Loss Firms and Analysts' Earnings Forecast Errors

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Negative earnings are not unfamiliar to financial statement users. Over the past two decades, about 23% of all companies reporting earnings were in the red. The treatment of negative earnings in financial statement analysis is problematic, especially for the computation and interpretation of a widely cited financial indicator, the price-to-earnings (P/E) ratio.

Because stock prices are always positive even if earnings are negative, it is inappropriate to view price as a multiple of negative earnings. In practice, a negative P/E is regarded as meaningless and hence is often not provided.

For example, a negative P/E appears as "dd" in the *Wall Street Journal*. A similar approach taken by most academic researchers is to ignore negative earnings and compute P/E ratios only for firms with positive earnings.

All the same, a negative P/E ratio could be a piece of valuable information. It could indicate, for example, that investors expect future losses will be stopped by liquidating the firm (Berger, Ofek, and Swary [1994] and Hayn [1995]). The stock price thus reflects a loss firm's liquidation value, or the market value of its net assets. Another more likely possibility is that investors consider losses to be temporary (Ali, Klein, and Rosenfeld [1992]). Consequently, the positive stock price reflects the market's expectation of future positive earnings.

We study the latter proposition by looking into financial analysts' earnings expectations for loss firms. Our research scope is twofold. First, we provide descriptive data on a popular source of analysts' earnings forecasts used in accounting and finance research: the Institutional Brokers Estimate System (IBES). We compare IBES firms with an extensive financial data base, Compustat, and find that IBES analysts tend to shy away from loss firms. Furthermore, IBES firms are on average larger and more profitable. We find that:

1. About 12% of firms in IBES are loss firms, while the ratio is about 23% in Compustat.
2. The average firm size is $191 million for IBES firms, and only $53 million for Compustat firms.
3. On average, return on equity is 14% in IBES, compared with 10% in Compustat.

The industry coverage and characterization differences between IBES and Compustat also support the findings reported above: IBES firms are larger and more profitable. We find that although IBES covers the major industries on Compustat, the IBES firms in each of these major industries have on aver-

age larger market value and higher return on equity.

The loss frequency for IBES firms and Compustat firms is also analyzed. We find that about 55% of IBES firms do not suffer a single loss in all the years they have data available on IBES; this ratio is about 41% for Compustat firms. Similarly, about 16% of Compustat firms suffer losses continuously in all their years on Compustat, while this ratio is only about 8% for IBES firms. We also observe that the more frequently a firm suffers losses, the less likely it is to be followed by IBES analysts. Again, this result supports our findings that IBES analysts follow firms that are more profitable.

Next, we examine IBES analysts' earnings forecast accuracy for loss firms. Using profit firms as the control group, we find that IBES analysts on average provide overwhelmingly optimistic earnings forecasts for loss firms. The average forecast error for loss firms is about ten times the error for profit firms. A number of studies show that analysts' earnings forecasts are on average higher than actual earnings (for example, Francis and Philbrick [1993]). We find that this positive forecast error is halved when loss firms are excluded, indicating that the optimistic bias documented in previous studies could be due to loss firms.

Elgers and Lo [1994] document that earnings forecast error is related to prior earnings or return performance; firms with lower than median earnings changes or returns have larger forecast errors, and vice versa. We show additionally that the average forecast error for loss firms is about ten times higher than that for profit firms, regardless of whether their prior earnings are good or bad. This further supports our finding on analysts' optimistic forecasts for loss firms. It seems that the sign of current earnings for a firm affects analysts' forecast accuracy more than its performance in prior years.

We also find that loss firms are on average much smaller than profit firms, suggesting that the higher forecast error for loss firms could be caused by size and risk characteristics. We study this size issue by further grouping loss firms and profit firms by their relative market value. We find that small firms on average have higher forecast errors than large firms. The sign of current earnings dominates the magnitude of forecast errors, however; large loss firms have significantly higher forecast errors than small profit firms. We conclude that analysts' forecast accuracy does not depend so much on size as on whether the firm reports a profit or loss in the current period.

DATA DESCRIPTION AND SAMPLE SELECTION

Data Source

IBES is not the only source of analyst forecasts. Another popular one is the Value Line Investment Survey. Still others are the Standard & Poor's Earnings Forecaster and Zacks Investment Research. Philbrick and Ricks [1991] provide a good description and comparison of these data bases, and we discuss some of their research findings below.

The IBES data base is developed by Lynch, Jones, and Ryan, and provides earnings forecasts and consensus earnings expectations derived from the forecasts. From 1971, more than 2,500 analysts have provided annual and quarterly earnings and long-term growth forecasts for over 3,400 publicly traded stocks. The summary data include the high, low, mean, and median forecasts; the standard deviation of forecasts; the number of analysts following the firm; the number of analysts revising up and the number revising down; and actual earnings per share. One major limitation of the IBES data is the reporting lag from data collection to publication. Another limitation is the unreliability of the IBES reported actual quarterly earnings data.[1]

The Value Line Investment Survey is published every Friday by Arnold Bernhard and Co. It provides quarterly earnings forecast data for stocks that are deemed to be of substantial institutional interest. Value Line covers about 91 industries and 1,700 stocks. Approximately 130 stocks in seven or eight industries are examined in each week. Thus all 1,700 stocks are analyzed once every 13 weeks, and their Value Line earnings predictions are updated four times a year. Typically, one or two Value Line analysts follow a given firm. These analysts provide various historical and projected measures such as the earnings predictability index, the timeliness and safety rankings, and the growth persistence index. A limitation of Value Line's forecast is its relative infrequency of revision.

