10	20,731	0.0012	22	15,488	0.0034	34	12,277	0.0057
11	20,117	0.0012	23	14,023	0.0029	35	11,263	0.0053

Table 6: Partitions by magnitude of change in EPS

Panel B: The 33% of Forecasts with the Most Extreme Forecasted Change in EPS

FY1			FY2				FY3			
Months Prior	Firm-years	Analysts' Superiority	Months Prior	Firm-years	Analysts' Superiority		Months Prior	Firm-years	Analysts' Superiority	
0	20,131	0.0025	12	9,695	0.0090		24	7,319	0.0018	
1	10,881	0.0616	13	18,483	0.0077		25	13,924	0.0005	NS
2	22,029	0.0591	14	18,885	0.0067		26	14,272	(0.0007)	NS
3	21,988	0.0566	15	18,865	0.0057		27	14,316	(0.0021)	
4	21,881	0.0530	16	18,684	0.0042		28	14,196	(0.0037)	
5	21,761	0.0453	17	18,463	0.0028		29	14,088	(0.0049)	
6	21,657	0.0381	18	18,157	0.0014		30	13,908	(0.0058)	
7	21,530	0.0320	19	17,728	0.0000	NS	31	13,639	(0.0076)	
8	21,385	0.0244	20	17,276	(0.0012)		32	13,360	(0.0087)	
9	21,217	0.0190	21	16,584	(0.0025)		33	12,964	(0.0095)	
10	20,993	0.0143	22	15,498	(0.0035)		34	12,267	(0.0109)	
11	20,635	0.0083	23	14,042	(0.0040)		35	11,256	(0.0115)	

Market expectation tests

- We estimate:

$$\text{Return} = \alpha + \beta\ \text{RWFE} + \epsilon_{it}$$

$$\text{Return} = a + b\ \text{AFE} + e_{it}$$

where the return accumulation period is equaled to forecast horizon.

- Market Expectation Proxy Ratio = β / b

Table 7: Associations with market returns

$$Return_{T,M} = \alpha + \beta\,(EPS_{T-1} - EPS_T) + \varepsilon_T$$

$$Return_{T,M} = \alpha + b\,(Forecasted\ EPS_{T,M} - EPS_T) + e_T$$

FY1			FY2				FY3			
Months Prior	Firm-years	β/b	Months Prior	Firm-years	β/b		Months Prior	Firm-years	β/b	
0	30,411	0.345	12	28,003	0.602		24	21,097	0.784	
1	62,355	0.395	13	53,654	0.678		25	40,377	0.831	
2	63,455	0.342	14	54,664	0.707		26	41,336	0.843	
3	63,419	0.396	15	54,473	0.742		27	41,369	0.874	
4	63,101	0.540	16	53,882	0.798		28	40,992	0.908	
5	62,790	0.632	17	53,196	0.833		29	40,674	0.928	
6	62,441	0.685	18	52,319	0.888		30	40,151	0.962	
7	62,016	0.735	19	51,113	0.912		31	39,409	1.001	
8	61,540	0.795	20	49,789	0.953		32	38,624	1.017	NS
9	60,915	0.838	21	47,783	1.007	NS	33	37,455	1.057	NS
10	59,936	0.905	22	44,672	1.008	NS	34	35,435	1.081	
11	58,261	0.939	23	40,500	1.032		35	32,530	1.099	

The association between returns and RW is 94% of the association between returns and analyst forecast errors.

Table 8: Market returns, by size & analyst following

$$Return_{T,M} = \alpha + \beta\,(EPS_{T-1} - EPS_T) + \varepsilon_T$$

$$Return_{T,M} = \alpha + b\,(Forecasted\ EPS_{T,M} - EPS_T) + e_T$$

Panel A: Small Firms

FY1				FY2				FY3			
Months Prior	Firm-years	*β/b*		Months Prior	Firm-years	*β/b*		Months Prior	Firm-years	*β/b*	
0	6,558	0.1813		12	7,275	0.6957		24	3,396	0.9083	
1	13,382	0.3422		13	13,711	0.7238		25	6,575	0.8822	
2	13,474	0.4286		14	14,068	0.7550		26	6,814	0.9084	
3	13,364	0.4433		15	13,887	0.7793		27	6,757	0.9330	
4	13,227	0.5309		16	13,468	0.8111		28	6,552	0.9392	NS
5	13,001	0.6186		17	12,974	0.8496		29	6,422	0.9495	NS
6	12,838	0.6610		18	12,424	0.9076		30	6,173	0.9550	NS
7	12,643	0.7170		19	11,713	0.8973		31	5,844	0.9762	NS
8	12,431	0.8323		20	10,906	0.9676	NS	32	5,491	1.0016	NS
9	12,176	0.8551		21	9,808	1.0151	NS	33	5,028	1.0965	
10	11,750	0.9273	NS	22	8,168	1.0043	NS	34	4,258	1.1229	
11	11,167	0.9431	NS	23	6,392	1.0277	NS	35	3,431	1.1230	

