Predicting predictions: game of hazard or reaping of rewards?

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Abstract

We examine revisions to analyst two-year-ahead EPS estimates and their relation to contemporaneous stock returns. We find that a trading strategy based on perfect foresight of analyst revisions earns positive abnormal returns every year from 1983 to 2012 and averages 56-59% per year. We then develop a model to predict analyst revisions and demonstrate a trading strategy that earns consistent positive abnormal returns of about 11-14% per year. Our findings are consistent with prior research that indicates investors naively incorporate analysts' initial long-term forecasts into stock prices. However, our study is unique in that we focus on predicting unscaled EPS revisions, an approach based on prior evidence showing that market participants fixate on EPS and deviations from EPS benchmarks in absolute dollars and cents per share terms.

1. Introduction

We examine revisions of analyst earnings per share (EPS) forecasts for future fiscal years and test whether those revisions are reflected in stock prices. Our primary interest is in revisions to the *initial* consensus EPS estimate of a given firm's *next* fiscal year, which we refer to as the "two-year-ahead EPS estimate" because it is typically first published by analysts roughly two years ahead of the eventual announcement date.[1] Presumably, when analysts "introduce" next year's EPS estimates very early in the current fiscal year, they set market expectations for a firm's intermediate-term profitability and stock value.[2] We examine revisions to these initial estimates over the following twelve months, focusing on how the revisions are correlated with contemporaneous stock returns, and whether predicted revisions can be used to earn abnormal returns.

The motivation for our study stems from several streams of research in accounting and finance on sell-side analysts (see Bradshaw 2011 for a review). Many studies document that analyst estimates are, on average, overly optimistic (McNichols and O'Brien 1997, Lin and McNichols 1998, Francis and Philbrick 1993, Hong and Kubik 2003, Lim 2001). Analyst optimism is greater when estimates are made earlier within the forecast period, and consensus estimates tend to be "walked down" by management to lower levels over time (Cotter et al. 2006, Cowen et al. 2006, Richardson et al. 2004, Ke and Yu 2006, Libby et al. 2008). Additionally, analyst forecast revisions are positively correlated with stock returns (Givoly and Lakonishok

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[1] For example, the consensus EPS estimate for a firm with a fiscal year ended December 2010 is typically first available in February 2009 (for 52% of our sample), which is about two years in advance of the eventual annual EPS announcement date in February 2011. In our sample, the actual mean (median) time between when the two-year-ahead consensus EPS estimate is first available in the I/B/E/S Summary History file and the eventual earnings announcement date for that forecast period is 23.2 (23.4) months.

[2] Analysts commonly use the term "introduce" when publishing initial estimates for a firm's future fiscal period, which we believe influences early market expectations for that period. For example, on 1/6/2005, the Prudential Equity Group analyst published a note for Hartford Financial Services entitled simply "Introducing 2006 EPS Estimate." Also, on 1/4/2005, the Credit Suisse analyst published a note for Golden West Financial entitled "Q4 Preview, Introducing 2006 Estimates and Raising Target."

1979, Lys and Sohn 1990, Ivkovic and Jegadeesh 2004, Copeland et al. 2004). Combined, these findings suggest that revisions (mainly downward) of analysts' initial estimates of a firm's next fiscal year EPS are predictable, and stock prices will move in the direction of the revisions over the same time period.

We begin our analysis by confirming the empirical findings from prior studies for our sample period. Using I/B/E/S Unadjusted Summary History data from 1983 to 2012, we indeed find that the overall mean and median full-year EPS forecast error (actual reported EPS – initial mean consensus estimate) is negative, indicating that analysts' initial estimates are optimistic on average. Importantly, we also find that the error is most negative when the forecast is made four years in advance of the eventual earnings announcement date and becomes less negative over each successive year (i.e., as each fiscal year passes), indicating that earlier estimates of future fiscal years are walked down over time.[3] However, not many analysts introduce full-year EPS estimates for firms three and four years in advance; the mean and median number of analysts in each case is approximately one. In contrast, the mean number of analysts who introduce two-year-ahead EPS estimates for firms is 4.3 (median=3), and the trend has been an increase from 1.4 to 6.1 over the past 30 years. Therefore, we focus on these two-year-ahead estimates and their revisions over the following twelve months (i.e., over the time that it takes for the initial two-year-ahead estimate to become a one-year-ahead estimate).[4]

To test whether analyst revisions are correlated with stock returns and to provide a benchmark for subsequent tests, we compute hedge portfolio returns to a strategy based on

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[3] In untabulated results, we find that the mean forecast errors based on initial four-, three-, two-, and one-year-ahead EPS estimates are -\$0.89, -\$0.65, -\$0.49, and -\$0.25, respectively. The same pattern exists for the median errors.

[4] In I/B/E/S, the forecast period indicator (FPI) variable for a given forecast period end date (FPEDATS) changes from "2" to "1" after a firm announces fourth quarter results for the prior fiscal year. In our sample, the mean (median) time elapsed between when the initial two-year-ahead EPS estimate is available to when it becomes a one-year-ahead EPS estimate is 11.78 (11.97) months.

perfect foresight of analyst revisions. That is, we form a zero investment portfolio by taking a long position in firms in the highest decile of EPS revisions and a short position in firms in the lowest decile of revisions. We find that the mean (median) abnormal return is 56.3% (59.0%) per year and the abnormal returns are positive for all 30 years from 1983 to 2012, with returns ranging from 18% in 1984 to 91% in 2012. Thus, we confirm that analyst revisions, specifically revisions to initial two-year-ahead consensus EPS estimates over the following twelve months, are strongly correlated with contemporaneous stock returns; further, the magnitudes of the returns are substantial.

In our next set of analyses, we develop a model to predict analyst revisions and test whether a hedge portfolio strategy based on predicted revisions earns abnormal returns. Interestingly, we find that the determinant with the greatest explanatory power for future revisions of the initial consensus EPS estimate is the level of the estimate itself. In other words, the two-year-ahead EPS estimates that are most likely to be revised downward over the following twelve months are simply those EPS estimates that have the highest dollar values. A hedge portfolio strategy based on our predicted revisions earns a mean (median) abnormal return of 14.3% (10.9%) per year, and the abnormal returns are positive in 24 of 28 years from 1985 to 2012. Thus, while this strategy captures roughly 25% (14.3%/56.3%) of the abnormal returns from the perfect foresight strategy, the returns are still economically significant.

In additional tests, we compute the impact of transactions costs and conclude that they do not negate the abnormal returns to our trading strategy, especially after decimalization in 2001. We also compare the returns from implementing our strategy for firms with low versus high analyst coverage and find that returns are higher for low coverage firms. We examine whether a trading strategy based on revisions of one-year-ahead EPS estimates yields similar results.

Consistent with prior evidence showing that revisions of shorter-term estimates do not impact stock returns as substantially (Copeland et al. 2004), we find that a hedge portfolio based on perfect foresight of one-year-ahead EPS revisions earns a mean (median) abnormal return of 34.3% (33.0%) per year. However, when we use our model to predict one-year-ahead EPS revisions, our hedge portfolio earns a mean (median) abnormal return of 3.2% (0.1%), which is not economically significant. Finally, we repeat our analyses using scaled versions of analyst EPS revisions (scaled by the initial EPS estimate and stock price) and find that abnormal returns are approximately half the magnitude of those using absolute EPS revisions (in dollars and cents per share terms) and the yearly returns are more volatile.

Overall, the findings in this paper contribute to our general understanding of stock market dynamics. Our results are consistent with prior research indicating that: (1) investors naively incorporate analysts' long-term forecasts into stock prices, despite evidence that the forecasts are biased, and (2) relatively simple trading strategies exploiting investor naiveté earn abnormal returns (Bauman and Dowen 1988, La Porta 1996, Dechow and Sloan 1997, Da and Warachka 2011).[5] However, our study differs from prior analyses in two ways. First, we focus directly on analyst revisions and the prediction of analyst revisions, while prior studies focus on variables shown to be correlated with future analyst revisions. For example, La Porta (1996) sorts firms by analyst forecasts of expected earnings growth and shows that firms in the lowest decile of expected growth experience upward forecast revisions in the following year. The opposite is true for firms in the highest decile of expected growth. Similarly, Da and Warachka (2011) sort firms by the disparity between short- and long-term growth forecasts and show that firms in their long (short) portfolio experience upward (downward) forecast revisions in the following six

[5] Da and Warachka (2011) conclude that that their empirical results are consistent with the theory of limited attention (DellaVigna and Pollet 2007, Hirshleifer et al. 2009). We discuss additional possible explanations in Section 6.

months. The implication from these studies is that stock prices react when analysts revise their forecasts. Our trading strategy, which generates greater abnormal returns than prior studies, sorts firms directly on (predicted) analyst revisions of future earnings rather than a variable correlated with future analyst revisions.[6]

Second, we focus on analyst revisions of EPS in dollar terms, while prior studies use scaled variables such as earnings growth rates, book-to-market ratios, and earnings-to-price ratios to sort firms into portfolios.[7] The intuition behind scaling is that changes in expectations should be assessed in relative terms, or in the case of revisions to EPS, percentage terms (i.e., change in EPS scaled by original EPS estimate). However, recent research, surveys and anecdotes show that investors, analysts, and the financial press fixate on EPS as the primary metric of firm performance, and react to deviations from EPS benchmarks, without adjustments for scale (Graham et al. 2005, Cheong and Thomas 2011). This fixation extends to executives' attempts to control deviations in reported EPS from relevant benchmarks by managing earnings (Degeorge et al. 1999, Burgstahler and Dichev 1997). Thus, if firms manage earnings to avoid reporting negative or zero EPS, then it becomes intuitively plausible that firms with small positive EPS expectations from analysts are less likely to "walk down" analyst estimates by issuing tempered guidance or providing other reasons for analysts to lower their forecasts, both for short- and long-term estimates. Conversely, firms whose analysts are very early to publish high EPS estimates for distant future fiscal periods have more time and cushion over relevant benchmarks to lower analyst expectations each quarter. The fact that our trading strategy based

[6] Da and Warachka (2011) report 4% annualized risk-adjusted returns based on monthly portfolio construction. Dechow and Sloan (1997) report a one-year return differential of 8% between the highest and lowest decile portfolios based on forecast growth in EPS (their Table 3). La Porta (1996) reports a return differential of 20% between the long and short portfolios, but as Dechow and Sloan (1997) explain, La Porta's higher returns are attributable to smaller sample size (no NASDAQ stocks) and shorter sample period.

[7] In our additional analyses discussed in Section 5.4, we conduct our trading strategy after scaling analyst revisions by the initial EPS estimate and stock price.

on predicted analyst revisions of EPS earns average abnormal returns of 11-14% per year suggests that investors do not incorporate this documented expectations management behavior nor the differential likelihood of downward revisions for low and high analyst EPS estimates into stock prices.

Additionally, our study differs from most papers on analyst forecasts in that we do not focus on analyst forecast errors (Ali et al 1992, Elgers and Lo 1994, Hribar and McInnis 2011, So 2012). Since we focus only on analyst forecast revisions, which occur before actual earnings are ever reported, we avoid potential measurement error arising from mismatches between the I/B/E/S definition of reported earnings and what analysts include or exclude in their earnings forecasts (Cohen at al. 2007).

The remainder of this paper is organized as follows. In the next section, we briefly review prior studies on analyst forecasts, revisions, and stock returns. In Section 3, we describe our sample and data. Section 4 discusses our analyses. We conduct additional robustness checks in Section 5. Finally, we conclude in Section 6 with a discussion of how our empirical findings relate to market efficiency (or inefficiency).