The Standard & Poor's Earnings Forecaster was available from 1967 to 1987. During that time, S&P published a weekly listing of actual annual earnings per share for the prior year and forecasts of annual EPS for the current year and the following year. The forecasts were made by S&P analysts and about 65 other analysts and brokerage houses. About 1,600 firms were covered in 1986-1987.

Zacks Investment Research has been published since 1978. It summarizes and analyzes, on a biweekly basis, annual earnings estimates of over 4,000 public companies, using forecasts made by more than 2,500 security analysts at 185 brokerage houses. Zacks provides consensus estimates of annual earnings for the current and next fiscal years and consensus estimates of quarterly earnings of the current year. Zacks also reports changes in individual analysts' annual earnings forecasts along with the date the revisions are made and the name of the analyst. This additional feature permits some earnings forecast research on an individual analyst basis (see Butler and Lang [1991]). Zacks, however, is the most costly data base and thus has not been used as frequently in accounting research as IBES or Value Line [2]

Data and Sample Selection

Our sample period covers the eighteen years from 1976 through 1993. Included in our Compustat sample are firms whose annual earnings (before extraordinary items) are available on the *1993 Compustat Annual Primary, Secondary, and Tertiary File, Full Coverage File*, or *Research File*. For each year in the study period, all sample firms are classified into one of two groups: profit firms and loss firms. Profit firms are the firms that reported positive annual earnings (before extraordinary items), and loss firms are those reporting zero or negative earnings for the year.

Throughout this article, "earnings" is defined as income before extraordinary items and discontinued operations. Return on equity is calculated as income before extraordinary items available for common shares divided by beginning-of-year book value of common equity. Forecast error is the difference between the average analysts' earnings forecast and actual earnings, standardized by beginning-of-year stock price. Stock price data come from the Center for Research on Security Prices (CRSP) daily returns file.

All firms that have data available are included in the first part of our study. Non-December fiscal year-end firms are excluded in the second part of the study, the analysis of analysts' forecast errors for loss firms [3]

SOME INITIAL CHARACTERIZATION OF IBES FIRMS

Exhibits 1 through 3 describe characteristics of firms covered on IBES, the source of analysts' forecasts for the latter part of this study, and Compustat, which is a more comprehensive data base. The inferences on forecast errors we make are specific to the IBES data base, but the inferences we draw also assume that Compustat represents the population of firms that IBES analysts could cover. All observations on these two data bases from 1976 to 1993 are used for our comparisons, and results are provided for each year, as well as for the entire period.

Exhibit 1 provides data for each data base on the number of firms covered in each year, the percentage of firms reporting losses, the median firm size, and the median return on equity. Both yearly medians and pooled medians are shown in Exhibit 1. We also compute and report the averages of the yearly median values for size and ROE. These averages are quite similar to their corresponding pooled medians, so only the averages of yearly medians are discussed here.

Exhibit 1 shows that the number of firms covered on Compustat declined from 5,241 firms in 1976 to a low of 4,705 firms in 1983, and recovered since then to 5,259 firms in 1992. The number of firms covered on IBES has increased steadily from 786 firms in 1976 to 2,207 firms in 1993. The average number of firms for the entire period on IBES is 1,685, about one-third of the average number of firms on Compustat, which is 4,982.

Over our sample period, there appears to have been a steady increase in the percentage of firms reporting losses on both IBES and Compustat.[4] The percentage of firms reporting losses is lower for IBES than for Compustat in every year, as well as in the pooled sample, however, suggesting that IBES analysts tend to avoid loss firms. Over the entire sample period, 23.36% of Compustat firms and 13.07% of IBES firms are loss observations.

EXHIBIT 1

DIFFERENCES IN NUMBER OF FIRMS, FIRM SIZE,[a] AND FIRM PROFITABILITY[b] BETWEEN COMPUSTAT AND IBES — 1976-1993

	Number of Firms						Median Firm Size		Median Return on Equity	
	Compustat			IBES						
Year	All Firms	Loss Firms[c]	% of Loss Firms	All Firms	Loss Firms	% of Loss Firms	Compustat	IBES	Compustat	IBES
1976	5,241	719	13 72	786	14	1 78	$27.11	$244 83	12.28	15.13
1977	5,223	669	12 81	932	17	1.82	32 29	201.54	12 75	15.67
1978	5,095	578	11.34	1,305	23	1 76	33 37	124 05	14 02	16 34
1979	4,956	619	12.49	1,338	39	2 91	35 04	139.43	14.50	17 11
1980	4,860	698	14.36	1,324	55	4 15	42.14	175 38	13.51	15 96
1981	4,720	777	16 46	1,419	74	5 21	35.39	169 29	12 56	15 43
1982	4,753	1,082	22 76	1,513	161	10 64	38 87	170 42	9 84	12.84
1983	4,705	1,062	22 57	1,653	187	11.31	53 76	189.95	10 59	13.51
1984	4,846	1,079	22 27	1,809	190	10.50	47 67	164.02	11 12	14 25
1985	4,885	1,361	27.86	1,823	291	15.96	57 03	193.90	9.02	12 63
1986	4,831	1,433	29.66	1,836	337	18 36	60.39	216.23	8.47	12 05
1987	5,063	1,504	29.71	1,951	312	15 99	49.50	176 86	8 18	12 29
1988	5,168	1,511	29 24	1,987	282	14 19	53.10	182 93	9.28	14 00
1989	5,124	1,598	31 19	2,028	313	15 43	57.87	195 51	8.22	13 24
1990	5,073	1,636	32 25	2,077	356	17.14	50 14	162.13	7 25	11 68
1991	5,102	1,666	32.65	2,107	419	19.89	72 34	224.52	6 46	10.70
1992	5,259	1,591	30.25	2,242	442	19.71	83 51	242 14	7.64	11 05
1993	4,769	1,368	28.69	2,207	454	20 57	120.69	268 68	8.67	11 35
Pooled Mean[d]	89,673 4,982	20,951 1,164	23 36 23 35	30,337 1,685	3,966 220	13 07 11 52	$49.78 52 79	$187 77 191 21	10.65 10 24	13 34 13 62

[a]Firm size measured by the market value of outstanding shares at fiscal year-end (in millions).