Table 8: Market returns, by size & analyst following

Panel B: Low analyst following

FY1				FY2				FY3			
Months Prior	Firm-years	*β/b*		Months Prior	Firm-years	*β/b*		Months Prior	Firm-years	*β/b*	
0	8,522	0.4728		12	5,691	0.6681		24	3,010	0.9507	NS
1	17,567	0.5084		13	10,710	0.6871		25	5,901	0.9674	NS
2	17,746	0.4986		14	10,912	0.7337		26	6,077	0.9682	NS
3	17,688	0.5739		15	10,706	0.7421		27	5,993	0.9786	NS
4	17,582	0.6328		16	10,395	0.8069		28	5,842	1.0100	NS
5	17,437	0.7040		17	10,026	0.8506		29	5,706	1.0230	NS
6	17,289	0.7165		18	9,631	0.9414	NS	30	5,502	1.0464	NS
7	17,220	0.7617		19	9,140	0.9273	NS	31	5,247	1.0736	NS
8	17,039	0.8377		20	8,606	0.9721	NS	32	4,941	1.0892	NS
9	16,825	0.9025		21	7,878	1.0209	NS	33	4,596	1.1288	
10	16,383	0.9530	NS	22	6,849	1.0100	NS	34	4,045	1.2025	
11	15,615	0.9823	NS	23	5,687	1.0570	NS	35	3,426	1.1849	

Table 9: Market returns, by magnitude of change in EPS

$$Return_{T,M} = \alpha + \beta\,(EPS_{T-1} - EPS_T) + \varepsilon_T$$

$$Return_{T,M} = \alpha + b\,(Forecasted\ EPS_{T,M} - EPS_T) + e_T$$

Panel A: The 33% of Forecasts with the Least Extreme Forecasted Change in EPS

FY1				FY2				FY3			
Months Prior	Firm-Years	*β/b*		Months Prior	Firm-years	*β/b*		Months Prior	Firm-years	*β/b*	
0	9,023	0.9388	NS	12	7,763	0.6330		24	5,840	0.7597	
1	18,254	0.9280	NS	13	14,935	0.7053		25	11,227	0.7974	
2	18,188	0.9300	NS	14	15,145	0.7316		26	11,462	0.8336	
3	18,083	0.9620	NS	15	15,057	0.7808		27	11,466	0.8514	
4	18,018	0.9882	NS	16	14,865	0.8222		28	11,356	0.8433	
5	17,921	0.9764	NS	17	14,697	0.8603		29	11,264	0.8631	
6	17,807	0.9807	NS	18	14,479	0.8661		30	11,101	0.9067	
7	17,710	0.9866	NS	19	14,147	0.9241		31	10,891	0.9716	NS
8	17,566	0.9767	NS	20	13,783	0.9412		32	10,696	0.9870	NS
9	17,398	0.9794	NS	21	13,218	0.9643	NS	33	10,337	1.0165	NS
10	17,143	0.9772	NS	22	12,365	0.9747	NS	34	9,777	1.0334	NS
11	16,646	0.9791	NS	23	11,269	0.9930	NS	35	9,034	1.0473	NS

Panel B: The 33% of Forecasts with the Most Extreme Forecasted Change in EPS

FY1			FY2			FY3			
Months Prior	Firm-Years	*β/b*	Months Prior	Firm-years	*β/b*	Months Prior	Firm-years	*β/b*	
0	8,795	0.2981	12	7,575	0.5937	24	5,566	0.8875	
1	17,647	0.3710	13	14,701	0.6814	25	10,831	0.8781	
2	17,619	0.3270	14	14,892	0.7739	26	10,975	0.8875	
3	17,498	0.3560	15	14,823	0.7831	27	10,950	0.9032	
4	17,319	0.5213	16	14,617	0.7384	28	10,811	0.9513	NS
5	17,210	0.6093	17	14,426	0.8124	29	10,741	0.9741	NS
6	17,103	0.6808	18	14,171	0.9003	30	10,587	0.9953	NS
7	16,903	0.7110	19	13,800	0.9175	31	10,376	1.0477	
8	16,709	0.7550	20	13,433	1.0186	32	10,130	1.0967	
9	16,438	0.7822	21	12,856	1.0476	33	9,823	1.0626	
10	16,084	0.8471	22	11,983	1.0304	34	9,269	1.1096	
11	15,650	0.8717	23	10,852	1.0735	35	8,493	1.1257	

