Do Analysts' Short-Term Earnings Estimate Trends Indicate Market Inefficiencies?

Darrol J. Stanley* **Michael D. Kinsman** **Andreas Simon**

Abstract

Analysts' estimates of earnings have been investigated since the beginning of stock market activities. This interest has increased exponentially since the end of WWII with a literature robust with studies of the impact of analysts' forecasts. Investment strategies have been based on many differing aspects of these estimates. This paper expands the earnings estimate strategy with a different orientation. We investigate the impact of the forecasted next quarter's consensus estimate in conjunction with the past four quarters' actual company results. This result in five quarters of earnings (expressed as twelve months' cumulative earnings to avoid seasonality). We then calculate the second derivative that best fits these five figures. If the line is straight, the second derivative is zero or near zero. An upward (downward) curving line indicates growth rates that are accelerating (decelerating). Finally, the second derivative is divided by the standard error of the estimate to account for the volatility of earnings. The S&P 1500 for a thirteen-year period ending December 31, 2015 was deciled based on this statistic. This statistic was therefore ranking short-term earnings growth from accelerating to decelerating. Results indicate that there appears to be market inefficiency in the unfavorable trend deciles.

Keywords: Analysts' estimates; Earnings Trend; Market Efficiency
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I. Introduction

Among the most widely believed paradigms in finance is the contention that the stock market is efficient. Eugene F. Fama espoused this paradigm, *The Efficient Market Hypothesis* (EMH), while a doctoral student at Chicago. The core concept is simple. Stock prices change from one period to the next due to the appearance of new and unanticipated information. Since this information is revealed randomly, stock prices at all times were correctly set, which is the finance definition of "efficient."

The concept of an efficient market is still paramount in investment theory, although strict interpretation of it has been challenged as time has passed. Fama (1970) noted that in an efficient market any new information would be immediately and fully reflected in equity prices. A financial market therefore quickly, if not instantaneously, discounts all available information. In an efficient market, investors should expect an asset price to reflect its true fundamental value at all times. Bruno Solnik (1996) noted that since fundamental value is unknown, the only way to test for market efficiency is to detect whether some specific news is not yet incorporated in the asset price and could therefore be used to make abnormal profit.

Those who challenge EMH suggest that there exists available public information that can be more effectively incorporated in the asset price and therefore be used to make abnormal profit. This group includes most of the world's investment managers.

II. Market Efficiency

It is essential to understand the environment in which securities are priced. The signal question is how effectively investor's expectations are incorporated into security pricing. Are investor's expectations for a particular security quickly and accurately reflected in the price of the security? This is the concept of market efficiency.

In an efficient market, the current prices of securities represent unbiased estimates of the "fair," "intrinsic," "real," "fair market," "sound," and "true" value of the securities. According to Capital Market Theory if all securities are correctly valued (by whatever term), investors will earn a return on their investment appropriate for the level of risk borne by the investor. This is called the "normal return". This "normal return" will occur regardless of which securities are purchased. Thus, in a perfectly efficient market in equilibrium all securities are correctly priced, and there are no under- or over- valued securities.

The degree to which a market is efficient has a profound implication for investors. In an efficient market, the time, money, effort, required knowledge, and anxiety required to engage in security analysis becomes meaningless on an individual basis.

The central theorem of the EMH is that the security market participants are competent and well-informed. It is the competition among these very astute market participants, which results in security prices being fairly and correctly priced. These market participants immediately "compete away" any chance to earn an abnormal profit.

III. The Efficient Market Hypothesis

The framework for a discussion of the Efficient Market Hypothesis (EMH) is generally centered around Eugene Fama's May 1970 Journal of Finance paper "Efficient Capital Markets: A Review of Theory and Empirical Work."

Fama defined efficient markets in terms of a "fair game" where security prices "fully reflect" all the information available. Consequently, if the markets are efficient, individuals cannot consistently receive abnormal risk-adjusted returns. In the framework of the Capital Asset Pricing Model, the expected value of ex-ante alpha (expected excess profits) must be zero. This implies that the complete measurement of is contained in the beta of the security.