2. Prior Literature

The prior research on sell-side analysts provides strong evidence that: (1) analyst estimates tend to be optimistic; (2) the optimism is greater when the estimates are made earlier within the forecast period; (3) the market reacts to analyst revisions; and (4) the market does not correct for the predictable biases in analyst estimates. In this section, we briefly review the extant analyst literature and build the rationale for developing a trading strategy that exploits the predictable market reaction to analyst estimate revisions. In addition, we review research that documents the market's fixation with firms' EPS and the finding that EPS forecast errors do not vary with scale.

2.1 Literature on Analyst Optimism and Forecast Revisions

Numerous studies document that analysts issue estimates that tend to be optimistic, and several reasons explaining this optimism have been posited. Analysts try to win underwriting services and trading commissions (Dugar and Nathan 1995, Lin and McNichols 1998, Dechow et al. 2000, Cowen et al. 2006), secure career advancements (Hong and Kubik 2003), curry favor with management of the firms they cover (Schipper 1991, Francis and Philbrick 1993, Lim 2001), and self-select to cover firms they like (McNichols and O'Brien, 1997). Additionally, Groysberg et al (2011) find that analyst compensation is not tied to forecast accuracy, which suggests that the above-mentioned incentives to be optimistic are not mitigated by disincentives embedded in analysts' compensation packages. While the reasons for, and the extent of, analyst optimism may vary by time and circumstance (Kadan et al. 2009), we take as a given that, on average, analyst estimates are optimistic.

Several studies document time-trends in analyst forecasts and optimism, showing that analyst optimism is greater when estimates are issued earlier within the forecast period. Cowen et al. (2006) document that analyst estimates are positively biased when issued more than 180 days before the earnings announcement date, unbiased when issued between 91 and 180 days before the announcement, and negatively biased when issued within 90 days of the announcement. Over time, consensus estimates tend to be "walked down" to lower levels by management guidance (Cotter et al. 2006). The reasons for the initial analyst optimism and subsequent walk down by management include more attractive pricing for firm equity offerings and insider selling (Richardson et al. 2004) and currying favor with management (Ke and Tu 2006, Libby et al. 2008).

Another stream of research shows that analyst forecast revisions are informative and are positively correlated with stock returns (e.g., Givoly and Lakonishok 1979). Lys and Sohn (1990) show that individual analyst estimate revisions are informative independent of prior revisions from other analysts and firm disclosures. Ivkovic and Jegadeesh (2004) show that one-quarter-ahead earnings forecast revisions are informative. Copeland et al. (2004) find that changes in expectations about next year's earnings and longer-term earnings are highly significant in explaining the cross-section of market-adjusted stock returns.

Despite the fact that analyst earnings estimates exhibit predictable biases, the market does not appear to correct for these biases. Frankel and Lee (1998) incorporate analyst forecasts into Ohlson's (1995) residual income model and document that not only is the model useful in predicting future cross-sectional stock returns, but also that the explanatory power of the model improves when analyst forecasts are corrected for their predictable forecast errors. In a study examining the value-glamour anomaly, La Porta (1996) documents that analysts significantly revise low-growth stock estimates upward and high-growth stock estimates downward. Accordingly, he shows that forming a long-short portfolio based on low-high analyst long-term growth forecasts generates abnormal size-adjusted returns. Consistent with this evidence, Dechow and Sloan (1997) suggest that actual firm earnings tend to grow at less than half the rate originally forecasted by analysts, yet stock prices initially reflect substantially all of the forecasted earnings growth. Da and Warachka (2011) develop a trading strategy that generates abnormal returns by exploiting the disparity between analysts' long-term and short-term earnings growth estimates. They implement a hedged trading strategy by forming long (short) portfolios of firms with high (low) short-term and low (high) long-term earnings growth estimates. Upon further examination, they find that the source of their strategy's return predictability is based on analyst revisions that occur within the six months after portfolio formation. In this study, we develop a trading strategy based on directly predicting analyst revisions of two-year-ahead EPS estimates over a twelve month period.

2.2 Literature on Market's Fixation on EPS

Early studies provide evidence that the market fixates on firms' earnings without distinguishing between the accrual and cash flow components of earnings (Hand 1990, Sloan 1996). Interestingly, recent evidence suggests that the market focuses specifically on EPS amounts and deviations from EPS benchmarks in absolute rather than scaled terms. A cursory perusal of the financial press and surveys (Graham et al. 2005) reveals a myopic focus on EPS in cents per share terms, but the phenomenon is, in fact, more pervasive than one might guess. Herrman and Thomas (2005) document that a disproportionate number of analysts issue EPS estimates at $0.05 intervals, suggesting that analysts manipulate their income statement models to obtain rounded EPS estimates. Cheong and Thomas (2011) document that analyst EPS forecast errors and dispersion do not vary with scale (e.g., stock price or level of EPS). In other words, forecast errors of EPS for high share-price firms are similar to those for low share-price firms. However, the fact that forecast errors of sales and cash flow per share do vary with scale indicates that the market's fixation is specifically on EPS. Cheong and Thomas (2011) investigate several explanations for this counterintuitive phenomenon and conclude that firm managers smooth EPS over time in order to reduce across-firm variation in EPS volatility.

While not explored in the above-mentioned studies, behavioral theories may also explain the market's fixation on absolute rather than scaled EPS. For example, anchoring is a cognitive bias whereby people use an initial piece of information to make subsequent judgments (Tversky and Kahneman 1974, Green et al. 1998, Northcraft and Neale 1987). When firms announce quarterly or yearly EPS in press releases, they compare the results to EPS from prior quarters or years. Similarly, when the financial press reports firms' EPS, they often compare the results to the analyst consensus EPS estimate. In either case, investors may anchor on the first EPS benchmark cited and assess deviations from the benchmark in cents per share terms without adjusting for the level of EPS or the share price. Another cognitive bias—salience—suggests that individuals perceive the world in discrete rather than continuous form and use thresholds to evaluate signals (Kahneman 1973, Degeorge et al. 1999). As such, investors may view analyst EPS estimates as salient thresholds, and revisions to EPS estimates as changes to those thresholds, again without adjustment for scale. While one specific explanation of the market's fixation on EPS in absolute terms has yet to emerge, the empirical evidence nonetheless is compelling. As a result, the trading strategy developed in this paper is based on absolute EPS revisions.

3. Data

We include consensus estimates of two-year-ahead EPS for all U.S. firms found in the I/B/E/S Unadjusted Summary History file from 1983 to 2012. Due to extreme values for a small number of estimates that would skew our descriptive statistics and regressions, we trim EPS estimates that are greater than $20.00 or less than -$20.00. This process results in 64,518 initial estimates of two-year-ahead EPS for 10,523 firms. We then require stock return data from CRSP to compute hedge portfolio returns based on perfect foresight of analyst revisions, which results in 61,997 firm-years from 9,957 firms. Finally, firms must have non-missing financial data from Compustat and one lag year of revisions to compute predicted analyst revisions, resulting in a sample size of 51,520 firm-years from 8,157 firms.

To gauge the prevalence of two-year-ahead EPS estimates relative to three-, and four-year-ahead EPS estimates, we compute the average number of analysts who issue such estimates over our sample period. Figure 1 shows that the mean number of analysts who issue two-year-ahead EPS estimates (FY2), in the month that the initial consensus is available, increases from 1.4 in 1983 to 6.1 in 2012. In contrast, the number of analysts who issue three-year-ahead (FY3) and four-year-ahead (FY4) EPS estimates remains close to 1.1 for most of the sample period, increasing to 2.2 and 1.5 in 2012, respectively. Figure 1 also shows that the trend in the number of one-year-ahead (FY1) EPS estimates included in the initial consensus resembles a U-shape. The number of estimates decreases from 5.6 in 1983 to 4.9 in 1997, and then it increases to 7.5 in 2012. Finally, for completeness, we compute the average number of analysts who issue long-term growth (LTG) forecasts. However, as noted by I/B/E/S, LTG values do not refer to any specific fiscal period (or even earnings measure), but rather, generally refer to the expected annual percentage growth rate in operating earnings over the next three to five years. LTG values are never considered early or late relative to a fiscal period, and thus, are not directly comparable to FY1 to FY4 EPS estimates. With that caveat in mind, we collect LTG values on the same date that the initial two-year-ahead EPS estimate is available. Figure 1 shows that the mean number of analysts who issue LTG estimates generally declines from about 3 to 1.5 over the sample period, suggesting declining issuance of LTG estimates by analysts. In sum, we interpret the rising prevalence of two-year-ahead EPS estimates, relative to the other fiscal periods, as an indication of their increasing use by analysts as a basis for a firm's intermediate-term profitability and stock value.

3.1 Definition of Variables

To compute our variable of interest, analyst revision, we first define $NUMEST\_2Y_t$ as the number of analysts who issued a two-year-ahead EPS estimate during the first month in which the estimate is available in I/B/E/S (approximately two years before the eventual announcement date) and $MEANEST\_2Y_t$ as the initial consensus mean EPS estimate for fiscal year *t*. As we discuss further in the next section, we require that the initial estimate be available between January 1st and April 30th of fiscal year *t-1* as we form portfolios on May 1st.[8] In the twelve months following the initial consensus estimate, the number of analysts who issued an EPS estimate for the given fiscal year typically increases and the consensus mean estimate also changes. Accordingly, we define the number of analysts issuing estimates and the mean EPS estimate at the end of the twelve month period as $NUMEST\_1Y_t$ and $MEANEST\_1Y_t$, respectively. We then define $REVEST_t$ as the change in the consensus mean estimate over that twelve month period (i.e., $REVEST_t = MEANEST\_1Y_t - MEANEST\_2Y_t$). If, however, a firm splits its stock within the twelve month period (such that $MEANEST\_1Y_t$ and $MEANEST\_2Y_t$ are not based on the same number of shares), then we split-adjust $MEANEST\_2Y_t$ so that $REVEST_t$ is computed based on the number of shares when $MEANEST\_1Y_t$ is measured. Figure 2 is a timeline that illustrates how these variables are measured.

In our prediction model of analyst revisions, we include several firm and stock characteristics (discussed further in Section 4.2) as explanatory variables. To proxy for firm size, performance, leverage, and growth, we include the log of total assets (*Log total assets)*, the log of market value of equity (*Log market value)*, income before extraordinary items divided by total assets (*Return on assets)*, the ratio of total debt to stockholder's equity (*Leverage)*, the

[8] This requirement produces a sample that consists mostly of firms with December 31st fiscal year ends. Of the 3,118 firms for which we predict future analyst revisions, 81% have December 31st fiscal year ends. The next most common fiscal year end months are September (4%), January (4%), and June (3%).

percentage change in total revenue from the prior year (*Growth)*, and the ratio of stockholder's equity to market value of equity (*Book-to-market*). Data are from Compustat and are measured for the fiscal year ending prior to the initial consensus two-year-ahead EPS estimate. To capture whether the firm exceeded or failed to meet analyst estimates in the prior year, we define *EPS Surprise* as the difference between the actual reported EPS and the latest consensus estimate from the prior year. We include a measure of past management guidance (*Guidance*), defined as an indicator variable set to 1 (0 otherwise) if the firm provided any type of earnings guidance in the prior year. Since stock splits affect firms' level of EPS and EPS revisions, we also include a variable (*Split*) set to 1 (-1) if the firm conducted a stock split (reverse stock split) during the twelve months ended prior to the initial consensus two-year-ahead EPS estimate, and 0 otherwise. To capture stock price, return, liquidity, and volatility, we use CRSP monthly data to define *Stock Price* as the stock price as of the most recent month ended prior to the initial estimate, *Past Return* as the size-adjusted-return over the calendar year prior to the initial estimate, *Past Volatility* as the standard deviation of monthly returns over the calendar year prior to the initial estimate, and *Past Liquidity* as the average monthly turnover (shares traded divided by shares outstanding) over the calendar year prior to the initial estimate.[9] Finally, we define the buy-and-hold size-adjusted-return ($BHSAR_t$) as a stock's raw return less the return of the corresponding CRSP size decile portfolio, where the holding period is from May 1st of year *t-1* to April 30th of year *t*. All variables are summarized in the appendix.