Table 10: Panel multivariate regression

$$Analysts'Superiority_{T,M} = \gamma_0 + \gamma_1 \#Analysts_T + \gamma_2 STD_{T,M} + \gamma_3 BTM_{T-1} + \gamma_4 Sales_{T-1} + \gamma_5 Forecast\Delta_{T,M} + \varepsilon_T$$

Months Prior RDQE	Intercept	#Analysts	STD	BTM	Sales	Forecasted Δ
0	-0.0083	-0.0021	0.0055	0.0035	0.0015 NS	0.0279
1	-0.0072	-0.0022	0.0052	0.0028	0.0017	0.0262
2	-0.0079	-0.0013	0.0043	0.0030	0.0017	0.0253
3	-0.0079	-0.0013	0.0047	0.0029	0.0012	0.0238
4	-0.0071	-0.0005	0.0039	0.0024	0.0005 NS	0.0206
5	-0.0055	0.0003 NS	0.0027	0.0025	-0.0002 NS	0.0175
6	-0.0054	0.0006	0.0025	0.0022	0.0001 NS	0.0148
7	-0.0050	0.0011	0.0015	0.0019	0.0004 NS	0.0115
8	-0.0047	0.0015	0.0009	0.0017	0.0007	0.0092
9	-0.0041	0.0016	0.0004	0.0015	0.0010	0.0069
10	-0.0026	0.0015	-0.0003	0.0010	0.0012	0.0043
11	-0.0017	0.0018	-0.0011	0.0008	0.0012	0.0025
12	0.0076	-0.0002 NS	0.0050	0.0045	0.0058	-0.0064
13	0.0070	0.0003 NS	0.0031	0.0041	0.0055	-0.0057
14	0.0056	0.0008	0.0031	0.0042	0.0053	-0.0057
15	0.0046	0.0011	0.0020	0.0042	0.0049	-0.0050
16	0.0028	0.0017	0.0010	0.0037	0.0052	-0.0048
17	0.0012	0.0022	0.0000 NS	0.0036	0.0054	-0.0043
18	0.0005 NS	0.0028	-0.0007	0.0036	0.0048	-0.0043
19	-0.0015	0.0031	-0.0014	0.0033	0.0049	-0.0037
20	-0.0023	0.0037	-0.0019	0.0030	0.0048	-0.0035
21	-0.0029	0.0038	-0.0023	0.0026	0.0054	-0.0036
22	-0.0036	0.0038	-0.0028	0.0024	0.0057	-0.0035
23	-0.0079	0.0057	-0.0027	0.0019	0.0062	-0.0035
24	0.0048	0.0009	-0.0005 NS	0.0051	0.0094	-0.0074
25	0.0026	0.0023	-0.0016	0.0059	0.0090	-0.0074
26	0.0026	0.0025	-0.0023	0.0056	0.0093	-0.0078
27	0.0019	0.0029	-0.0026	0.0053	0.0094	-0.0083
28	0.0007 NS	0.0035	-0.0028	0.0052	0.0096	-0.0089
29	-0.0007 NS	0.0039	-0.0028	0.0047	0.0096	-0.0090
30	-0.0020	0.0042	-0.0033	0.0046	0.0106	-0.0093
31	-0.0027	0.0046	-0.0035	0.0042	0.0104	-0.0097
32	-0.0036	0.0049	-0.0038	0.0038	0.0108	-0.0099
33	-0.0040	0.0051	-0.0040	0.0035	0.0111	-0.0103
34	-0.0060	0.0054	-0.0044	0.0030	0.0133	-0.0108
35	-0.0062	0.0058	-0.0048	0.0019	0.0127	-0.0108

Conclusion

- DISCLAIMER: Prior research was appropriately deliberate in its sample selection and other research design choices, and the conclusions drawn are warranted.
  - However, as is common in our field, it is the subsequent researcher who over-generalizes findings from prior studies.

- **Analysts** only appear persistently superior to a simple earnings extrapolation for **short horizons for large firms**.
- Equivalently, **time-series** forecasts perform as well or better than analysts over **moderate-to-long forecast horizons, and especially for smaller, younger firms**.