Fama suggested that the Efficient Market Hypothesis (EMH) can be dividend into three categories. These categories are as follows:

1. **Strong-Form EMH.** The strong-form EMH represents the most extreme case of market efficiency. Under the strong-form it is argued that security prices fully reflect all information whether public or private. Fama himself thought that this form was an extreme one that, if ever adequately tested, would prove false.
2. **Semi-Strong Form EMH.** The semi-strong form EMH asserts that security prices rapidly and correctly adjust to the release of publicly available information. Thus, under the semi-strong form, current prices fully reflect not only all past price data but all other data as well. Hence, any and all information that is available to the public should be quickly, if not instantaneously, reflected in security prices so that investors cannot consistently earn abnormal returns by acting on such public information.
3. **Weak-Form EMH.** In the weak-form EMH, the type of information being considered is restricted exclusively to historical price data. If the weak-form EMH is correct, investors should not be able to consistently earn abnormal profits by simply observing the historical prices of securities. Weak-Form efficiency is, in fact, a special case of Semi-Strong form efficiency.

There are an extensive number of empirical studies of the EMH. It is beyond the scope of this paper to conduct even a casual review of those studies. Suffice it to say, researchers have

tested the EMH due to its signal importance in financial literature and their combined results indicate that the EMH as postulated by Fama is overwhelmingly supported especially in dealing with the weak and semi-strong versions of the hypothesis. The difficulty of obtaining data on undisclosed sources of information makes it difficult to research the strong-form hypothesis.

However, even in face of this consensus, there are a growing number of researchers who question the EMH. Among them, Robert Haugen argues in multiple books that the EMH is a paradigm that is at the extreme end of the spectrum. He has made a serious case for recognizing that the market overreacts to past records of success and failure with resulting incorrect or imprecise security prices. (Haugen (1999) New Finance p. ix)

Other researchers hold even more extreme views, holding that the market is in chaos (which also implies you cannot beat the index as well). Finally, there is a small but growing group that believes the American stock market is now (perhaps again) manipulated.

IV. Short Term Analysts' Forecasts

This paper is focused on one aspect of the CAPM spectrum: Short-term analysts' earnings forecasts and, more specifically, the magnitude of the actual and forecasted earnings trends The purpose of this paper is to determine the advantage, if any, of utilizing the earnings trend as a **predictive** factor in portfolio management.

For many years, the emphasis has been on long-term growth forecasts by analysts. Jung, Shane and Yang (2008) show the relevance of these forecasts in stock prices. Copeland Dolgoff, and Moei (2004) report that revisions in long-term analyst forecasts exert an even greater influence on stock prices than revisions in short-term analyst forecasts.

When it comes to investment styles, nothing lasts forever. This can be seen in the more recent research on the topic of analysts' forecasts. Recent literature notes that investors have limited attention and are unable to process immediately all information relevant to future earnings. Among those who have discussed this are Hong, Torous, and Valkanov (2007); Cohen and Frazzini (2008), and Hirshleifer, Lim, and Teoh (2009).

The research of DellaVigna and Pollet (2007) makes a strong case that investors have *limited attention for long-term earnings forecasts.* Thus, it would seem prudent to look to short-term forecasts as a proxy for the limited attention span of today's investors.

Portfolio managers have found it most difficult to outperform indices consistently, and especially the S&P 500 index (large-cap), on a risk-adjusted basis. Stated another way, investors have not been able to capture positive "excess alpha" in their stock selection process.

V. Short Term Earnings Trend (STET)

There has always been an interest by investors in recently reported earnings. This has resulted in the development of numerous models. There has been more interest, however, in developing models dealing with recently reported earnings and their short-term impact. This is due to the desire by investors to respond to this new information quickly. The objective, of course, is the attempt to capture excess returns caused by the incorporation of this new information in the price adjustment process.

One of the earliest models was formulated by Henry Latane. He was the clearly the first to use the concept of Standardized Unexpected Earnings (SUE). Using the same quarter over an historical five year period (later changed to 12 months running of the past five quarters) Latane would predict the sixth point and compare it to actual. If the actual minus the expected were greater than one standard error, the stock became a potential buy.

This has morphed into today's SUE (defined as actual minus analysts' consensus estimates exceeding one standard deviation of the analysts' estimates). If that test is met, the stock becomes a potential buy.

The concept of SUE has become very well known, and it is widely utilized in investment management, particularly by hedge fund managers. Their speed of trading has quickly eliminated excess return with their rapid price response.