3.2 Descriptive Statistics

[9] We also used alternative measures of stock volatility and liquidity. To capture volatility, we used the variance of monthly returns. For liquidity, we used the log of total trading volume and the Amihud (2002) illiquidity measure. The results discussed in Section 4 are robust to using these alternative measures.

Table 1 provides descriptive statistics of the variables for the total sample and across deciles based on actual analyst revisions (*REVEST)*.[10] Starting with the properties of the initial two-year-ahead EPS estimate, we find that the median number of analysts who issue an estimate is three and the median EPS value is $1.53. When the estimate becomes a one-year-ahead estimate, the median number of analyst rises to six and the median EPS value declines to $1.33. We compute a median and mean *REVEST* of -$0.10 and -$0.25, respectively, for the total sample. The median *REVEST* increases monotonically (by construction) from -$1.45 for the lowest decile to $0.62 for the highest decile. We also find that 63% of the values of *REVEST* are negative, compared to 35% that are positive and 2% that are zero (not tabulated). These descriptive statistics indicate that the majority of analysts' initial two-year-ahead EPS estimates are revised downward over the following twelve months, consistent with the analyst optimism and "walk down" literature discussed earlier.

The median values of most of the firm characteristics, including *Log total assets*, *Log market value*, *Return on assets*, *Leverage*, *Growth*, and *Book-to-market*, do not appear to differ significantly across the *REVEST* deciles. The median *EPS Surprise* is zero for the first six deciles, $0.01 for deciles 7-9, and $0.02 for decile 10, suggesting that analyst revisions tend to be slightly higher for firms that had positive EPS surprises in the prior year. Stock characteristics *Stock Price*, *Past Volatility*, and *Past Liquidity* do not differ significantly across the deciles. However, *Past Return* does increase monotonically across the deciles. In terms of our hedge portfolio strategy returns, we find that the median buy-and-hold size-adjusted-return (BHSAR) increases monotonically from -28% for the lowest decile of *REVEST* to +19% for the highest decile; the mean BHSAR increases from -24% to +34% across the deciles.

[10] For parsimony, we do not show the variables *Guidance* and *Split* in Table 1 because their median values are zero across all deciles of *REVEST*. The mean value of *Guidance* is approximately 24-25% across all deciles. The mean value of *Split* increases from 0.05 to 0.09 from the lowest to the highest decile.

Figure 3 plots mean *REVEST* by year and decile. The sizeable differences in the magnitudes and sign of analyst revisions in the extreme deciles provide some intuition as to why large abnormal returns can be earned each year from a hedge portfolio strategy where such revisions are perfectly foreseeable. For example, in 2009, firms in the lowest decile (Decile 1) experienced downward EPS revisions over the prior twelve months that averaged $4.01, while firms in the highest decile (Decile 10) experienced upward EPS revisions of $0.50 on average. Over that same period, firms in the lowest decile experienced size-adjusted returns of -28% while firms in the highest decile experienced size-adjusted returns of 15% (discussed further in the next section).

4. Analysis

4.1 Hedge Portfolio Returns Based on Perfect Foresight of Analyst Revisions

To set a benchmark for subsequent tests, we compute hedge portfolio returns to a strategy based on perfect foresight of analyst revisions. As discussed in Section 3.1, $REVEST_{i,t}$ is the revision to the initial consensus two-year-ahead EPS estimate for firm *i* and fiscal year *t*. We require that the consensus estimate is first available between January 1st and April 30th as we form portfolios on May 1st. Each year, we sort firms into deciles based on *REVEST*, take a long position in the stock of firms in the highest decile of *REVEST*, take a short position in the stock of firms in the lowest decile of *REVEST*, hold the positions for exactly one year, and then re-form a new hedge portfolio. The average number of firms in each decile across all years in our sample period is 207. This hedge portfolio is based on perfect foresight of *REVEST* because we already know what the revisions will be over the next twelve months. We measure abnormal returns as raw returns less returns of the corresponding CRSP size-decile. The holding period is from May 1st of year *t-1* to April 30th of year *t*. Figure 4 illustrates the abnormal returns to this strategy over time; the mean (median) abnormal return is 56.3% (59.0%) per year, and the abnormal returns are positive in all 30 years from 1983 to 2012, with returns ranging from 18% in 1984 to 91% in 2000. We examine these abnormal returns further by looking at the long and short portfolios separately. Figure 5 illustrates the returns for each portfolio by year. We again find a consistent pattern; the abnormal returns for the long portfolio are positive every year with a mean of 33% and the returns for the short portfolio are negative every year with a mean of negative 23%. Thus, we confirm that analyst revisions, specifically revisions to initial two-year-ahead consensus EPS estimates over the following twelve months, are strongly correlated with contemporaneous stock returns; furthermore, the magnitudes of these returns are consistent and significant over time.

We examine the contemporaneous relation between analyst estimates and stock prices further by comparing how, on average, the initial two-year-ahead EPS consensus estimate for a firm changes over the following twelve months and how the firm's stock price changes over the same period. For brevity, we present in Figure 6 the median EPS estimates and stock prices for firms in only the lowest and highest deciles, pooled over the entire sample period. Stock prices are measured as the closing price on the date that the I/B/E/S consensus is updated, which is typically the third Thursday of each month. Starting with the lowest decile (Decile 1), the median initial consensus EPS estimate is $2.40 (month 0) and it declines monotonically to $0.80 over the following 12 months. Over the same period, the median stock price declines from $24.24 to $15.87. For the highest decile (Decile), the median initial consensus EPS estimate is $1.87 and it increases monotonically to $2.60 over the following 12 months, while the median stock price increases from $24.63 to $35.54. We caveat that these findings are based on averages for thousands of firms pooled across 30 years, but the general trend is that changes in the initial two-year-ahead EPS estimate (i.e., revisions) over the following 12 months are positively correlated with contemporaneous changes in stock prices (i.e., returns).[11]

4.2 Hedge Portfolio Returns Based on Predicted Analyst Revisions

In this section, we investigate variables that might predict analyst revisions and a trading strategy based on these predicted revisions. We proceed in four steps. First, we examine the explanatory power of variables individually by running univariate regressions on the pooled sample. Second, based on those results, we select a subset of the variables to include in a pooled multivariate regression to gauge the explanatory power of the variables combined. Third, we transition to running annual cross-sectional regressions, in which we use the estimated coefficients each year to predict next period analyst revisions. We note that all the variables used in the prediction model would be available to market participants prior to the month of the initial two-year-ahead EPS estimate, and as such, this final step is essentially a *yearly* out-of-sample test of the prediction model. Finally, we implement a yearly trading strategy which buys the firms in the highest decile of predicted analyst revisions and sells the firms in the lowest decile of predicted revisions, excluding firms with short-selling constraints and a history of stock splits.

While no theory outlines the determinants of analyst revisions of distant fiscal period earnings forecasts, we posit that the determinants include properties of the forecasts themselves. To control for the possibility that revisions are serially correlated, we include the revision from the prior year ($REVEST_{t-1}$) as an explanatory variable for $REVEST_t$. We include the number of estimates ($NUMEST\_2Y_t$) used to compute the initial consensus mean and the level of the EPS estimate itself ($MEANEST\_2Y_t$), motivated by Gleason and Lee (2003), Hou and Moskowitz

[11] The trend is similar when the same analysis is conducted each year (from 1983 to 2012).

(2005), and Cheong and Thomas (2011). Prior studies suggest that several firm and stock characteristics are associated with analyst optimism and revisions (Abarbanell 1991, Ang et al. 2006, Chan et al. 1996, Copeland et al. 2004, Diether et al. 2002, Frankel and Lee 1998). We include the variables *Log total assets* and *Log market value* to proxy for firm size, *Return on assets* to proxy for firm performance, firm characteristics *Leverage* and *Growth*, and *Book-to-market* to proxy for firm valuation. We also include *EPS Surprise, Guidance,* and *Split* to capture the firm's prior earnings surprises, guidance behavior, and stock split decisions. Finally, we include stock characteristics *Stock Price, Past Return, Past Volatility,* and *Past Liquidity,* as defined in Section 3.1 and the Appendix.

We first regress *REVEST* on each independent variable alone. We find that every variable is significant at the 1% level, except that *Return on assets* is significant at the 5% level and the number of analysts (*NUMEST_2Y*) is not significant.[12] Based on the results of these univariate regressions, we exclude *NUMEST*_2Y when we estimate the following pooled multivariate regression for all firm *i* and year *t* in our sample.

$$\begin{aligned} REVEST_{i,t} = {} & \beta_0 + \beta_1 REVEST_{i,t-1} + \beta_2 MEANEST\_2Y_{i,t} + \beta_3 Log\ total\ assets_{i,t-1} \\ & + \beta_4 Log\ market\ value_{i,t-1} + \beta_5 Return\ on\ assets_{i,t-1} + \beta_6 Leverage_{i,t-1} + \beta_7 Growth_{i,t-1} \\ & + \beta_8 Book\text{-}to\text{-}market_{i,t-1} + \beta_9 EPS\ Surprise_{i,t-1} + \beta_{10} Guidance_{i,t-1} + \beta_{11} Split_{i,t-1} \\ & + \beta_{12} Stock\ Price_{i,t-1} + \beta_{13} Past\ Return_{i,t-1} + \beta_{14} Past\ Volatility_{i,t-1} \\ & + \beta_{15} Past\ Liquidity_{i,t-1} + \varepsilon \end{aligned}$$

Table 2 shows the results from this regression, where standard errors are clustered by firm (Rogers 1993) and significance levels are based on two-tailed *t*-tests. We find that all of the variables are significant, except for *Book-to-market*, and the adjusted-R^2 is 8.73%. In particular, the coefficient for the prior year revision ($REVEST_{t-1}$) is significantly positive, which indicates a

[12] For parsimony, the results of 16 univariate regressions are not tabulated.

positive serial correlation in analyst revisions. The coefficients for *Log total assets, Return on assets*, *EPS Surprise, Guidance*, *Split, Stock Price,* and *Past Return* are also positive, which generally suggest that larger firms, more profitable firms, firms that have issued guidance and split their stock, and firms that have outperformed in the past and tend to experience upward analyst revisions. In contrast, the coefficients are significantly negative for the level of the consensus EPS estimate (*MEANEST_2Y*), *Log market value*, *Leverage, Growth, Past Volatility,* and *Past Liquidity*, which suggest that firms with higher EPS expectations, higher valuations, faster top line growth, and higher stock volatility and liquidity tend to experience downward analyst revisions. To compare each variable's relative explanatory power, we multiply each variable's coefficient by the variable's inter-quartile range (1 for an indicator variable). The level of the consensus EPS estimate (*MEANEST_2Y*) has the most significant impact on $REVEST_t$, as a shift from the first quartile consensus EPS value of $0.83 to the third quartile value of $2.64 implies an incremental downward EPS revision of $0.32.