[b]Firm profitability measured by accounting rate of return (ROE), income before extraordinary items available for common, divided by beginning-of-year book value of common equity.

[c]Loss firms are firms that reported zero or negative earnings. Earnings are income before extraordinary items.

[d]Mean values are the average percentage of loss firms and the averages of the yearly median values for firm size and ROE over sample years.

Exhibit 1 also shows that IBES firms are larger and more profitable. The average firm size for Compustat is $52 79 million, about one-quarter the average firm size for IBES, $191.21 million. Again, the median firm size for Compustat is lower in every year, although the difference has shrunk over the years. The average return on equity for Compustat firms is 10.24%, while it is 13.62% for IBES firms. The difference in return on equity may not be as significant as the difference in firm size between Compustat firms and IBES firms, but, the median return on equity for Compustat firms is smaller in every year.

Overall, Exhibit 1 shows that IBES analysts seem to hesitate to follow firms that report losses. The analysts tend to cover larger and more profitable firms.

Is industry coverage between Compustat and IBES different because some industries are on average more profitable than the others? We examine industries at the two-digit SIC code level in Exhibit 2. We first identify the top ten industries covered by Compustat and compare their ranks in IBES. We find a considerable resemblance in the two rankings; nine of the top ten industries in Compustat are also ranked top ten in IBES. Real estate (SIC code 67) is the only top ten industry in Compustat that is not covered as extensively by IBES.

Although similar industries are covered by both Compustat and IBES, the profile of firms in each industry across data bases is quite different. We measure industry profitability by the percentage of less profitable firms, firms that experienced losses in more than half of their total years, in each data base. Exhibit 2 shows that IBES covers fewer companies that are less profitable than Compustat in every major industry except chemicals (SIC code 28).

Exhibit 2 also shows that the median firm size in each of the top ten industries in Compustat is smaller than that in IBES. For example, machinery and computers (SIC code 35) is the most covered industry for both Compustat and IBES. The median firm size for the firms in this industry covered by Compustat is $35.41 million, which is significantly smaller than the median for the firms covered by IBES, $81.70 million.

Exhibit 2 also shows that the median return on equity is higher for IBES firms in each industry

EXHIBIT 2

DIFFERENCES IN INDUSTRY DISTRIBUTION AND CHARACTERIZATION BETWEEN COMPUSTAT AND IBES: TOP TEN INDUSTRIES IN COMPUSTAT AND THEIR CORRESPONDING RANKINGS IN IBES

Compustat							IBES					
		Number of Firms			Median			Number of Firms			Median	
Ranking	SIC Code[a]	All Firms	%[b]	% of Less Profitable Firms[c]	Firm Size[d]	ROE[e]	IBES Ranking	All Firms	%[b]	% of Less Profitable Firms[c]	Firm Size[d]	ROE[e]
1	35	748	7.45	32.89	$35.41	2.15	1	317	7.97	18.61	$81.70	6.81
2	36	687	6.84	33.48	25.49	4.84	2	272	6.84	19.85	66.73	7.22
3	73	630	6.28	36.67	28.63	3.81	5	250	6.29	20.80	90.35	11.07
4	38	622	6.20	37.46	25.83	3.46	3	271	6.81	21.77	51.03	6.84
5	13	569	5.67	55.18	13.38	−5.86	8	117	2.94	41.88	99.71	3.28
6	28	534	5.32	46.25	93.99	1.59	4	251	6.31	45.02	169.64	2.62
7	67	398	3.96	36.43	20.54	3.56	13	87	2.19	14.94	96.06	9.41
8	49	365	3.64	10.96	278.38	10.97	6	205	5.15	4.88	549.74	11.27
9	60	341	3.40	9.38	349.60	12.39	7	191	4.80	5.24	471.53	13.63
10	50	317	3.16	34.38	14.86	3.40	9	101	2.54	17.82	65.18	9.56

[a]SIC codes and industries:
- 35: Machinery and computers
- 36: Electronics and communications equipment
- 73: Services and software
- 38: Instruments
- 13: Petroleum
- 28: Chemicals
- 67: Real estate
- 49: Utilities and water supply
- 60: Banks
- 50: Motor and electronic parts

[b]Number of firms in each industry divided by total number of firms covered by Compustat (or IBES)

[c]Number of firms that have experienced losses in more than half of their total years in Compustat (or IBES) in each industry divided by total number of firms in that industry

[d]Firm size measured by the market value of outstanding shares at fiscal year-end. We first compute the average of firm sizes across sample years for each firm. The medians of average firm size over sample firms in each industry are reported here (in millions).

[e]ROE is income before extraordinary items available for common, divided by beginning-of-year book value of common equity (percentage). Consistent with firm size variable, the median ROE is the median of average ROE over firms.