Thus, other variants of this theme have emerged. Instead of looking to the most recent quarter reported, many are looking at the next quarter's estimate. This estimate is used in one of two ways. The first is to observe the revision in that consensus number. Zacks investment services is one of many vendors that heavily depends on such revisions to rank stocks. This orientation can take other forms such as revisions of current fiscal year and the following fiscal year earnings commonly estimated by analysts. There is also the long-term growth forecast (3-5 years) as well, with many vendors looking to the revisions. If investors use the Williams Dividend Discount Model (also known as the Gordon Model) a change in the long-term forecast should impact the stock price profoundly. The model, as expressed by Gordon, states that the price of the security is equal to the capitalized value of the expected next year's dividend by the required rate of return on equity minus the growth rate. (Williams, 1938).

Another variant of SUE is use of absolute revision numbers instead of revision percentages. In this case, the 12 months earnings are used and, like the Latane SUE, five data points are incorporated into the model. Unlike the Latane, model the fifth data point is the 12 months earnings utilizing the analysts' latest forecast.

VI. The STET Model Employed in this Study

If one were to continue with the Latane model, the five-quarter 12 months earnings (including the fifth or forecasted consensus number) would then be subjected to an OLS regression with a statistical estimate of the fifth point. We would then compute the relationship of actual earnings minus statistical estimate of earnings divided by the standard error.

However, because the fifth data point is an estimate, the results of this method could be questioned. Further, the concept of SUE has been fully exploited. Thus, a different approach needs to be taken.

Using the past four 12 month earnings segments and the fifth 12 month forecasted earnings, the model employed in this work uses the second derivative of the trend. We are looking at the critical point to determine its degree of concavity. Thus, we are, at a minimum, looking for three groups: (1) those positive; (2) those around zero; and (3) those negative.

It should be noted that a company that has very high but consistent growth in short term earnings will normally have a second derivative around zero. Thus the STET value tends to more clearly identify the extremities of either accelerating or declining short term earnings. In

addition, the resulting second derivative can have large and questionable values especially for widely fluctuating earnings of speculative companies. Like Latane, the value developed by the second derivative is then divided by the standard error reflecting the goodness of fit. This value still can remain large. Thus, all the values are then percentiled.

VII. Research Hypotheses

The research hypothesis of this paper is that by sectoring the S&P 1500 into STET deciles, the top STET decile will, on a risk-adjusted basis before transaction costs, outperform both the S&P 1500 (Equally-Weighted) as well as the bottom STET based on the portfolio's Coefficient of Variation (CV). Thus, this paper is conducting a test of the semi-strong form of the EMH.

The deciles are rebalanced on a quarterly basis. The research period is December 31, 2002 through December 31, 2015 or 13 years. The CV analysis was applied against intermediate or yearly period data. While the statistics for a total run period seldom vary for the intermediate period, the intermediate yearly periods are far more important to investment managers due to the drawdown character of investment management.

Dividing the S&P 1500 into ten portfolios based on STET alone was done to assure efficient diversification. While industry and/or sector groups should be accounted for in normal portfolio construction, the ten 150 security portfolios obtained from deciles of the S&P 1500 mitigates this problem.

VIII. Data and Methods

This paper will explore the total portfolio's return on a risk-adjusted basis through the above noted hypotheses. Ford Equity Research of San Diego, a data vendor with proprietary models for investment managers globally supplied the data for this study. Ford Equity Research is affiliated with Mergent, a subsidiary of the London Stock Exchange, through stock ownership.

A review of the data and methods used by Ford Equity Research is constructed such that the three most common biases in investment data (no look-ahead bias; no restatement bias; and survivorship bias) were eliminated.

Ford Equity Research, likewise, provided all variables utilized in this study. Total return includes both price changes and dividends in the appropriate period based on their ex-dividend date. All returns were computed on a geometric basis, as were the standard deviations. These methods are in conformity with accepted professional investment standards.

All returns, including the index, were calculated on a monthly basis. Note that re-balancing occurs only on a quarterly basis for the entire study period. All returns were computed equally-weighted. All stocks were selected from the S&P 1500 Index.

All deciles previously noted were constructed utilizing the highest positive STET to the lowest negative STET based on a percentile basis. The bottom decile is therefore also constructed as the "short" portfolio since the research hypothesis states that it will underperform the top decile portfolio as well as the S&P 1500 (Equally-Weighted).

The selection of the sample size is a concern for all researchers. The selection of ten portfolios of 150 stocks each reduces the impact of industry concentration, especially in short time frame studies. Ideally, the number of stocks from any specific industry should be in line with the benchmark index. Even more ideally, the selected portfolio should be of the same industry weightings as the benchmark index. Such back-testing requires significant manual analysis and unfortunately introduces questions of inappropriate manipulation of results.