Based on our findings from the pooled multivariate regression, we then run annual cross-sectional regressions and use the estimated coefficients each year to predict analyst revisions (*REVEST_PRED*) over the following twelve months. The adjusted R-squared for the annual regressions ranges from 5% to 37% and averages 16% across all years (not tabulated). We also we compute a correlation across all years between *REVEST* and *REVEST_PRED* of 0.22. Table 3 provides descriptive statistics of the variables for the total sample and across deciles based on predicted analyst revisions (*REVEST_PRED)*. While all of the information in Table 3 (prediction model) is compared to the information in Table 1 (perfect foresight model), we highlight how the buy-and-hold size-adjusted-returns (BHSAR) vary across deciles of *REVEST_PRED*. The median (mean) BHSAR increases generally from -7% (0%) in the lowest decile to -1% (+6%) in the highest decile. These findings suggest that a hedge portfolio based on extreme deciles of predicted analyst revisions would earn abnormal returns of 6% on average.

We implement a hedge portfolio trading strategy each year by buying the firms in the highest decile of predicted analyst revisions (*REVEST_PRED*) and short-selling the firms in the lowest decile. However, we exclude from each year's short-selling firms with stock prices under $5.00 because of short-selling constraints on low-priced stocks. We also do not short firms that have a history of splitting their stock because splits affect the absolute level of EPS revisions and our regression results (Table 2) indicate that firms that have recently split their stock are more likely to experience upward EPS revisions. Combined, these two exclusions reduce the number of firms that are shorted each year by approximately half.

To provide some intuition about how a trading strategy based on predicted revisions works, consider the following example. Suppose that on April 30, 2013, we regress firms' actual *REVEST* for the twelve months ended between January 1 and April 30, 2013 on the prior year revision (*REVEST_LAG*), the level of the initial consensus EPS estimate, and the explanatory variables measured as of the end of fiscal or calendar year 2011. Second, we use the coefficients from this model and apply them to the current *REVEST* (which now becomes the lagged *REVEST* used to predict next period's revision). Additionally, we input the level of the current two-year-ahead EPS estimate (for fiscal year 2014) and explanatory variables (measured as of the end of fiscal or calendar year 2012) into our model in order to compute predicted analyst revisions (*REVEST_PRED*) over the next twelve months. Third, on May 1, 2013 we sort firms into deciles based on *REVEST_PRED*, take long positions in firms in the highest decile and short positions in firms in the lowest decile (excluding firms that have a history of stock splits and whose stocks are under $5.00). Fourth, we hold our hedged portfolio for twelve months and close out our positions on April 30, 2014. The number of firms in highest (lowest) decile for the May 2013 to April 2014 holding period would be approximately 228 (122). We then repeat the process to form a new hedge portfolio on May 1, 2014. As previously mentioned, this procedure yields out-of-sample predictions.

Figure 7 illustrates the annual abnormal returns to this strategy had we formed portfolios beginning on May 1, 1984. Again, we measure abnormal returns as raw returns less returns of the corresponding CRSP size-decile. The mean (median) abnormal return is 14.3% (10.9%) per year, and the abnormal returns are positive in 24 of 28 years from 1985 to 2012. The year with the worst return of -15% occurred for the holding period from May 1, 2009 to April 30, 2010. Given that the predicted revisions (*REVEST_PRED*) for this period were based on actual revisions (*REVEST*) for the twelve months ended in early 2009 and explanatory variables measured at the end of fiscal or calendar 2007, we believe that the negative hedge portfolio return is primarily related to the financial crisis and its effect on our prediction model.[13]

We again examine the returns for the long and short portfolios separately. Figure 8 shows that the long portfolio earns positive abnormal returns in 19 of 28 years and the mean return is 5.7%, while the short portfolio earns negative abnormal returns in 21 of 28 years and the mean return is -8.6%. Overall, the findings indicate that a strategy based on predicted analyst revisions captures roughly 25% (14.3%/56.3%) of the abnormal returns from the perfect foresight strategy. At 11-14% annually, the returns to our strategy are economically significant.

5. Additional Analyses

5.1 Trading Strategy Based on Revisions to One-Year-Ahead EPS Estimates

[13] The -15% abnormal return is the result of a -5.7% abnormal return in the long portfolio (highest decile of *REVEST_PRED)* and a +9.6% abnormal return in the short portfolio (lowest decile of *REVEST_PRED*).

Based on the results of our trading strategy, a natural question that arises is whether a similar strategy based on revisions to one-year-ahead EPS estimates would earn abnormal returns. Prior research suggests that returns would be smaller. For example, Copeland et al. (2004) find that revisions to current year analyst growth estimates, while correlated with stock returns, are not significant after controlling for revisions to estimates of later years. Conventional thinking suggests that as a firm's earnings announcement date draws nearer, typically there will be less information that surprises analysts and their estimate revisions will be less dramatic. Our findings are consistent with this notion. Table 1 Panel A illustrates that the median and mean *REVEST* are -$0.10 and -$0.25, while the median and mean revisions to one-year-ahead EPS estimates are -$0.08 and -$0.23 (not tabulated), respectively.

To be consistent with our methodology discussed in Section 4, we form portfolios on May 1st each year. However, we shorten our holding period by three months as we do not want to include the returns for the months after actual EPS are announced (an issue that we did not need to worry about for two-year-ahead EPS estimates). For example, most of the one-year-ahead EPS estimates are available in mid-February of a given year (51% of our sample), and actual EPS are typically announced in mid-February of the following year. Therefore, we compute size-adjusted returns between May 1st and January 31st of the following year (nine months).[14] In untabulated results, we find that a hedge portfolio based on perfect foresight of one-year-ahead EPS revisions earns a mean (median) abnormal return of 34.3% (33.0%) for the nine-month period, and the returns are positive each year from 1983 to 2011. However, when we use predicted revisions, our hedge portfolio earns a mean (median) abnormal return of 3.2% (0.1%) per nine-month period each year. Therefore, we find that our trading strategy based on

[14] We also computed size-adjusted returns to a perfect foresight strategy for 8-month holding periods (from May 1st to December 31st) and 10-month holding periods (from May 1st to February 28th of the following year). The mean and median annual hedge returns were slightly smaller (0-2%) than those reported for the 9-month holding period.

predicting analyst revisions of one-year-ahead EPS estimates earns returns that are not economically significant.

5.2 The Effect of Transactions Costs

The trading strategy based on predicted analyst revisions discussed in Section 4.2 generates annual abnormal returns of about 11-14%, excluding transaction costs. Transaction costs include the bid-ask spread, commissions paid to the broker, and the price impact of the buy and sell orders. Broker's commissions have been declining in the past 15 years, with many discounted brokers offering very low or even zero commission for an unlimited number of shares per trade.[15] The price impact depends on the trade size and could be substantial for large institutional investors investing in small-cap stocks. However, due to data limitations, we explicitly consider only the bid-ask spread in this section. We compute the spread for a given stock as the difference between the ask and bid prices, divided by the average of the ask and bid prices. We then consider the total spread to establish and close our hedge portfolio as the sum of the average spread of the stocks in the short portfolio and the average spread of the stocks in the long portfolio. We also compare the total spread before and after decimalization in April 2001. We find that the mean spread prior to decimalization was 4.0% (2.2% for the short portfolio plus 1.8% for the long portfolio), and we find that it declined to 1.2% (0.5% for the short portfolio plus 0.7% for the long portfolio) after decimalization. Therefore, we conclude that transaction costs would not negate the abnormal returns to our trading strategy prior to decimalization, and they would have even less of an impact after decimalization.

5.3 High vs. Low Analyst Coverage Firms

[15] For example, Charles Schwab charges $8.95 per trade, whereas Scottrade charges $7 per trade. Bank of America Merrill Lynch offers zero commission for the first 30 trades per month.

In Section 4.2 we found that the number of analysts included in the initial consensus two-year-ahead EPS estimate (*NUMEST_2Y*) was not a significant predictor of future analyst revisions (results presented in column (3) of Table 2), indicating that low and high coverage firms experience analyst EPS revisions of similar magnitude. However, it is unclear as to whether returns to our trading strategy would be similar across firms with low versus high analyst coverage. On one hand, firms with low analyst coverage are thought to have poorer information environments and, therefore, be subject to greater undervaluation or overvaluation (Healy and Palepu 2001) due to the "lemons" problem (Akerlof 1970). A poorer information environment could also be associated with higher spreads (Glosten and Milgrom 1985, Kim and Verrecchia 1994). Thus, one might expect that returns to our trading strategy would be higher for low analyst coverage firms, but offset to some degree by higher transactions costs.

On the other hand, our results are consistent with the notion that investors naively incorporate initial long-term analyst forecasts into stock prices and that subsequent price changes occur when analysts revise their initial estimates. This logic suggests that when a firm has more analysts, there will be more revisions to the initial consensus and more subsequent price reactions. Therefore, one might expect that returns to our trading strategy would be higher for high analyst coverage firms.

We examine this empirical question by computing the abnormal returns to our trading strategy based on predicted analyst revisions (*REVEST_PRED*) for firms with high analyst coverage versus firms with low analyst coverage. We define the former group as firms with *NUMEST_2Y* greater than or equal to 3 (the median shown in Table 1), and the latter group as the remaining firms.[16] We also consider the total spread for the two separate groups of firms.

[16] Note that three is not the median number of analysts who cover a firm in the high analyst coverage group. Rather, it is the number of analysts who issue a two-year-ahead EPS estimate in the first month after the prior year's

In untabulated results, we find that the mean (median) abnormal return for high analyst coverage firms is 11.2% (8.1%) per year. We compute the total spread before and after decimalization to be 2.8% and 0.9%, respectively. For low analyst coverage firms, we compute a mean (median) abnormal return of 13.9% (10.7%) per year, and the total spread is 4.8% before decimalization and 1.8% afterwards. Taking into account the post-decimalization spreads, the mean return for low analyst coverage firms is higher than for high analyst coverage firms: 12.1% versus 10.3%.

5.4 Scaled Analyst Revisions

Throughout this paper, we have focused on analysts' two-year-ahead EPS estimates and revisions to these estimates in absolute dollars and cents per share terms. The reason, as discussed in the literature review of Section 2.2, is prior evidence that shows market participants fixate on EPS as the primary metric of firm performance, and react to deviations from EPS benchmarks, without adjustments for scale (Graham et al. 2005, Cheong and Thomas 2011). As such, attempts to predict a scaled version of analyst EPS revisions and implement a trading strategy based on predicted scaled revisions should earn less economically significant returns. In this subsection, we test this conjecture by repeating our analyses using scaled versions of analyst revisions.

In our first test, we divide analyst revisions (*REVEST*) by the initial consensus two-year-ahead EPS estimate (*MEANEST_2Y*), which creates a variable that measures the percentage revision (*REVEST_PCT*). To avoid small denominator problems, we require that the initial EPS estimate be equal to or greater than $0.20, which reduces the number of sample firm-years from 51,520 to 41,955. We find that our trading strategy based on predicted (percentage EPS) analyst

earnings are announced. The median level of analyst coverage is closer to eleven, which is the median number of analysts who issue a one-year-ahead EPS for this group of firms.

revisions earns a mean (median) abnormal return of 4.6% (5.8%). This average return is less than half the magnitude of the 11-14% average return discussed in the main results, and the yearly returns are more volatile when compared to the returns based on predicted absolute EPS revisions. For example, while the worst hedge return using predicted absolute EPS revisions was -15% in 2010, the returns are -36% in 2000, -22% in 2004, and -20% in 2010 using predicted percentage EPS revisions.