Table 1

TYPICAL STUDY:

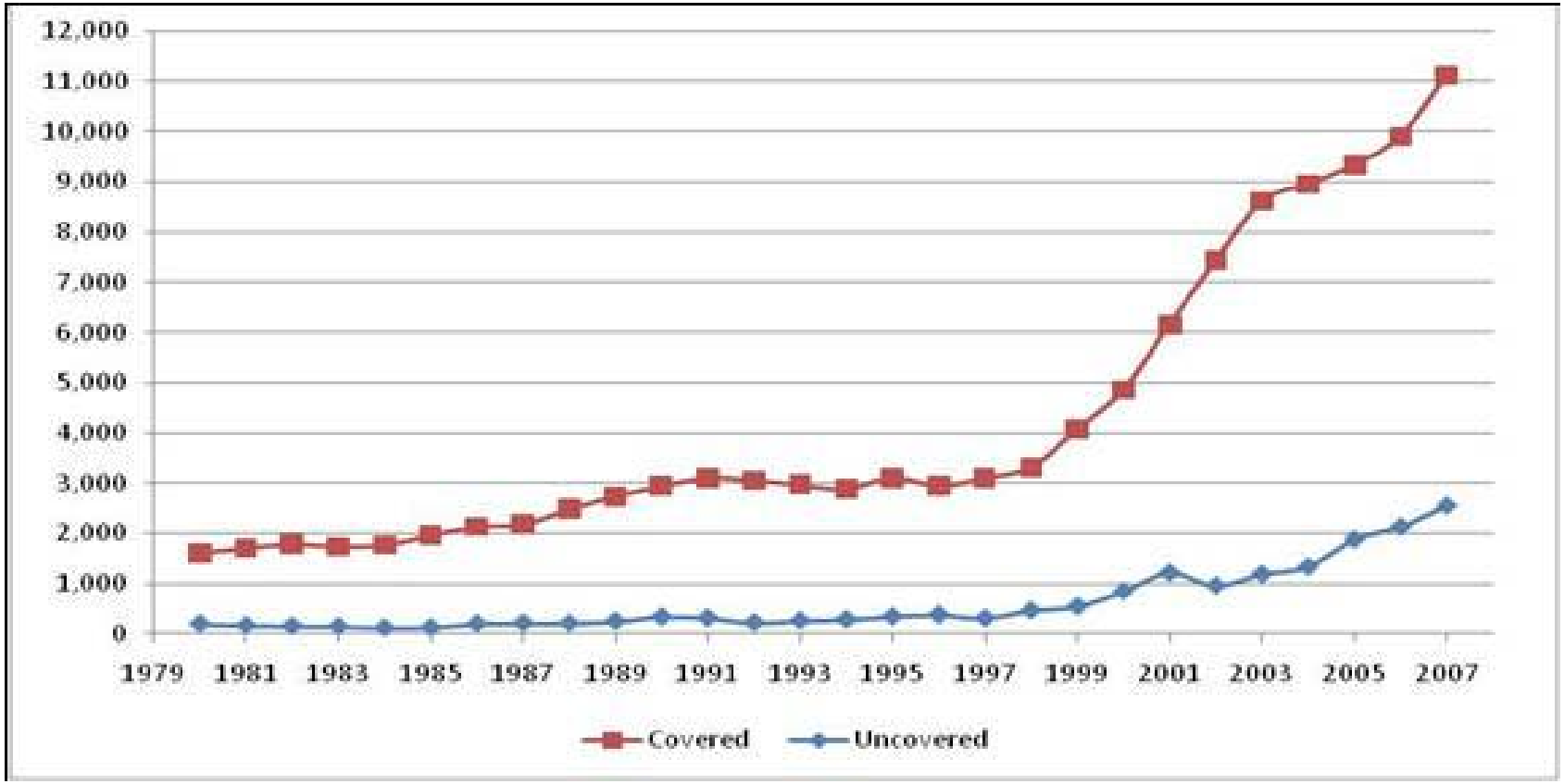
1. Data from 1960 and 1970.
2. Sample size ranges from fifty to a few hundred.
3. Models require a minimum of 10 years of data, and some require as many as 20 years of data.
4. Forecast horizons range from 1 quarter-ahead to 18 months-ahead.
5. Reported differences are typically statistically significant in favor of analysts, only modest magnitudes .