EXHIBIT 3
A COMPARISON OF LOSS FREQUENCY FOR FIRMS COVERED IN COMPUSTAT AND IBES

	Compustat				IBES			
Loss Frequency[a]	No. of Firms	%[b]	Median Firm Size[c]	Median ROE[d]	No. of Firms	%[b]	Median Firm Size[c]	Median ROE[d]
0	4,120	41.04	$122.86	13.63	2,194	55.17	$203.14	13.97
< 20	1,385	13.80	113.32	7.17	617	15.51	280.36	7.02
< 40	1,291	12.86	25.70	−0.60	441	11.09	56.41	−0.67
< 60	991	9.87	10.65	−14.81	283	7.12	32.17	−9.74
< 80	580	5.78	5.75	−26.24	112	2.82	25.75	−13.36
< 100	107	1.07	8.79	−36.20	11	0.28	32.60	−20.48
100	1,565	15.59	6.54	−60.72	319	8.02	34.78	−28.92

[a]Number of loss years for each firm divided by total number of years this firm exists in Compustat (or IBES).
[b]Number of firms in each loss frequency group divided by total number of loss firms in Compustat (or IBES)
[c]Firm size is the market value of outstanding shares at fiscal year-end (in millions)
[d]ROE is the accounting rate of return (percentage).

group. Using the machinery and computers industry as an example again, the median return on equity for the firms in this industry covered by IBES is 6.81%; it is only 2.15% for Compustat. Exhibit 2 thus further supports our findings from Exhibit 1: IBES firms are systematically larger and more profitable than Compustat firms.

As we describe in our data and sample selection, loss firms are defined as firms that reported negative or zero earnings in any given year in our sample years. Some loss firms, however, suffered more loss years than the others. To examine this loss frequency issue, we group loss firms into seven portfolios, according to the number of loss years divided by the total number of years each firm is covered in either Compustat or IBES. The results are reported in Exhibit 3.

As shown in Exhibit 3, 41.04% of Compustat firms suffered no losses at all in our sample years, while the percentage is a much higher 55.17% for IBES. As its frequency of losses grows, Exhibit 3 shows that a given firm is less likely to be an IBES firm than a Compustat firm. For example, when the loss frequency is less than 20%, about one loss in a five-year period, there are about 13.80% of Compustat firms and 15.51% of IBES firms. When the loss frequency is between 20% and 40%, about one to two losses in a five-year period, there are about 12.86% Compustat firms and a lower 11.09% IBES firms. The IBES percentage drops appreciably for high loss frequencies. About 15.59% of Compustat firms suffered losses in all the years they exist in Compustat; this percentage is halved for IBES, 8.02%.[5]

The results reported in Exhibit 3 reinforce the inference that IBES analysts tend to follow firms that are more profitable. Loss firms covered by IBES are in fact less likely to suffer frequent losses. Additionally, Exhibit 3 also shows that for each loss frequency portfolio, IBES firms are larger in size and more profitable than their corresponding Compustat firms, a finding that we have reported in both Exhibits 1 and 2.

EARNINGS FORECAST ACCURACY FOR LOSS FIRMS AND PROFIT FIRMS

Exhibits 4 through 6 provide data on analysts' earnings forecast errors. Exhibit 4 reports IBES analysts' earnings forecast errors and mean squared forecast errors for all firms, for profit firms, and for loss firms for each year in our sample period, as well as for the whole sample period. We also report the average number of analysts following each of the three groups of firms. Because the pooled average figures and the yearly average figures are rather similar, only the pooled average results are discussed here.

The first column of Exhibit 4 reports the number of December fiscal year-end firms with earnings

forecast and forecast error data available from IBES. The number of firms meeting these additional restrictions is lower than that in Exhibit 1. The pooled average percentage of loss firms is 12.85%, similar to the corresponding 13.07% reported in Exhibit 1, however. The percentage of firms reporting losses in any year for this sample appears to track the percentage of firms reporting losses on the entire IBES data base fairly closely, but it is significantly lower than the percentage of firms reporting losses on Compustat. Thus, our sample is quite representative of IBES, but not of the total population on Compustat.

The average number of analysts following all firms in this sample, as shown in Exhibit 4, grows steadily from 6.02 in 1976 to a high of 11.03 in 1986, followed by a decline to an average of 9.69 in 1991, after which there is a small increase. The number of analysts following profit firms is always slightly higher than the average for the whole sample, while the number of analysts following loss firms is always much lower than that for profit firms. For the pooled sample, on average, there are 6.83 analysts following loss firms and 9.72 analysts following profit firms.

Exhibit 4 shows that the pooled average forecast error is a positive 1.99% for all firms. Analysts on average tend to overestimate actual earnings, a result consistent with the findings in several other previous studies (for example, Francis and Philbrick [1993]). The average forecast error in each year ranges between a low of 1.05% in 1978 and a high of 3.16% in 1993, and there is a larger average forecast error in the later years of the sample period.