In our second test, we divide analyst revisions (*REVEST*) by the stock price as of the most recent month ended prior to the initial consensus EPS estimate. To avoid small denominator problems, we require that the stock price be equal to or greater than $1.00, which reduces the number of sample firm-years from 51,520 to 45,557. We find that our trading strategy based on predicted analyst revisions, scaled by stock price, earns a mean (median) abnormal return of 5.7% (3.6%). Again, the average return is less than half the magnitude and the yearly returns are more volatile, when compared to the returns based on predicted absolute EPS revisions. In summary, although our results suggest that using a scaled version of analyst revisions of EPS can earn positive abnormal returns, on average, the magnitude of returns are smaller when compared to the returns based on analyst revisions of EPS in absolute dollars and cents per share terms.

6. Conclusion

This study focuses on the predictability of analyst revisions for two-year-ahead EPS estimates. Our motivation is grounded in a large literature on sell-side analysts showing that analyst estimates are overly optimistic, initial analyst estimates tend to be walked down by management over time, and revisions to estimates are strongly correlated with contemporaneous stock returns. In addition, we build upon recent research indicating that investors fixate on EPS, and deviations from expected earnings in terms of absolute cents per share. We find that a trading strategy based on perfect foresight of analyst EPS revisions earns consistent abnormal returns of 56-59% per year, and we demonstrate that an analogous trading strategy based on predicted analyst revisions captures roughly 25% of the perfect foresight returns (or 11-14% annualized abnormal returns).

Our empirical findings are consistent with the explanation that investors naively incorporate analysts' long-term forecasts into stock prices, despite evidence suggesting that the forecasts are biased. While the theory of investors' limited attention has been proposed in prior studies (Da and Warachka 2011, DellaVigna and Pollet 2007, Hirshleifer et al. 2009), we do not purport to explain our empirical findings *solely* in terms of market inefficiency. That is, our findings can be consistent with either market inefficiency or market efficiency; below, we discuss three plausible explanations consistent with the latter.

Past research shows that stock returns are predictable conditional on a variety of observable variables. The empirical results can be consistent with either market efficiency or mispricing. The market is deemed to be informationally efficient if the distribution of returns perceived by investors based on information they process is identical to the distribution conditional on all publicly available information. When this condition is satisfied, the explanation of predictability invokes shifts in the risk premium. In our setting, the abnormal returns to the trading strategy we demonstrate could be the result of a shift in risk premia for stocks in the extreme deciles of analyst revisions.

Another explanation for predictability is parameter uncertainty, which posits that investors are Bayesian rational but have imperfect information about the parameters of the distribution of fundamental values (Lewellen and Shanken 2002). For example, in the case of Lewellen and Shanken, the fundamental value of dividends are truly drawn from a distribution with a constant mean (from the perspective of a researcher), whereas the subjective distribution perceived by the investor has a random variable as the mean. Applied to our setting, this explanation suggests that while investors derive Bayesian rational updates of analysts' two-year-ahead EPS estimates, they view the subsequent revisions as random variables such that they cannot exploit what an empiricist documents (such as in our study) as an empirical regularity of analysts revising downward their estimates over time.

Dontoh, Ronen, and Sarath (2004) provide yet a third explanation positing that rational investors have no parameter uncertainty (i.e., investors have perfect information about the distribution of the fundamental value). Instead, investors face noisy prices where the noise is injected by trading that is not based on fundamental information (such as liquidity trading, etc.). This noise makes trading risky; hence, investors hedge against the risk by not fully acting on available information. Applying this theory to our paper's findings, the interpretation would be that even if investors can make the same predictions of analyst revisions as we do, they do not act fully on their predictions in order to hedge against price fluctuations caused by noisy trading.

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Appendix: Variable Definitions

Variable	Description	Source
NUMEST_2Y	Number of analysts who issued a two-year-ahead EPS estimate during the first month in which the estimate is available in I/B/E/S.	I/B/E/S
MEANEST_2Y	Mean consensus two-year-ahead EPS estimate for the first month in which the estimate is available in I/B/E/S.	I/B/E/S
NUMEST_1Y	Number of analysts who issued a one-year-ahead EPS estimate during the first month in which the estimate is available in I/B/E/S.	I/B/E/S
MEANEST_1Y	Mean consensus one-year-ahead EPS estimate for the first month in which the estimate is available in I/B/E/S.	I/B/E/S
REVEST	Change in the mean consensus two-year-ahead EPS estimate from the time it was first available to when it became a one-year-ahead estimate (*MEANEST_1Y* - *MEANEST_2Y*).	I/B/E/S
Log total assets	Log of total assets, measured for the most recent fiscal year ended prior to the initial consensus two-year-ahead EPS estimate.	Compustat
Log market value	Log of market value of equity, measured for the most recent fiscal year ended prior to the initial consensus two-year-ahead EPS estimate.	Compustat
Return on assets	Income before extraordinary items, measured for the most recent fiscal year ended prior to the initial consensus two-year-ahead EPS estimate.	Compustat
Leverage	Ratio of total debt to stockholder's equity, measured for the most recent fiscal year ended prior to the initial consensus two-year-ahead EPS estimate.	Compustat
Growth	Percentage change in total revenue from the prior year, measured for the most recent fiscal year ended prior to the initial consensus two-year-ahead EPS estimate.	Compustat
Book-to-market	The ratio of stockholder's equity to market value of equity, measured for the most recent fiscal year ended prior to the initial consensus two-year-ahead EPS estimate.	Compustat
EPS Surprise	Difference between the actual reported EPS and the latest consensus estimate from the prior year.	I/B/E/S
Guidance	An indicator variable set to 1 (0 otherwise) if the firm provided any type of earnings guidance in the prior year.	First Call
Split	Variable set to 1 (-1) if the firm conducted a stock split (reverse stock split) during the twelve months ended prior to the initial consensus two-year-ahead EPS estimate, and 0 otherwise.	I/B/E/S
Stock Price	Stock price as of the most recent month ended prior to the initial consensus two-year-ahead EPS estimate.	CRSP
Past Return	Size-adjusted return (raw return - CRSP size decile return) for the most recent calendar year ended prior to the initial consensus two-year-ahead EPS estimate.	CRSP
Past Volatility	Standard deviation of monthly returns for the most recent calendar year ended prior to the initial consensus two-year-ahead EPS estimate.	CRSP
Past Liquidity	Average monthly share volume turnover (shares traded / shares outstanding) for the most recent calendar year ended prior to the initial consensus two-year-ahead EPS estimate.	CRSP
BHSAR	Raw return less the return of the corresponding CRSP size decile portfolio, where the holding period is from May 1 of year t-1 to April 30 of year t.	CRSP

Figure 1: Analyst Four-, Three-, Two-, and One-Year-Ahead EPS Estimates

Figure 1 shows the mean number of analysts included in the initial one-year-ahead (FY1), two-year-ahead (FY2), three-year-ahead (FY3), and four-year-ahead (FY4) EPS consensus estimate. The number of analysts included in the median long-term growth (LTG) forecast is measured on the same date as the FY2 estimate.

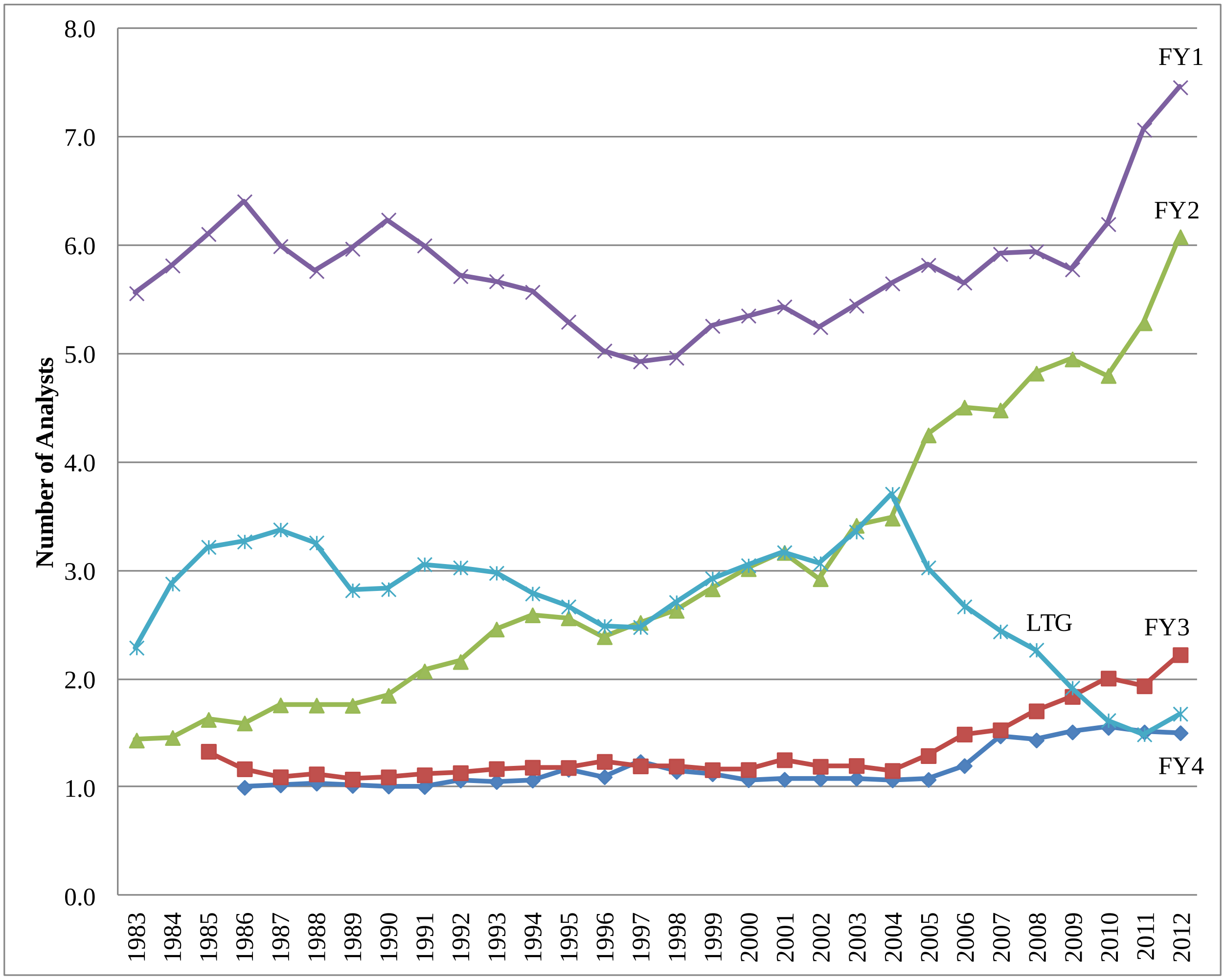

Figure 2: Timeline of Analyst Revisions

Figure 2 illustrates how, $REVEST_t$, the revision in the initial two-year-ahead EPS estimate is measured. $MEANEST\_2Y_t$ is the initial mean EPS estimate for fiscal year *t*, available between January 1st and April 30th of year *t-1*. $MEANEST\_1Y_t$ is the updated EPS estimate one year later. $REVEST_t$ is the difference between $MEANEST\_1Y_t$ and $MEANEST\_2Y_t$.

