Earnings Forecasts from Firm-Level Regressions: Implications for Research and Practice

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This Draft: 1 September 2014

Abstract

Analyst forecasts are used in research on valuation, cost of capital, and more. In this paper I deconstruct this supposed advantage of analysts over statistical forecasts. I develop and evaluate a novel statistical forecasting framework for earnings. I reinterpret and reevaluate estimates of firms' implied cost of capital and market-level risk premia that rely on analyst forecasts by using a statistical forecast. I examine if the main strength of the purported superioty of analyst forecasts is concentrated in the period prior to the passage of Regulation Fair Disclosure (Reg FD). My work posits a model of earnings that has many of the desirable properties of analyst forecasts, but less bias and is applicable to more firms and years. This model is thus more useful to both researchers and practitioners.

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1 Introduction

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5.1 Univariate Results

In the "univariate" equation above, X_{t-1} is the lagged observation of a predictor. Table **??** below shows summary statistics for the firm-level univariate regressions.

Table 3 shows summary statistics for R^2 values of these regressions. Predictors with high incremental R^2 values may be predictive in subsequent out-of-sample tests and the values

may serve to limit the set of predictors. In particular, the lower in-sample explanatory power of *Accruals* compared with ΔAP and ΔAR serve as partial motivation for the former to be replaced by the latter two in the multivariate model.

5.2 Earnings Forecasts

To assess how the model performs by target year (the target firm's fiscal year end in which earnings will be announced), I compute mean squared prediction errors (MSPE) for all target years. The results in Table 4 show MSPE by target year for the model, mean analyst forecast, and median analyst forecast. All three estimates do extremely poorly during the dotcom bubble bursting period. [1]

Does private information help analyst forecasts? Table 5 presents comparisons of the model's accuracy before and after implementation of Regulation Fair Disclosure. As noted in prior literature (e.g. Gintschel and Markov (2004)) analyst forecasts are worse in the post-Reg FD period. The performance of the model forecasts does not change in any consistent way pre- and post-Reg FD.[2]

The effects of *ex ante* uncertainty on forecasts. Table 6 presents comparisons of the accuracy of model and consensus forecasts during information environments characterized by high and low uncertainty. Both the model and analyst forecasts perform better during periods characterized by low analyst dispersion.[3] For the one-year-ahead forecasts, the model performs relatively better than consensus forecasts.

[1] MSPE comparisons for two-year-ahead and three-year-ahead forecasts have been omitted.

[2] In this section and all others, "consensus" forecasts refer to the mean analyst estimate. Results with median analyst estimates are qualitatively similar.

[3] Dispersion is measured as the standard deviation of analyst forecasts. High (low) dispersion periods are those with a standard deviation above (below) the median. Results are not sensitive to choice of percentile.

5.3 Earnings Forecasts as Trading Signals

Most studies that compare time series forecasts to analyst forecasts use a loss function (evaluation criterion) that is some form of relative prediction error or bias. To better quantify the significance of divergence between the consensus forecasts of earnings and the model forecast, I examine the returns to an investor who uses the divergence in analyst and model forecasts as a signal. As a first step, I calculate buy and hold returns ($BAHR$) for each firm from the forecast date to one month and, separately, two months after the target date (i.e., the date at which forecasted earnings are revealed.) I do this for all forecasts (one-, two-, and three-year-ahead forecasts.) I then compute the divergence between the model forecasts and the consensus forecast, $DIFF$, as the model forecast less the consensus forecast. $DIFF$ is calculated for each forecast horizon. For each forecast target and returns horizon I run a regression of the form

$$BAHR_{t+\tau} = \alpha_0 + \alpha_1 DIFF_i + \varepsilon. \tag{1}$$

Table 7 shows the coefficient and p-values from each of these regressions. For the forecasts of FY1 earnings, buy-and-hold returns are positively and statistically significantly related to the degree of divergence between model forecasts and consensus analyst forecasts. Note, however, that returns have not been adjusted for standard asset pricign risk factors.