IX. Data Results

The results of the investigation can be found in the following two tables. Table 1 presents the results on a risk-adjusted basis *before* transaction costs. Table 2 presents the correlation table of the results. It was decided *a-priori* that the study would be re-run if the results warranted it for turnover and transaction costs. The performance, again, was computed on a monthly basis with rebalancing quarterly.

X. Data Analysis

The results of the study were mixed with only one hypothesis in line with the projection. The first hypothesis was rejected. The top STET portfolio did not outperformed the S&P 1500 (Equally-Weighted). The CV of the top portfolio was 1.63, inferior to the S&P 1500 index at 1.58. The second hypothesis was confirmed. The Top STET portfolio outperformed the bottom STET portfolio. The CV of the top portfolio was 1.63 while the bottom STET portfolio was 2.64. Again, the results are stated before transaction costs.

A number of pragmatic investment management conclusions can be drawn from these results. The first is the fact that the top STET is of little value from the long perspective. The top STET does not outperform the index on a pre-transaction basis let alone after transaction costs. Further, the correlation between the index and the top STET portfolio is + 0.98.

The second is the fact that the top STET and the bottom STET are useful in a long-short relationship before transaction costs. However, the correlation is +0.91 which is not advantageous. It would not make sense to go long the top and short the bottom STET deciles after transaction costs.

An alternative, not hypothesized, would be to go long the index (with minimum transaction costs) and short the bottom STET portfolio. It is still highly questionable that this would be advantageous after transaction costs.

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TABLE 1

Short Term Earnings Trend for the Period December Year End 2002-2015 for the S&P 1500

Intermediate Period Rebalanced Quarterly Equally-Weighted

	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6	Sector 7	Sector 8	Sector 9	Sector 10	Comp Univ
	Perf	Perf	Perf	Perf	Perf	Perf	Perf	Perf	Perf	Perf	Perf
12/02-12/03	43.9	44.1	46.8	42.1	32.8	36	46	39.9	51.2	66.8	44.5
12/03-12/04	14.4	17.9	19.9	19.3	20	18.1	20.7	17.9	19.6	20.8	18.9
12/04-12/05	12.8	9.4	9.7	10.7	6.5	5.7	5.6	7.8	6.1	1.6	7.6
12/05-12/06	22.2	16.5	20.1	19.3	17.6	13.8	11.2	15	16.4	13.1	16.6
12/06-12/07	7.1	5.1	-1.4	1.7	0.5	-0.4	-3.5	-0.7	-11.9	-12.2	-1.7
12/07-12/08	-42.5	-38.1	-34.8	-38.8	-28.9	-32.4	-31.2	-33	-34.9	-47	-36.6
12/08-12/09	43.4	30.6	36.5	34.5	32.8	42.6	54.6	57	62	86.4	46.9
12/09-12/10	25	24.6	31.4	31.4	25.1	21.9	19.3	28.8	28.1	34.9	27
12/10-12/11	-5.8	1	-0.6	0.4	2.9	1.8	1.5	0.3	-7.3	-8.7	-1.6
12/11-12/12	23.7	24	20.2	19.4	16.6	12.4	12.5	19.2	15	17.5	18
12/12-12/13	39.7	38.2	39.7	40.5	39.2	35.8	36.4	41.5	39.4	41.1	39.2
12/13-12/14	8.3	10.8	7.4	14.2	5.7	15.3	10.5	12.3	0	3.5	8.9
12/14-12/15	2.5	1.9	-2.2	-3.8	3.2	0.6	-2	-6.9	-8.1	-26.4	-4.4

Total Cumulative for Intermediate Periods

	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6	Sector 7	Sector 8	Sector 9	**Sector 10**	**Comp Univ**
	Perf	Perf	Perf	Perf	Perf	Perf	Perf	Perf	Perf	Perf	Perf
12/02-12/15	352.4	348	369.3	355.8	331.4	307.4	328	387	263.3	213	322
Annual	12.3	12.2	12.6	12.4	11.9	11.4	11.8	12.9	10.4	9.2	11.7
Annual STD	20.1	19.4	18.6	17.7	16.5	16.8	17.2	18.3	20.8	24.3	18.5
CV	1.63	1.59	1.47	1.42	1.45	1.47	1.46	1.42	2	2.64	1.58