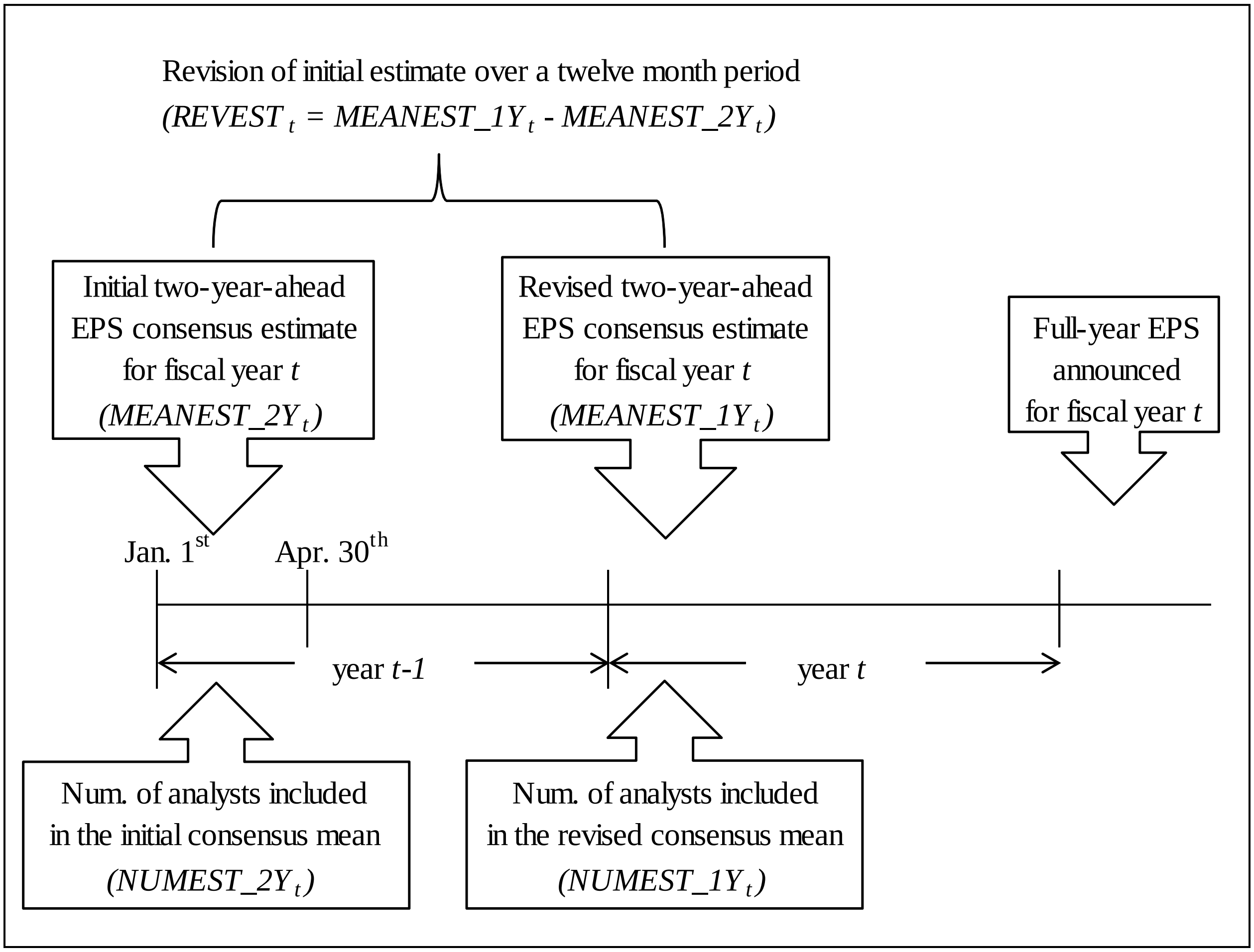

Figure 3: Actual REVEST across deciles and years

Figure 3 shows the mean revision to analysts' two-year-ahead EPS estimates (*REVEST)* by decile and year.

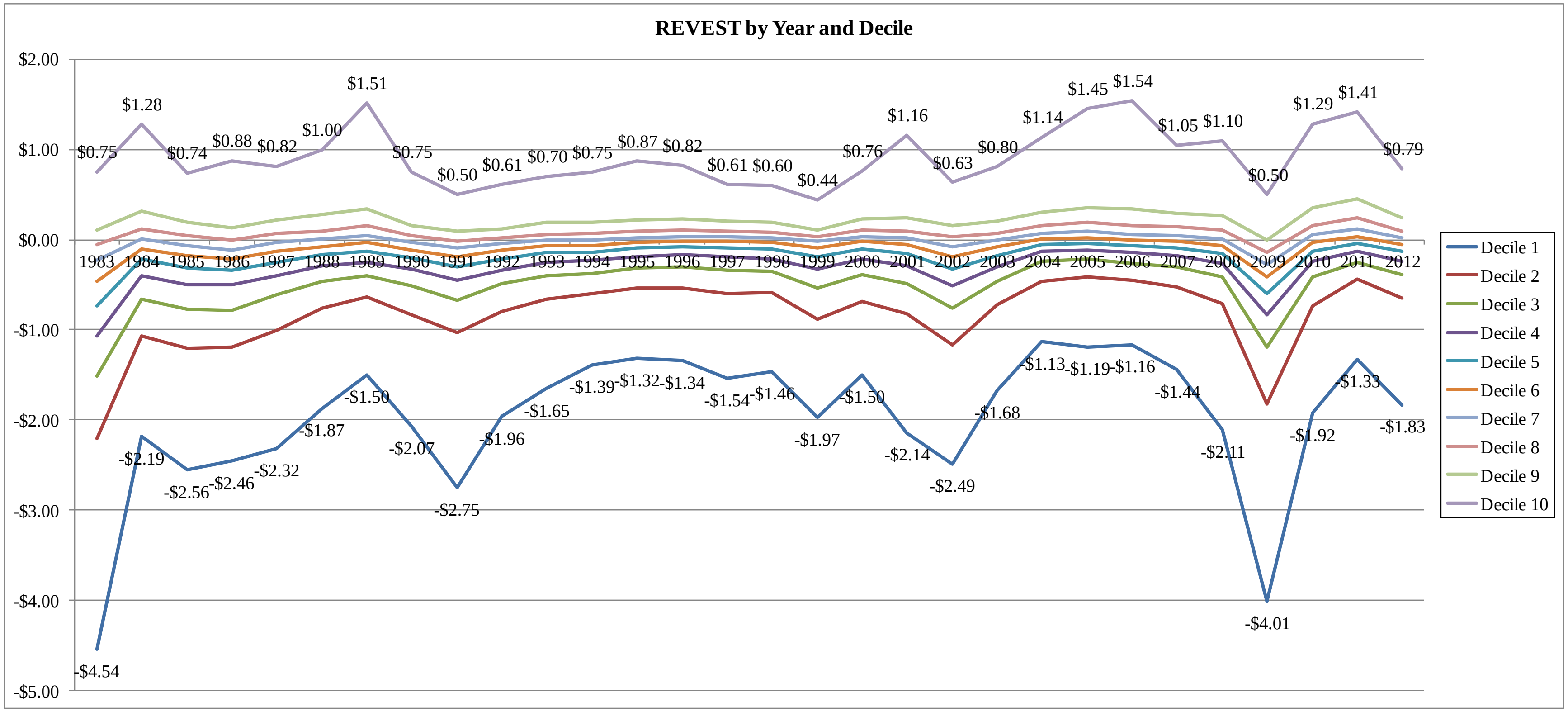

Figure 4: Hedge Portfolio Size-Adjusted-Returns based on Perfect Foresight of Analyst Revisions (*REVEST*)

Size-adjusted-returns to a hedge portfolio based on perfect foresight of analyst revisions of two-year-ahead estimates (*REVEST*), taking a long position in firms in the highest decile of *REVEST* and a short position in firms in the lowest decile of *REVEST*. Size-adjusted-returns are cumulated from May 1st of year *t-1* to April 30th of year *t*.

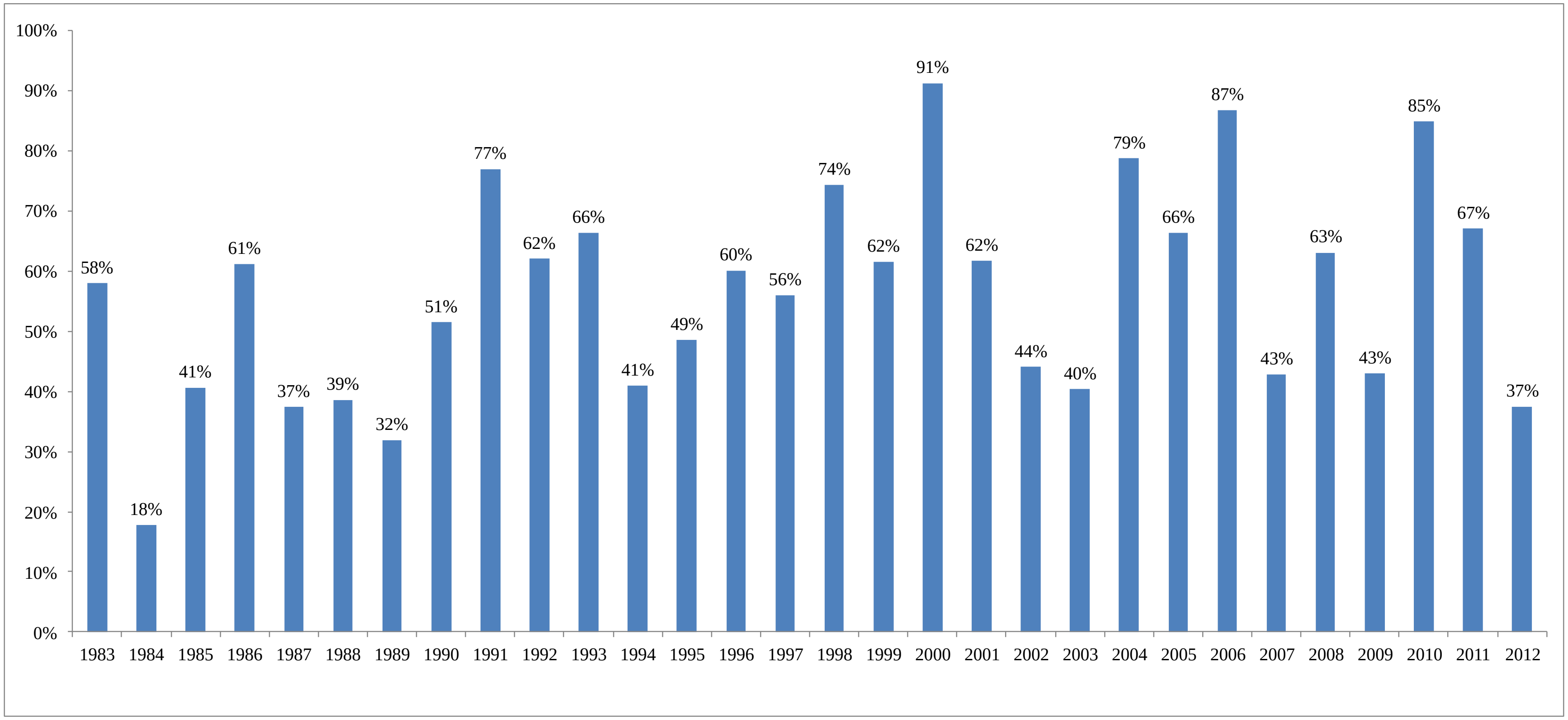

Figure 5: Long and Short Portfolio Size-Adjusted-Returns based on Perfect Foresight of Analyst Revisions (*REVEST*)

Size-adjusted-returns based on perfect foresight of analyst revisions of two-year-ahead estimates (*REVEST*). The long portfolio is created by taking a long position in firms in the highest decile of *REVEST*, and the short portfolio is created by taking a short position in the firms in the lowest decile of *REVEST*. Size-adjusted-returns are cumulated from May 1st of year *t-1* to April 30th of year *t*.