Next, I rank and group each forecast into deciles by the level of divergence. As Figures 1 and 2 show, the buy-and-hold returns over the forecast horizon for the forecast of FY1 earnings is increasing in the level of divergence between the model and the consensus forecast. This indicates that the stock returns of firms for which the model forecasts higher earnings than analysts are higher than those for which analysts are more optimistic than the model suggests.

6 Conclusions and Extensions

References

Gintschel, Andreas, and Stanimir Markov. 2004. "The effectiveness of Regulation FD." *Journal of Accounting and Economics*, 37(3): 293 – 314.

Appendix: Tables and Figures

	mean	med	min	max	stdev
EPS	1.504	1.165	-21.690	89.610	2.103
EPS Growth	0.126	0.121	-246.500	768.000	8.127
Total Assets	8858.471	2038.377	48.195	797769.000	30477.603
Accruals	-0.030	-0.037	-1.013	2.832	0.121
Dividends	0.541	0.274	0.000	51.403	0.929
Dividend Payer	0.203	0.000	0.000	1.000	0.402
Negative Earnings	0.056	0.000	0.000	1.000	0.229
Delta Price	0.083	0.038	-2.674	14.366	0.486
return	-0.003	0.038	-3.501	2.732	0.422
PE Ratio	59.508	24.157	-110000.000	151250.000	1635.234
GDP	0.048	0.049	-0.032	0.124	0.023
ROE	0.482	0.147	-282.640	5822.013	44.669
Unemployment	0.062	0.056	0.038	0.108	0.017
Inflation (PPI)	0.003	0.003	-0.053	0.030	0.011
Sales	8096.594	1975.248	-7.237	470171.000	25083.807
AR	1497.423	258.700	0.000	418777.000	10231.124
AP	783.347	127.400	0.000	149813.000	3446.179
Age	16.396	15.000	5.000	32.000	7.977
$\Delta Sales$	832.864	154.138	-295570.000	368056.000	7283.693
ΔAR	128.839	18.461	-45714.199	99095.000	1780.134
ΔAP	76.889	8.921	-83588.000	71555.000	1149.442

Table 1: Summary statistics of EPS and independent variables.

Age is number of years company is in the sample.

	mean	med	min	max	stdev
EPS_{t-1}	0.6226	0.6972	0.0002	0.9981	0.3130
assets	0.6440	0.7110	0.0013	0.9982	0.2984
Accruals	0.6491	0.7069	0.0068	0.9983	0.2849
Dividends	0.6490	0.7168	0.0063	0.9984	0.2962
Negative Earnings	0.6353	0.7079	0.0006	0.9981	0.2995
$\Delta Price$	0.6901	0.7469	0.0224	0.9981	0.2624
return	0.6957	0.7549	0.0179	0.9981	0.2588
PE Ratio	0.6431	0.7152	0.0128	0.9982	0.2961
GDP	0.6578	0.7366	0.0062	0.9983	0.2927
ROE	0.7294	0.7957	0.0045	0.9982	0.2406
Unemployment	0.6618	0.7358	0.0010	0.9984	0.2877
Inflation (PPI)	0.6647	0.7364	0.0296	0.9982	0.2829
Sales	0.6870	0.7596	0.0009	0.9982	0.2743
AR	0.6497	0.7148	0.0010	0.9983	0.2931
AP	0.6514	0.7234	0.0079	0.9982	0.2932
$\Delta Sales$	0.7089	0.7838	0.0047	0.9984	0.2684
ΔAR	0.6744	0.7403	0.0110	0.9983	0.2781
ΔAP	0.6690	0.7364	0.0027	0.9981	0.2822

Table 2: R^2 values from regressions of the form $EPS_t = \alpha_0 + \alpha_1 EPS_t + \alpha_2 X_{t-1} + \varepsilon$.