TABLE 2

	Top	*Decile 2*	*Decile 3*	*Decile 4*	*Decile 5*	*Decile 6*	*Decile 7*	*Decile 8*	*Decile 9*	*Bottom*	*Universe*
Top	1										
Decile 2	0.981	1									
Decile 3	0.974	0.98	1								
Decile 4	0.974	0.99	0.991	1							
Decile 5	0.967	0.97	0.985	0.98	1						
Decile 6	0.962	0.96	0.965	0.971	0.971	1					
Decile 7	0.936	0.92	0.945	0.931	0.941	0.982	1				
Decile 8	0.953	0.93	0.957	0.954	0.956	0.983	0.98	1			
Decile 9	0.935	0.91	0.955	0.928	0.943	0.959	0.98	0.98	1		
Bottom	0.908	0.88	0.928	0.906	0.904	0.945	0.98	0.98	0.986	1	
Universe	0.977	0.97	0.988	0.981	0.98	0.989	0.98	0.99	0.98	0.96	1

XI. Where does all of this lead us?

Fischer Black, who by all accounts he held an opinion about stock selection that was even more extreme than the strong form random walk hypothesis, made an exception at a seminar at the University of Chicago's Center for Research in Security Prices in 1971. He noted in that speech the results of the Value Line Ranking System. Indeed, even as a limited partner of Goldman, Sachs, he kept his own copy of Value Line behind his desk. Thus, even Fischer Black felt there *could* be combinations of factors that might allow a portfolio manager to outperform the market on risk-adjusted basis.

Please note the term factors. Value Line ranking is a multi-factor model. Thus, additional research will be applied to this paper with other factors. Logically, these factors should center around analysts' consensus estimates and their revisions of those estimates.

In developing this paper, the authors noted certain output information that seemed interesting. One such item was the magnitude of the change in fiscal year two compared to fiscal year one earnings estimates by analysts.

An extremely small effort was applied to this information set. Using December year-end information, we noted the change in the number utilizing (c+FY2/c+FY1). This recognizes the magnitude the difference between long-term and short-term forecasts (DA, 2008). We then sectored the S&P 1500 into deciles by STET. For both the top and bottom deciles, we segmented the subset into a 25 stock portfolio based on the change in FY2 from FY1. We hypothesized that the top 25 stocks of the top decile would outperform the bottom 25 of the bottom decile again based on the change. The following results were obtained for the three month periods for the past five years of the study.

Year	Top	Bottom	Universe	Long-Short
2015	3.8%	-7.4%	2.9%	11.2%
2014	4.0%	-9.4%	7.9%	13.4%
2013	15.1%	11.2%	9.7%	3.9%
2012	11.9%	-4.8%	2.5%	16.7%
2011	10.8%	13.3%	15.1%	-3.5%

This data certainly looks advantageous enough to conduct an additional study to determine its value. The above numbers are inconsistent as they use ending STET ranks at December 31st instead of the end of September 30th. A quick review showed a very modest number stocks changing out of the deciles. The change in FY1 and FY2 numbers will have also changed during the three-month period, but by how much we do not know. Hence, these results are highly questionable, but this should be investigation

XII. Conclusion

This study examined the semi-strong form of the EMH utilizing the fundamental tool of STET developed from the five quarter trend in earnings with the fifth quarter utilizing analysts' consensus estimates. The top decile STET portfolio of the S&P 1500 showed that on a before transaction cost basis the top STET portfolio marginally underperformed the equally-weighted S&P 1500 utilizing the Coefficient of Variation. This top STET portfolio outperformed the bottom STET portfolio. This clearly would not allow for a risk-free arbitrage opportunity on an after-transaction basis.

The key implication of this study is that the earnings estimates, as well as their revisions, are increasingly incorporated rapidly into the market. This would confirm the market's efficiency. There is some potential inefficiency in the bottom decile. This is in line with other observations about revisions downward of poorly performing stocks.

Thus, the use of the STET (and perhaps like-minded ideas such as the variously constructed SUEs) *alone* has no value. These concepts may have value in portfolio construction when used with other data.

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Authors

Darrol J. Stanley*
Professor of Finance and Accounting, Department of Finance and Accounting, Graziadio School of Business and Management, Pepperdine University, Malibu, CA. USA, darrol.stanley@pepperdine.edu, dstanley@pepperdine.edu

Michael D. Kinsman
Professor of Finance and Accounting, Graziadio School of Business and Management, Pepperdine University, Malibu, CA. USA, Michael.kinsman@pepperdine.edu

Andreas Simon
Assistant Professor of Accounting, Graziadio School of Business and Management, Pepperdine University, Malibu, CA USA, Andreas.simon@pepperdine.edu

* Corresponding Author