Paper	Sample and Time Period	Time-Series (TS) Models and Data Requirements	Outliers	Forecast Horizon	Difference in Forecast Accuracy	Analysts' Superiority Determinants
Brown and Rozeff (1978)	50 firms from 1972 through 1975.	Three TS models using quarterly data, requiring complete data for 20 years.	Winsorized forecast errors at 1.0	One to five quarters ahead.	Median difference in forecast errors between all univariate forecasts and the analysts' forecast is significantly greater than zero.	
Collins and Hopwood (1980)	50 firms from 1951 through 1974.	Four TS models, requiring a minimum of 76 quarters of data.	Winsorized forecast errors at 3.0	One to four quarters ahead.	Four quarters out, analysts' forecast errors are 31.7% compared to the best TS error of 32.9%. One quarter out, mean analysts' forecast error are 9.7% compared to the best TS error of 10.9%.	
Fried and Givoly (1982)	424 firms from 1969 through 1979.	Modified submartingale models, requiring a minimum of 10 years of past data.	Winsorized forecast errors at 1.0	8 months prior to the fiscal end.	Analysts' forecast errors are 16.4% of realized EPS compared to 19.3% for the best TS model.	
Hopwood and McKeown (1982)	258 firms from 1974 through 1978.	Random walk and 7 other TS models, requiring at least 12 years (48 quarters) of data.		One to four quarters ahead.	Four quarters out (annual), absolute analysts' forecasts errors are 22.5% compared to absolute forecast errors of 26.1% for random walk.	Number of days separating TS and analysts' forecast – positive
Brown, Hagerman, Griffin, and Zmijewski (1987)	233 firms from the 1975 through 1980.	3 TS models, requiring a minimum of 60 quarters of data.	Winsorized forecast errors at 1.0	One, two, and three quarters ahead.	Three-quarters-ahead, analysts' forecast errors are 28.7% and TS forecast errors are 33%.	Forecast horizon – negative
Brown, Richardson, and Schwager (1987)	Sample 1: 168 firms from Q1-1977 through Q4-1979.	Quarterly random-walk model.		One, two, and three quarters ahead.	For the one month horizon, the log of the squared ratio of TS to analysts' forecast errors is 0.56.	Firm size – positive; Prior analysts' forecast dispersion – negative

Table 1 (cont.)

Brown, Richardson, and Schwager (1987)	Sample 2: 168 firms from 1977 through 1979.	Annual random-walk model.		Horizons of 1, 6, and 18 months prior to the fiscal year-end date.	For the one month horizon, the log of the squared ratio of TS to analysts' forecast errors is 1.08.	Firm size – positive; Prior analysts' forecast dispersion – negative
Brown, Richardson, and Schwager (1987)	Sample 3: 702 firms from 1977 through 1982.	Annual random-walk model.		Horizons of 1, 6, and 18 months prior to the fiscal year-end date.	Log of the squared ratio of TS to analysts' forecast errors is 1.01 for the one month horizon.	Firm size – positive; Prior analysts' forecast dispersion – negative
O'Brien (1988)	184 firms from 1975 through 1982.	Two TS models, requiring 30 consecutive quarters of data.	Deleted absolute forecast errors larger than $10	Horizons of 5, 60, 120, 180, and 240 trading days prior to the earnings announcement date.	At 240 trading days (one year), analysts' forecast errors are $0.74 compared to TS forecast errors of $0.96.	Forecast horizon – positive
Kross, Ro, and Schroeder (1990)	279 firms from 1980 through 1981.	Box-Jenkins model, requiring 28 quarters of data.		Last available one-quarter-ahead forecast.	Natural log of 1 + absolute TS error - absolute analysts' error is positive across all industries (ranging from (0.043 to 0.385)).	Earnings variability – positive; *Wall Street Journal* coverage – positive; # of days separating TS and analysts' forecasts – positive
Lys and Soo (1995)	62 firms from 1980 through 1986.	Box-Jenkins model, requiring 20 years of data.	Removed one firm	Up to 8 quarters ahead.	Across all horizons, the mean (median) absolute analysts' forecast error is 4.4% (2.8%) and the mean (median) absolute TS error is 26.8% (1.4%).	Forecast horizon – negative
Branson, Lorek, and Pagach (1995)	223 firms from 1988 through 1989.	ARIMA model, requiring 11 years of complete data.		One quarter ahead.	The median absolute percentage forecast error (Actual - predicted)/actual)) from TS minus analysts' forecasts is 7.22%.	Conditional on the firm being small: earnings variability – positive; firm size – negative

Figure 3: Mean assets for firms with (in maroon) and without (in blue) earnings forecasts on I/B/E/S



I have no idea what you're talking about...

...so here's a bunny with a pancake on its head.