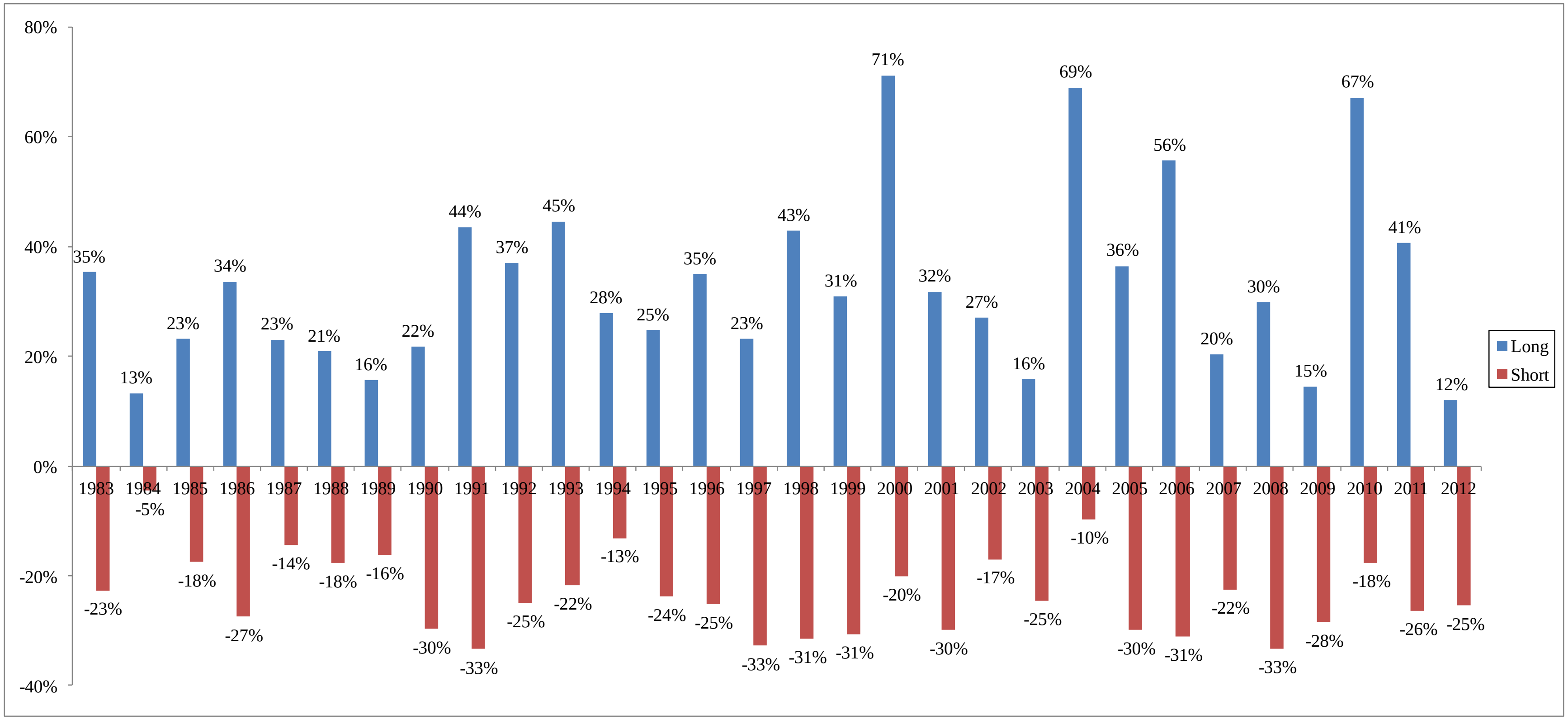

Figure 6: Changes in the Initial Two-Year-Ahead EPS Estimate and Stock Prices

Figure 6 plots the median two-year-ahead EPS consensus estimate (left vertical axis) from the time it is first available (month 0) to 12 months later for firms in the lowest *REVEST* decile (Decile 1) and highest decile (Decile 10) across the entire sample period. Also plotted (on the right vertical axis) is the median stock price over the 12 months for firms in the lowest and highest deciles.

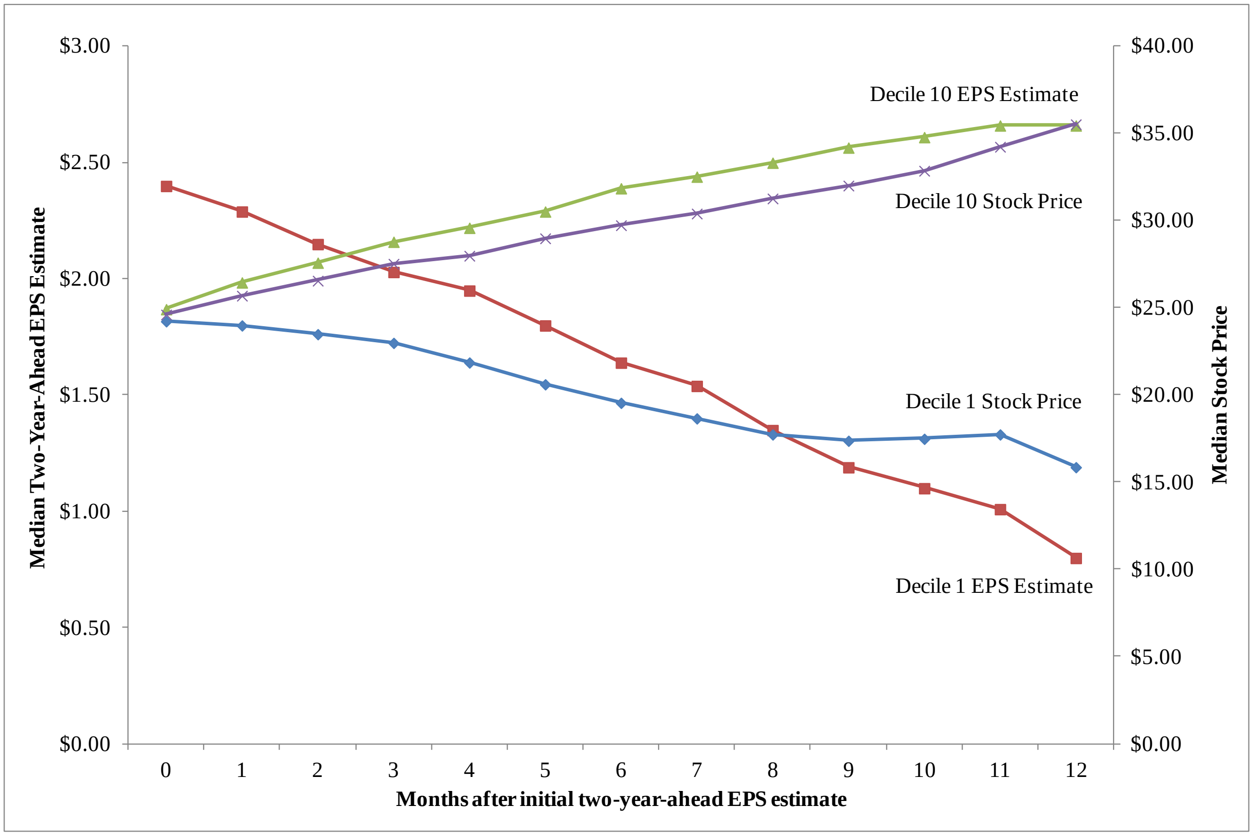

Figure 7: Hedge Portfolio Size-Adjusted-Returns based on Predicted Analyst Revisions (*REVEST_PRED*)

Size-adjusted-returns to a hedge portfolio based on predicted analyst revisions of two-year-ahead estimates (*REVEST_PRED*), taking a long position in firms in the highest decile of *REVEST_PRED* and a short position in firms in the lowest decile of *REVEST_PRED*. Size-adjusted-returns are cumulated from May 1st of year *t-1* to April 30th of year *t*.

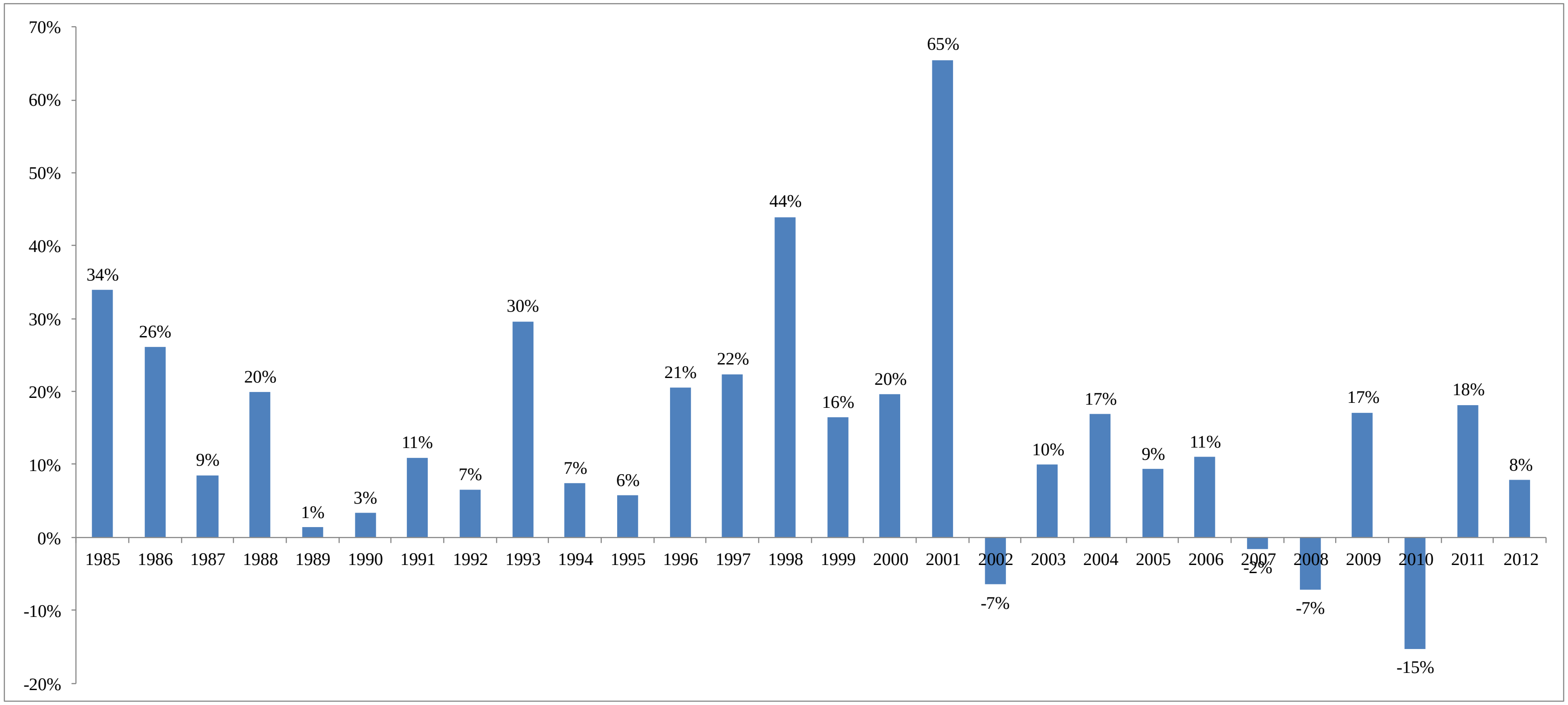

Figure 8: Long and Short Portfolio Size-Adjusted-Returns based on Predicted Analyst Revisions (*REVEST_PRED*)

Size-adjusted-returns based on predicted analyst revisions of two-year-ahead estimates (*REVEST_PRED*). The long portfolio is created by taking a long position in firms in the highest decile of *REVEST_PRED*, and the short portfolio is created by taking a short position in the firms in the lowest decile of *REVEST_PRED*. Size-adjusted-returns are cumulated from May 1st of year *t-1* to April 30th of year *t*.