The pooled average forecast error for profit firms is 0.92%, half that for the pooled sample. The

EXHIBIT 4
IBES ANALYSTS' EARNINGS FORECASTS: ALL FIRMS, PROFIT FIRMS, AND LOSS FIRMS — 1976-1993

	Number of Firms				Average No. of Analysts			Average Forecast Error[a]			Average Mean Squared Error[b]		
Year	All Firms	Profit Firms	Loss Firms	% of Loss Firms	All Firms	Profit Firms	Loss Firms	All Firms	Profit Firms	Loss Firms	All Firms	Profit Firms	Loss Firms
1976	520	514	6	1.15	6.02	6.08	1.00	1.62	1.39	21.51	0.81	0.73	7.58
1977	611	606	5	0.82	6.75	6.76	5.20	1.57	1.42	20.22	0.66	0.62	5.80
1978	828	814	14	1.69	6.96	7.03	2.64	1.05	0.87	11.33	0.62	0.57	3.73
1979	830	813	17	2.05	7.10	7.17	3.76	1.23	0.94	15.00	0.70	0.62	4.37
1980	833	804	29	3.48	7.97	8.11	4.10	1.42	1.14	9.10	0.80	0.66	4.82
1981	871	828	43	4.94	8.67	8.84	5.40	1.62	1.31	7.70	0.58	0.54	1.39
1982	905	803	102	11.27	8.85	9.26	5.63	1.79	1.21	6.42	0.91	0.67	2.83
1983	965	872	93	9.64	9.22	9.47	6.88	1.58	1.09	6.21	0.70	0.55	2.10
1984	988	903	85	8.60	9.45	9.75	6.20	1.46	0.71	9.50	0.56	0.41	2.16
1985	1,044	895	149	14.27	10.71	11.10	8.36	2.68	1.00	12.77	1.06	0.49	4.48
1986	1,035	863	172	16.62	11.03	11.60	8.16	2.53	0.87	10.87	0.70	0.23	3.05
1987	1,038	897	141	13.58	10.45	11.07	6.49	2.00	0.71	10.23	0.66	0.25	3.28
1988	1,057	936	121	11.45	10.88	11.40	6.87	1.87	0.91	9.29	0.54	0.27	2.62
1989	1,126	980	146	12.97	10.61	11.33	5.77	1.72	0.58	9.43	0.61	0.33	2.49
1990	1,171	991	180	15.37	9.96	10.56	6.61	2.38	0.63	11.95	0.80	0.21	4.01
1991	1,176	956	220	18.71	9.69	10.21	7.45	2.54	0.59	10.98	1.26	0.48	4.66
1992	1,186	965	221	18.63	10.01	10.58	7.49	2.30	0.63	9.59	0.71	0.29	2.54
1993	1,253	1,012	241	19.23	10.05	10.84	6.70	3.16	1.06	12.01	0.98	0.25	4.04
Pooled	17,437	15,452	1,985	12.85	9.39	9.72	6.83	1.99	0.92	10.37	0.77	0.44	3.37
Mean[c]	969	858	110	10.25	9.13	9.51	5.82	1.92	0.95	11.34	0.76	0.45	3.66

[a]Forecast error is the difference between average analysts' earnings forecast and actual earnings, divided by beginning-of-year stock price.
[b]Mean squared error is forecast error squared.
[c]Mean values are the average percentage of loss firms and the averages of the yearly average values for forecast error and mean squared error over sample years.

yearly average forecast error for profit firms also shows a different pattern from that of the pooled sample; the average forecast error for profit firms actually decreases in later years, suggesting that analysts have reduced their optimistic bias in forecasting the earnings of profit firms.

Exhibit 4 shows that the average forecast error for loss firms is a significant 10.37% for the pooled sample, which is ten times that for profit firms. The forecast error for loss firms is always higher than that for profit firms in every year of our sample period. And, there does not appear to be as distinct a pattern over time in the ability of analysts to forecast the earnings of loss firms.

This overwhelming overprediction bias for loss firms may contribute to the higher forecast error for all firms in later years. As shown in Exhibit 1 and the first columns of Exhibit 4, we observe more loss firms in the later years. As more firms experienced losses in recent years, and as analysts have a tendency to overpredict earnings for these firms, the forecast error for the pooled sample is higher for the later years. If we exclude loss firms, and focus only on profit firms, analysts' ability to predict earnings has in fact improved over time.

While average forecast errors capture the average optimism or pessimism of analysts' forecasts, they do not measure the average accuracy of the forecasts. Exhibit 4 thus reports average mean squared forecast errors to examine the degree of variability around the actual earnings number. The analysis of the average mean squared errors does not change our inferences drawn from the average forecast errors analysis. Our conclusions remain the same: that analysts have become more accurate over time at forecasting earnings for profit firms, and that they have always been more accurate at forecasting the earnings for profit firms than for loss firms.

Exhibit 5A replicates Elgers and Lo [1994]. Earnings changes in the year prior to analysts' forecasts are used to group firms into "good firms," defined as firms that have higher-than-median earnings changes, and "poor firms," defined as firms that have lower-than-median earnings changes. Exhibit 5B extends Elgers and Lo's study, dividing good firms and poor firms further, according to whether they are profit firms or loss firms. Exhibits 5C and 5D examine a possible confounding variable, firm size.