	mean	med	min	max	stdev
EPS_{t-1}	0.8027	0.8753	-0.1915	1.6592	0.2938
assets	0.0408	0.0211	-0.2675	1.2235	0.1008
Accruals	1.1515	0.1889	-27.7192	51.6659	5.7370
Dividends	-1.9528	-0.0001	-868.1679	101.1100	44.6254
Negative Earnings	0.2092	0.1332	-4.6542	5.7750	1.4040
$\Delta Price$	0.5412	0.2741	-1.0112	29.5364	1.5372
return	0.5667	0.2829	-1.0074	31.0738	1.6127
PE Ratio	-0.0036	-0.0004	-0.2647	0.0760	0.0213
GDP	3.4401	1.8823	-122.6991	64.2745	12.9067
ROE	2.0801	0.9929	-6.2682	24.3831	3.4486
Unemployment	-1.2504	0.1596	-176.6090	97.6023	21.2597
Inflation (PPI)	10.6295	4.8897	-162.8660	168.6141	27.7419
Sales	0.5747	0.3485	-3.3250	9.0993	1.1306
AR	0.0681	0.0322	-0.3495	1.7380	0.1476
AP	0.0757	0.0435	-0.3640	1.6566	0.1532
$\Delta Sales$	0.0004	0.0001	-0.0022	0.0093	0.0009
ΔAR	0.0018	0.0005	-0.0268	0.1659	0.0091
ΔAP	0.0023	0.0008	-0.0631	0.0523	0.0086

Table 3: Coefficients from regressions of the form $EPS_t = \alpha_0 + \alpha_1 EPS_t + \alpha_2 X_{t-1} + \varepsilon$.

Year	Model	MEANEST	MEDEST
1990	14.440	20.250	18.662
1993	0.116	0.152	0.176
1994	0.096	0.137	0.137
1995	0.166	0.037	0.031
1996	0.122	0.002	0.000
1997	0.180	0.554	0.606
1998	1.018	0.196	0.201
1999	4.547	5.233	5.126
2000	0.542	0.379	0.324
2001	41.042	19.687	19.687
2002	1701.955	1832.864	1828.333
2003	0.152	0.151	0.148
2004	0.263	0.365	0.359
2005	2.929	2.737	2.749
2006	0.593	0.211	0.209
2007	0.771	1.316	1.389
2008	18.404	11.094	11.298
2009	0.592	1.357	1.303
2010	1.658	1.379	1.381
2011	1.016	0.367	0.378
2012	2.357	1.612	1.618

Table 4: Mean squared prediction error of model forecast, mean analyst (MEANEST) forecast, and median analyst forecast (MEDEST). Forecasts are of one-year-ahead earnings.

	Pre-Reg FD		Post-Reg FD	
Forecast horizon	Model	Consensus	Model	Consensus
1-Year Ahead	2.365	2.466	27.479	28.159
2-Year Ahead	2.255	1.905	4.163	3.672
3-Year Ahead	0.732	2.574	3.889	4.256

Table 5: Mean squared prediction error comparison of "model" and "consensus" earnings forecasts.

	Low Dispersion		High Dispersion	
Forecast horizon	Model	Consensus	Model	Consensus
1-Year Ahead	1.45	0.774	90.436	94.511
2-Year Ahead	8.133	7.853	0.874	0.371
3-Year Ahead	1.409	0.860	5.155	4.986

Table 6: Mean squared prediction error comparison of "model" and "consensus" earnings forecasts.

	BAHR $\tau + 1$ month		BAHR $\tau + 2$ months	
Forecast horizon, τ	Coeff.	*P-Value*	Coeff.	*P-Value*
1-Year Ahead	0.06825**	0.0334	0.06903**	0.0329
2-Year Ahead	0.02169	0.344	0.02610	0.259
3-Year Ahead	-0.02812	0.216	-0.02903	0.205

Table 7: Buy-and-hold returns for FY1 ($\tau = 12$), FY2 ($\tau = 24$), and FY3 ($\tau = 36$) forecasts. Return horizons are one month and two months after the forecast target date.