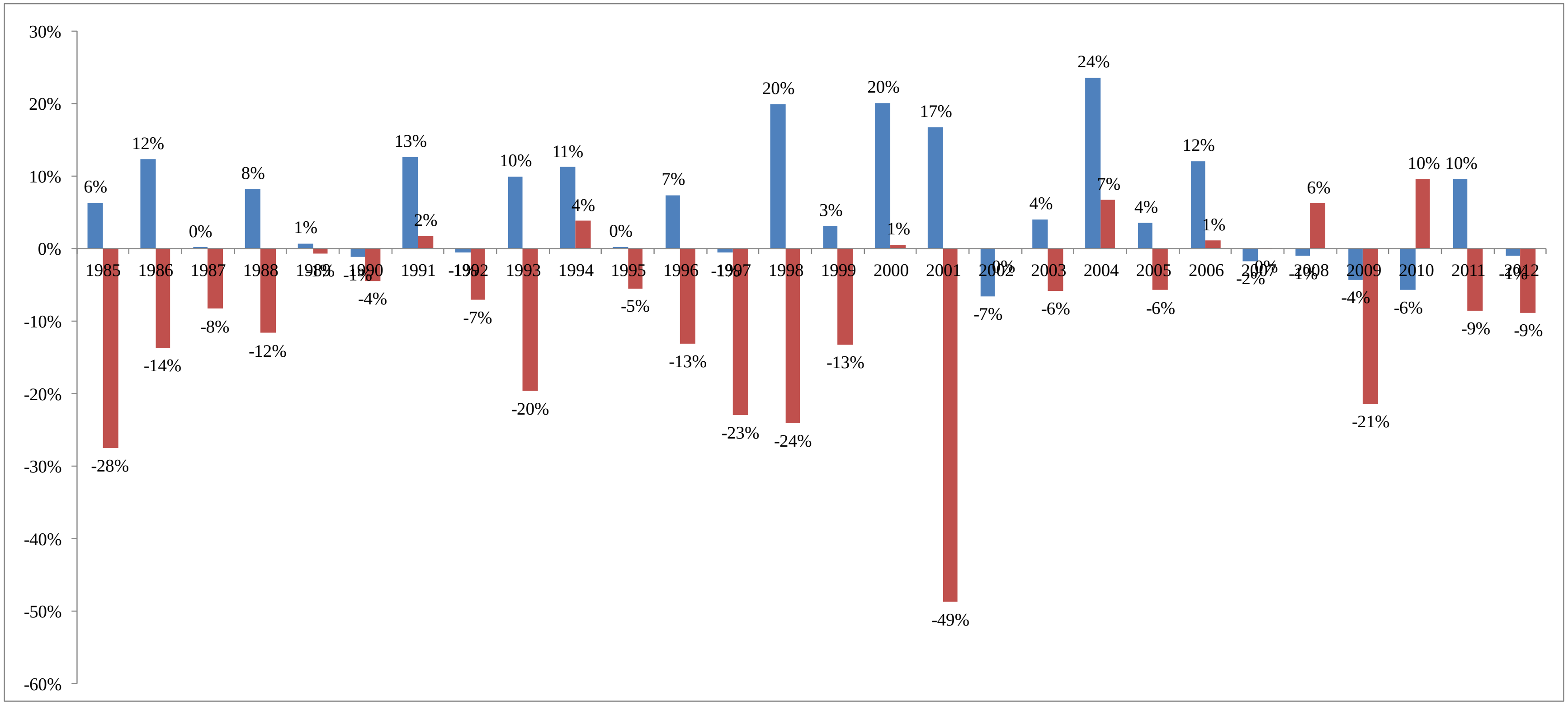

Table 1

Table 1 presents descriptive statistics across deciles based on analyst revisions of two-year-ahead estimates (*REVEST*). All variables are defined in the appendix.

	Lowest	2	3	4	5	6	7	8	9	Highest	Total Sample
Median REVEST	-$1.45	-$0.67	-$0.40	-$0.25	-$0.13	-$0.05	$0.01	$0.09	$0.22	$0.62	-$0.10
Mean REVEST	-$1.87	-$0.77	-$0.47	-$0.30	-$0.17	-$0.08	$0.00	$0.09	$0.23	$0.90	-$0.25
Sample N (for REVEST)	6,165	6,223	6,240	6,214	6,181	6,271	6,273	6,203	6,168	6,059	61,997
Properties of the Two-Year-Ahead EPS Estimate (Medians)											
MEANEST_2Y	$2.40	$1.67	$1.50	$1.36	$1.34	$1.30	$1.35	$1.42	$1.52	$1.87	$1.53
NUMEST_2Y	3	3	2	2	2	2	2	2	3	3	3
MEANEST_1Y	$0.80	$0.92	$1.04	$1.08	$1.19	$1.25	$1.35	$1.50	$1.75	$2.60	$1.33
NUMEST_1Y	7	6	6	6	6	6	6	6	7	7	6
Firm Characteristics (Medians)											
Log total assets	7.11	6.56	6.47	6.38	6.42	6.34	6.46	6.54	6.65	7.04	6.60
Log market value	6.63	6.21	6.12	6.11	6.09	6.04	6.16	6.21	6.30	6.50	6.24
Return on assets	3%	3%	3%	3%	3%	3%	4%	4%	4%	3%	3%
Leverage	0.36	0.27	0.25	0.23	0.25	0.25	0.25	0.23	0.25	0.31	0.27
Growth	12%	12%	11%	10%	11%	10%	10%	11%	11%	10%	11%
Book-to-market	0.57	0.53	0.52	0.51	0.52	0.51	0.50	0.50	0.50	0.55	0.52
EPS Surprise	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.01	$0.01	$0.01	$0.02	$0.01
Stock Characteristics (Medians)											
Stock Price	$24.57	$19.96	$18.75	$18.09	$17.88	$18.00	$19.63	$21.44	$22.50	$26.00	$20.50
Past Return	-8%	-7%	-6%	-6%	-3%	-2%	1%	3%	6%	7%	-1%
Past Volatility	11%	11%	11%	11%	10%	10%	10%	10%	10%	11%	10%
Past Liquidity	12%	10%	9%	8%	8%	7%	7%	8%	8%	9%	9%
Buy-and-Hold Size-Adjusted-Returns (BHSAR)											
Median BHSAR	-28%	-21%	-15%	-11%	-6%	-1%	3%	7%	13%	19%	-4%
Mean BHSAR	-24%	-18%	-13%	-9%	-4%	4%	8%	13%	22%	34%	1%

Table 2

Table 2 presents the results of a pooled regression of *REVEST* on lagged *REVEST* and prior year firm and stock characteristics. The I.Q.R. effect for each variable is the product of the estimated coefficient and the inter-quartile range (1 for an indicator variable). All variables are defined in the appendix.

Dependent Variable: $REVEST_t$	Coeff.		I.Q.R. Effect
$REVEST_{t-1}$	0.121	***	0.068
$MEANEST\_2Y_t$	-0.176	***	-0.318
Log total assets$_{t-1}$	0.074	***	0.202
Log market value$_{t-1}$	-0.059	***	-0.136
Return on assets$_{t-1}$	0.102	***	0.007
Leverage$_{t-1}$	-0.025	***	-0.018
Growth$_{t-1}$	-0.110	***	-0.027
Book-to-market$_{t-1}$	0.005		0.003
EPS Surprise$_{t-1}$	0.078	***	0.005
Guidance$_{t-1}$	0.025	***	0.025
Split$_{t-1}$	0.173	***	0.173
Stock Price$_{t-1}$	0.006	***	0.144
Past Return$_{t-1}$	0.070	***	0.033
Past Volatility$_{t-1}$	-0.342	***	-0.027
Past Liquidity$_{t-1}$	-0.414	***	-0.052
Intercept	-0.037		
N	52,346		
Adjusted-R^2	0.0873		

*, **, *** Significantly different from zero at the 0.10, 0.05, and 0.01 level, respectively, using a two-tailed *t*-test and standard errors clustered by firm.

Table 3

Table 3 presents descriptive statistics across deciles based on predicted analyst revisions of two-year-ahead estimates (*REVEST_PRED*). All variables are defined in the appendix.

	Lowest	2	3	4	5	6	7	8	9	Highest	Total Sample
Median REVEST_PRED	-$0.36	-$0.25	-$0.19	-$0.14	-$0.11	-$0.10	-$0.07	-$0.05	-$0.02	$0.02	-$0.10
Mean REVEST_PRED	-$0.68	-$0.40	-$0.33	-$0.25	-$0.20	-$0.18	-$0.15	-$0.12	-$0.06	$0.02	-$0.23
Sample N	5,138	5,156	5,157	5,151	5,148	5,164	5,153	5,155	5,158	5,140	51,520
Properties of the Two-Year-Ahead EPS Estimate (Medians)											
MEANEST_2Y	$2.22	$1.78	$1.70	$1.65	$1.58	$1.55	$1.57	$1.45	$1.38	$1.34	$1.58
NUMEST_2Y	3	3	3	3	3	3	3	3	3	3	3
MEANEST_1Y	$1.47	$1.35	$1.36	$1.37	$1.38	$1.39	$1.45	$1.35	$1.33	$1.31	$1.37
NUMEST_1Y	8	7	7	6	6	6	6	6	6	7	6
Firm Characteristics (Medians)											
Log total assets	7.20	6.59	6.53	6.46	6.53	6.53	6.67	6.67	6.76	6.96	6.66
Log market value	6.62	6.24	6.27	6.23	6.23	6.28	6.33	6.33	6.35	6.70	6.34
Return on assets	2%	4%	4%	4%	4%	4%	4%	3%	3%	2%	4%
Leverage	0.27	0.24	0.23	0.25	0.27	0.26	0.30	0.29	0.27	0.21	0.26
Growth	12%	12%	11%	10%	10%	10%	10%	10%	11%	13%	11%
Book-to-market	0.55	0.53	0.52	0.53	0.53	0.52	0.53	0.52	0.48	0.41	0.51
EPS Surprise	$0.00	$0.00	$0.00	$0.00	$0.00	$0.01	$0.01	$0.01	$0.01	$0.01	$0.01
Stock Characteristics (Medians)											
Stock Price	$22.88	$19.38	$20.19	$20.15	$20.38	$20.75	$21.41	$21.50	$22.86	$30.25	$21.63
Past Return	-17%	-14%	-11%	-7%	-4%	-1%	2%	4%	11%	19%	-2%
Past Volatility	13%	12%	11%	10%	10%	10%	9%	9%	9%	9%	10%
Past Liquidity	14%	12%	10%	9%	8%	8%	7%	7%	7%	8%	9%
Buy-and-Hold Size-Adjusted-Returns (BHSAR)											
Median BHSAR	-7%	-6%	-4%	-4%	-3%	-4%	-3%	-3%	-2%	-1%	-4%
Mean BHSAR	0%	0%	2%	0%	2%	2%	2%	2%	4%	6%	2%