EXHIBIT 5A
IBES EARNINGS FORECAST ERROR AND PAST EARNINGS PERFORMANCE[a]

	Prior-Year Performance		t-Test	
	Poor Firms[b]	Good Firms[c]	Percentage Point Difference	Significance Level
Number of Firms[d]	484.11	484.61		
Changes in Earnings	−3.85%	5.35%	9.20	0.00
Annual Return[e]	15.82%	28.18%	12.36	0.03
ROE[f]	8.73%	15.38%	6.65	0.00
Firm Size[g]	$1,428.60	$1,526.22	$97.62	0.16
Forecast Error[h]	2.29%	1.70%	0.59	0.00
Mean Squared Error[i]	0.85%	0.69%	0.16	0.02

[a]Past earnings performance is changes in earnings change in annual earnings from year t − 1 to year t standardized by the firm's market value at the beginning of fiscal year t − 1. We deleted firms whose fiscal year end is not December. All numbers in Exhibits 5A–D except number of firms, are the pooled averages for each category of sample firms.
[b]Poor firms are firms whose changes in earnings in previous year are below the overall median.
[c]Good firms are firms whose changes in earnings in previous year are above the overall median.
[d]Number of firms is the average of the number of firms across sample years for each category of firms.
[e]Annual return is return for the fiscal year, including dividends.
[f]ROE is accounting rate of return.
[g]Firm size is the market value of outstanding shares at the fiscal year-end (in millions).
[h]Forecast error is the difference between average analysts' earnings forecast and actual earnings, divided by beginning-of-year stock price.
[i]Mean squared error is forecast error squared.
[j]Small firms are those firms whose firm size at year-end is smaller than the pooled median.
[k]Big firms are those firms whose firm size at year-end is larger than the pooled median.

Exhibits 5A and 5B examine whether the poor forecasting for loss firms is driven by the firms' earnings performance in the prior year as documented by Elgers and Lo [1994]. We calculate the change in earnings for the previous year, and following the earlier studies, rank all observations on this earnings change data.

Exhibit 5A provides descriptive statistics for the good firms and poor firms. The differences in these variables and the corresponding statistical tests are also reported. By construction, the two groups of firms have significantly different earnings changes in the prior year. The good firms also have significantly

EXHIBIT 5B
IBES EARNINGS FORECAST ERROR, PAST EARNINGS PERFORMANCE, AND SIGN OF CURRENT EARNINGS

	Poor/Loss Firms	Poor/Profit Firms	Good/Loss Firms	Good/Profit Firms
Number of Firms	74.61	409.50	35.67	448.94
Changes in Earnings	−8.79	−2.95	9.26	5.04
Annual Return	−6.26	19.84	−6.63	30.94
ROE	−25.97	15.05	−22.43	18.39
Firm Size	$553.93	$1,587.91	$639.32	$1,596.29
Forecast Error	10.16	0.85	10.78	0.98
Mean Squared Error	3.36	0.39	3.39	0.48

	Poor/Loss versus Poor/Profit		Good/Loss versus Good/Profit		Poor/Loss versus Good/Loss		Poor/Profit versus Good/Profit	
t-Test	Diff.	Sig.	Diff.	Sig.	Diff.	Sig.	Diff.	Sig.
Changes in Earnings	−5.84	0.00	4.22	0.00	−18.05	0.00	−7.99	0.00
Annual Return	−26.10	0.00	−37.57	0.09	0.37	0.89	−11.10	0.09
ROE	−41.02	0.00	−40.82	0.00	−3.54	0.53	−3.34	0.00
Firm Size	−$1,034	0.00	−$957	0.00	−$85	0.40	−$8	0.92
Forecast Error	9.31	0.00	9.80	0.00	−0.62	0.40	−0.13	0.23
Mean Squared Error	2.97	0.00	2.91	0.00	−0.03	0.94	−0.09	0.12

higher average annual returns and return on equity. The two groups are fairly similar in size.

The average analyst forecast error is significantly higher for poor firms than for good firms, 2.29% versus 1.70%. The difference, 59 basis points, is statistically significant at a 0.00 level. The average mean squared error is again significantly higher for the poor firms than the good firms, suggesting that the precision of analyst forecasts is lower for the poor firms. The results reported in Exhibit 5A are consistent with Elgers and Lo [1994].

Exhibit 5B further classifies poor firms and good firms by the sign of earnings in the current year, profit firms, or loss firms. As shown in Exhibit 5B, poor prior-year performance firms tend to report about twice as many losses (74.61) in the subsequent year as good prior-year performance firms (35.67). Firms reporting losses have negative annual returns, while those reporting profits tend to have large positive returns on average. Loss firms are smaller on average than profit firms, regardless of how they performed in the prior year.

The average forecast error for loss firms is about ten times that for profit firms, regardless of their prior-year performance, suggesting that analysts systematically overpredict earnings for loss firms. The average mean squared error is also about ten times as high for loss firms as for profit firms. Again, this higher mean squared error is unrelated to firms' prior earnings performance; analysts' forecasts are always more accurate for profit firms.

The statistical tests reported in the second panel of Exhibit 5B support our findings above: The sign of current earnings dominates past earning performance in explaining analysts' predictive ability. When we control for prior earnings performance (poor/loss versus poor/profit or good/loss versus good/profit), the difference in analysts' forecast errors is large (9–10 percentage points) and statistically significant. When the sign of current earnings is controlled for (poor/loss versus good/loss or poor/profit versus good/profit), the difference in analysts' forecast errors is small (under 1 percentage point) and statistically insignificant.

A particularly interesting result is observed in the second panel of Exhibit 5B. Firm size is significantly different between the loss firms and the profit firms in the poor firms group, as well as in the good firms group. The result shows that loss firms are significantly smaller than profit firms.