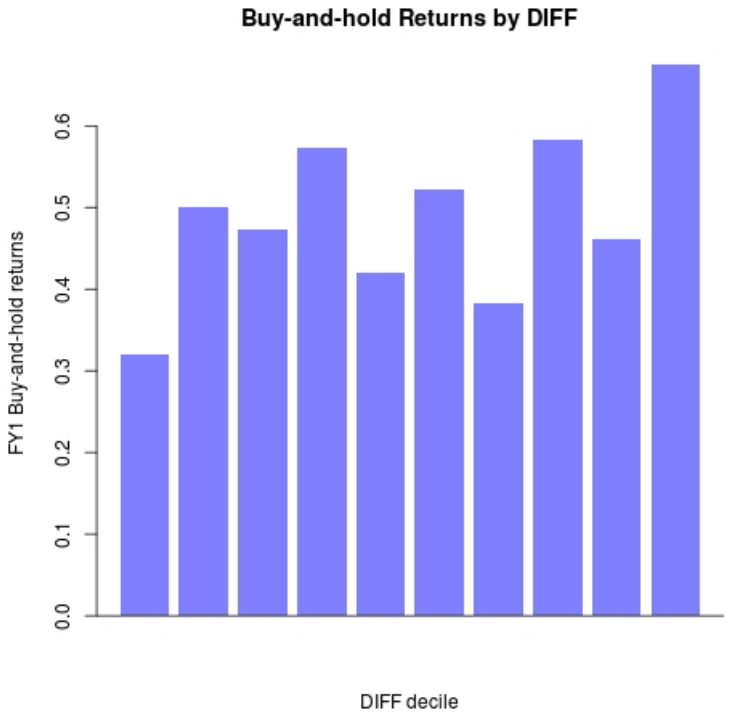

Figure 1: Buy-and-hold returns by $DIFF$ decile for one-year-ahead model. $DIFF$ is the model forecast of earnings less the consensus forecast.

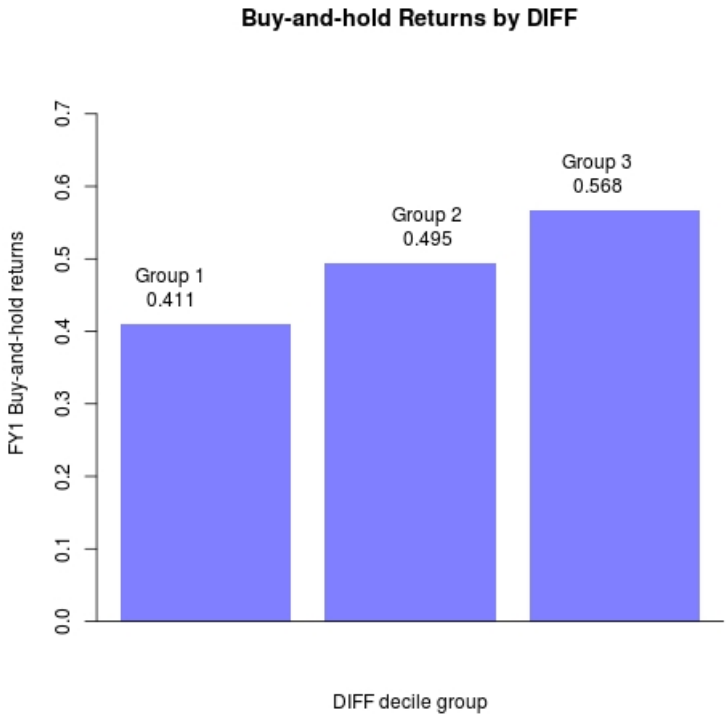

Figure 2: Buy-and-hold returns by $DIFF$ decile for one-year-ahead model. $DIFF$ is the model forecast of earnings less the consensus forecast. Group 1: first and second decile. Group 3: ninth and 10th deciles.