EXHIBIT 5C
IBES EARNINGS FORECAST ERROR AND FIRM SIZE

	Firm Size		t-Test	
			Percentage	
	Small Firms[j]	Big Firms[k]	Point Difference	Significance Level
Number of Firms	483.94	484 44		
Changes in Earnings	0 68	0 83	−0 15	0.24
Annual Return	17 20	26.79	−9.59	0.10
ROE	9 05	15.07	−6.02	0 00
Firm Size	$113.49	$2,840 00	−$2,726 51	0 00
Forecast Error	2.40	2 07	0 33	0.00
Mean Squared Error	0 99	0 54	0.45	0.00

EXHIBIT 5D
IBES EARNINGS FORECAST ERROR, FIRM SIZE, AND SIGN OF CURRENT EARNINGS

	Small/ Loss Firms	Small/ Profit Firms	Big/ Loss Firms	Big/ Profit Firms
Number of Firms	82 44	401 50	29 29	456 78
Changes in Earnings	−3 13	1 46	−2 49	1 03
Annual Return	−5.50	22 87	11.61	28.06
ROE	−26.87	16.42	−18 77	17.12
Firm Size	$80.92	$120.17	$2,074 66	$2,886 35
Forecast Error	10 53	0 73	9 75	1 08
Mean Squared Error	3 64	0 44	2 47	0 43

Research has shown that firm size is related to analysts' predictive ability for at least two reasons. One is that more analysts follow larger firms (see also Exhibit 4), and the increased competition could result in greater forecast accuracy (Bhushan [1989]). Larger firms also tend to be stable and in more mature industries, making their earnings easier to predict (Anthony and Ramesh [1992]).

The relationship between forecast error and firm size is examined in Exhibit 5C. Each year, we rank all IBES firms by beginning market value and then partition them into big or small if they are above or below the median firm size for that year. Exhibit 5C indeed shows that smaller firms have significantly higher forecast errors than big firms. The average forecast error for small firms is 2.40, 33 basis points higher than the big firms' 2 07% The 33-basis point difference in forecast error is statistically significant at the 0.00 level. The mean square error for small firms, 0.99%, is also significantly higher than the big firms' 0.54% Therefore, it is possible that the higher forecast error for loss firms is caused by their being the smaller ones

Exhibit 5D does not support the conjecture that firm size drives the higher forecast error for loss firms. If firm size is truly the driving factor, we would observe loss firms that are big to have lower forecast errors than profit firms that are small. As Exhibit 5D shows, however, the average forecast error for the big/loss firms is about thirteen times larger than the forecast error for the small/profit firms (9.75% versus 0.73%). The t-test (not reported in Exhibit 5D) shows this difference is statistically significant at the 0.00 level

Therefore, we conclude that analysts' forecast accuracy does not depend so much on size as on whether the firm reports a profit or loss in the current period Furthermore, our conclusion from Exhibits 5A-D is that while the accuracy of analysts' forecasts is greater if firms performed better in the previous year, this effect is dwarfed by the performance of firms in the current year The accuracy of analysts' earnings forecasts is always bad for loss firms

The analysis presented in Exhibits 5A-D assumes that loss firms and profit firms are homogeneous within each sample, regardless of how much the losses or the profits are. This assumption is relaxed in Exhibit 6, where we examine if analyst forecast bias and accuracy are a function of the magnitude of loss or profit We first partition firms into profit- and loss-firm groups, and then rank observations in each year on the basis of earnings deflated by beginning-of-year price. Each year, we assign each firm to five portfolios in the loss-firms group or five portfolios in the profit-firms group. These portfolios are then combined across years.

The results for these ten earnings portfolios are reported in Exhibit 6. The first portfolio in the loss-firms group (profit-firms group) has the most negative (smallest positive) earnings, and the fifth portfolio has the smallest negative (most positive) earnings.

Note from Exhibit 6 that because there are relatively fewer loss firms, the number of firms in each loss quintile is smaller than the number of firms in each profit quintile Consistent with our ranking procedure, the average earnings deflated by share price

increase systematically across the ten portfolios. Since earnings is also the numerator for ROE, it is not surprising that the average ROE also increases across portfolios. Exhibit 6 also shows that when the current earnings are low, the average earnings changes and average annual returns in the prior year are also low, and vice versa.

As for analysts' earnings forecasts, Exhibit 6 shows that the average number of analysts following each firm increases up to the second portfolio in the profit-firms group, and then decreases slightly. We find a similar pattern for firm size. The positive correlation between firm size and the number of analysts following a firm has been noted previously.

We also find that for loss firms, both average forecast errors and average mean squared errors are monotonically increasing in the magnitude of the reported loss. Exhibit 6 shows that for the most negative earnings portfolio, the average forecast error is 25.60%, and the average mean squared error is 11.98%. The forecast error and the mean squared error drop to 3.71% and 0.39%, respectively, as the magnitude of losses decreases.

These results suggest that the bigger the loss, the less accurate analysts' forecasts are. If indeed the loss is a temporary phenomenon, Exhibit 6 suggests that for the loss firms, the larger the temporary component, the more difficult it is for the analysts to predict earnings.

This temporary earnings argument does seem to apply to profit firms. We find in Exhibit 6 that the third portfolio for profit firms, firms with average earnings, has the lowest positive average forecast error and the lowest average mean squared error. When the temporary earnings component increases (resulting in either the lower than average earnings level, portfolios 1 and 2, or the higher than average earnings level, portfolios 4 and 5), the average and mean squared

EXHIBIT 6
IBES EARNINGS FORECAST ERROR AND EARNINGS LEVEL[a]

Portfolio	No. of Firms[b]	Earnings	Average Earnings Changes[c]	Average Annual Return[d]	Average ROE[e]	Average Firm Size[f]	Average No. of Analysts	Average Forecast Error[g]	Avg. Mean Squared Error[h]
Loss Firms									
1	391	−0.5073	−6.26	−14.32	−57.56	$333.42	5.40	25.60	11.98
2	399	−0.1694	−3.77	−3.68	−25.78	457.33	6.68	10.32	2.28
3	400	−0.0873	−2.17	−2.72	−24.07	508.36	7.04	7.46	1.48
4	400	−0.0452	−1.95	−6.51	−11.35	718.97	7.20	4.97	0.87
5	393	−0.0153	−0.60	−4.69	−5.58	888.24	7.80	3.71	0.39
Profit Firms									
1	3,081	0.0407	0.16	3.31	10.55	1,195.94	9.21	1.69	0.31
2	3,093	0.0776	0.61	12.90	16.59	1,946.31	10.77	1.34	0.45
3	3,092	0.1025	0.92	21.76	16.57	2,006.92	10.34	0.87	0.22
4	3,092	0.1303	1.44	26.19	18.08	1,525.42	10.07	1.03	0.42
5	3,086	0.2001	3.02	63.99	22.16	1,284.47	8.19	−0.34	0.78

[a]Earnings are current earnings level divided by the beginning-of-year price. On the basis of this earnings level variable, we construct five portfolios for loss firms and five portfolios for profit firms.
[b]No. of firms is the average of the number of firms across sample years for each earnings portfolio.
[c]Average earnings changes are the changes in annual earnings from year t − 2 to year t − 1, standardized by the firm's market value at the beginning of year t − 1, averaged over the number of firms in each portfolio.
[d]Annual return is return for the prior fiscal year, including dividends.
[e]ROE is the accounting rate of return.
[f]Firm size is the market value of outstanding shares at the fiscal year-end (in millions).
[g]Forecast error is the difference between average analysts' earnings forecast and actual earnings, divided by beginning-of-year stock price.
[h]Mean squared error is forecast error squared.

error also increase. It should be noted that for portfolio 5, firms with large temporary positive earnings, IBES analysts in fact give pessimistic forecasts. The average forecast error is −0.34%.

The forecast error and magnitude of earnings for profit firms thus show a U-shaped relationship. This U-shaped relationship lends support to our argument that it is temporary components in reported earnings that are more difficult to predict and that cause larger analysts' forecast errors.

SUMMARY AND CONCLUSIONS

We have examined the IBES analysts' forecast accuracy for firms that report losses and for firms that report profits. We first show that IBES analysts do not follow as many loss firms as they could. They instead follow firms that are larger and more profitable than the firms in the whole Compustat population. The IBES firms are also the larger and more profitable ones in each industry they belong to. Furthermore, they are those that are less likely to report consistent losses over time.

We also show that for the loss firms that *are* followed by IBES analysts, the number of analysts is on average smaller than that for profit firms. The analysts' earnings forecasts for these loss firms are on average much too high and much less accurate than those for profit firms. We conclude that these higher forecast errors do not seem to be related to the firms' prior earnings performance or to be driven by the inherent riskiness of the firm, proxied by firm size. Finally, we show that the larger the loss, the higher the forecast error.

One interpretation of our results is that loss firms are followed primarily by sell-side analysts. Sell-side analysts on average overpredict earnings because they are paid by the amount of commissions they generate (Philbrick and Ricks [1991], Siconolfi [1995]). Another interpretation we suggest is that the forecast error is related to the amount of temporary components embodied in the earnings figures. Since temporary earnings are more difficult to predict, the higher the temporary components, the higher the forecast error, a result consistent with Basu [1995].

Most important, we demonstrate that IBES analysts' earnings forecasts on loss firms are quite different from their forecasts on profit firms. This finding suggests analysts need to rethink the methodologies they employ for evaluating firms in general. There is little logic to suggest forecast accuracy is a function of profits or losses. But our findings are consistent with the notion that negative earnings are more temporary in nature than positive earnings, and, thus, perhaps harder for analysts to estimate.

ENDNOTES

The authors thank IBES for providing analysts' forecast data.

[1]Philbrick and Ricks [1991] report that, from 1984 to 1986, IBES did not report a single negative actual EPS, while 8.5% of the Compustat actual earnings are negative. In addition, IBES often reported, for quarter t, the actual EPS for quarter (t − 1). IBES, however, claims to have corrected this data misalignment problem.

[2]IBES allows academic researchers to use its consensus or summary data free of charge.

[3]The non-December fiscal year-end firms are excluded because analysts' forecast errors for them may be affected when other firms in the same industry have already announced their earnings.

[4]Hayn [1995] and Jan and Ou [1994] also report increasing numbers of loss firms on Compustat. There are several potential interpretations of this finding. One is that as the data bases increase the scope of their coverage, they tend to include more risky firms, which are more likely to report losses. A second possibility is that the economic environment has grown more risky over time, increasing the chances of firms incurring losses.

Another possibility is the higher auditor liability in recent years. Basu [1995] shows that changes in conservatism are correlated with the changes in auditor liability regimes documented by Kothari et al. [1989]. We do not infer causation from this evidence. The increased legal liability exposure of auditors may cause auditors to be more conservative and thus report more losses (Kellogg [1984]). Alternatively, it is possible that the courts enforce conservatism in response to greater demand for conservatism by contracting parties when the number of losses increases (Ball [1989]).

[5]Our finding that 15.59% of Compustat firms report losses in all the years they are followed by Compustat calls into question the conjectures made in Berger, Ofek, and Swary [1994] and Hayn [1995]. It seems that a significant percentage of firms choose to bear future losses rather than to liquidate.

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