Analyst Long-term Growth Forecasts, Accounting Fundamentals and Stock Returns

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Abstract:

We decompose consensus analyst long-term growth forecasts into a hard growth component that captures accounting information (asset and sales growth, profitability and equity dilution) and an orthogonal soft growth component. The soft component does not forecast future returns, and the hard component does forecast future returns, but in a perverse way. Specifically, stocks with accounting information indicating favorable long-term growth forecasts tend to realize negative future excess returns. This and other evidence we present is consistent with biased long-term growth forecasts generating stock mispricing.

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I.   Introduction

The Gordon growth model expresses a stock's price as a function of its current dividends, a discount rate, and long-term growth expectations. Of the three relevant components of price, determining long-term growth expectations requires the most judgement and is the most likely to be subject to systematic mistakes. This paper analyzes potential errors in long-term growth expectations by examining the long-term consensus (mean) forecasts of earnings reported by sell-side analysts.[2] Consistent with earlier work, we find evidence of systematic errors in the forecasts, as well as evidence that these errors are reflected in stock prices in ways that are consistent with various return anomalies discussed in the academic finance literature.

To better understand the biases in long-term growth forecasts we decompose the forecasts into what we call a hard component, which can be explained by accounting and choice variables, and a soft component, which is the residual. Elements of the hard component include accounting ratios that capture profitability and changes in sales, as well as choices that influence asset growth and equity dilution. As we show, both components of long-term growth are related to current stock prices, suggesting that either the forecasts or the rationale used by the forecasters influence stock prices.[3] However, our evidence indicates that the forecasts of sell-side analysts are systematically biased, and that these biases may have influenced stock prices in ways that make their returns predictable.

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[2]Analysts periodically provide forecasts of the current, one- and two-year forward EPS and a longer-term growth rate (LTG) that reflects expected annual percentage changes in EPS after the two-year EPS forecast. The exact forecast period for LTG is subjective and can vary by analyst. Da and Warachka (2011) explain that LTG reflects an analyst's perception of EPS growth over the three-year period starting two years from now.

[3]There is a large literature that links analyst long-term growth forecasts to stock prices. Easton, Taylor, Shroff and Sougiannis (2001), Bradshaw (2004), Claus and Thomas (2001), Gebhardt, Lee and Swaminathan (1998) and Nekrasov and Ogneva (2011) use analyst long-term growth as an input for a residual income valuation model to estimate the cost of capital. Bandyopadhyay, Brown and Richardson (1995) examine 128 Canadian firms and find that 60% of the variation in analyst stock price recommendations can be explained by long-term earnings growth forecasts.

The observed biases are linked to the hard component of the growth forecasts. In particular, the forecasts suggest that analysts believe profits are mean reverting, but profitability actually tends to be fairly persistent. The forecasts also indicate that analysts believe that high past sales growth is a good predictor of future earnings growth. However, we find that high sales growth is actually weakly negatively associated with future earnings growth. Endogenous firm decisions, such as the rate of asset growth, and the use of external financing, are associated with higher growth forecasts, but the relationship between these choices and actual earnings growth is actually negative. The soft component of the growth forecasts does in fact correctly predict actual growth, although in some tests the relationship is relatively weak.

The above evidence is consistent with the idea that the logic of mapping hard information to expected future growth rates may be leading investors astray. If this is the case, investors may be able to profit with trading strategies that buy stocks when the hard component of growth is unfavorable and sell when the hard component is favorable. Our evidence, which is consistent with other papers in the investment anomalies literature, indicates that this is indeed the case.

Our paper is not the first to describe biases in analyst long-term growth forecasts and relate these biases to abnormal stock returns.[4] Previous research by Dechow and Sloan (1997), Chan, Karceski and Lakonishok (2003), La Porta (1996) and Sloan and Skinner (2002) find evidence that overly optimistic equity analyst forecasts contribute to the value premium and that growth stocks underperform when high expectations are not met. Copeland, Dolgoff, and Moel (2004) show that innovations in analyst long-term growth estimates are positively correlated with contemporaneous stock returns. A more recent paper by Da and Warachka (2011) conjectures that short-term earnings forecasts are much more accurate than the long-term forecasts and shows that a strategy that exploits differences between these forecasts generates excess returns.

We contribute to this literature in a number of ways. In particular, we are the first to consider how the various types of hard information, such as endogenous choices like asset growth and equity issues may influence long-term growth forecasts. Second, we are the first to seriously consider the challenges associated with estimating realized long-term earnings growth in a sample with considerable survivorship bias – close to 1/3 of our sample has missing realized five-year earnings growth as reported by I/B/E/S. Some of the missing firms were acquired and some went bankrupt, so our sample of survivors is clearly biased. As we will describe in detail later, to address this problem, we use the market-adjusted returns measured until the firm is no longer in the database to create a proxy for EPS growth rate.

Our paper is also related to the literature that examines the relation between information disclosed in firms' financial statements and future stock returns. For example, Novy-Marx (2013) finds that highly profitable firms outperform low profit firms. Lakonishok, Shleifer and Vishny (1994) report a negative relation between sales growth and future returns. There is also a larger literature that explores whether various measures of asset growth and equity dilution explain stock returns.[5] This literature suggests two potential explanations for why analysts provide favorable long-term growth forecasts for firms growing assets and raising external equity. The first explanation, discussed in Daniel and Titman (2006), is that executives tend to raise capital when soft information about growth prospects is most favorable. If analysts tend to overreact to this soft information, then we will see a relation between favorable analyst forecasts, increases in external financing, and negative future returns. A second, somewhat more cynical explanation is that analysts issue optimistic growth forecasts for firms that are likely to be raising capital externally. The idea here is that analysts that make optimistic

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[5]Pontiff and Woodgate (2008), Daniel and Titman (2006) and Bradshaw, Richardson and Sloan (2006) find that firms that repurchase shares outperform those that issue additional shares. Cooper, Gulen and Schill (2008) and Titman and Wei (2004) find evidence that asset and capital investment growth, respectively, are negatively related to future returns.

long-term growth forecast make it easier for their investment bankers to generate underwriting business.[6]

One can potentially distinguish between these explanations by examining our evidence on data both before and after the enactment of the global research analyst settlement in September 2002 (See Kadan, Madureira and Wang (2009), Clarke, Kohrana, Patel and Rau (2011) and Loh and Stulz (2011) for more information on the global research analyst settlement), which curtailed the ability of investment bankers to influence sell-side recommendations. Consistent with the idea that the settlement changed analyst behavior, we find that the relation between hard information and future returns are weaker in the post-settlement period. This evidence, however, should be interpreted with caution given the short post-global settlement sample period and confounding events such as the inclusion of certain accounting ratios in quantitative investment models (McLean and Pontiff (2014) and Chordia, Subrahmanyam and Tong (2014)) and the effect of regulation-FD (Agrawal, Chadha and Chen (2006) and Mohanram and Sunder (2006)).

The rest of this paper is organized as follows. The first section describes the data used in our analysis and the characteristics of high and low forecasted growth firms. The second section presents the decomposition of analyst long-term growth forecasts and examines the persistence of long-term growth forecasts and different accounting and valuation ratios. The third section presents the main analysis, exploring how various measures of expected growth are related to valuation ratios and realized earnings growth. The fourth section analyzes how different components of long-term growth forecasts predict future stock returns. The fifth section discusses pre- and post-Global Settlement evidence and evaluates various explanations for our results. The final section concludes.

II.   Data

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[6]For a discussion of this more cynical view see Cragg and Malkiel (2009), Dechow, Hutton and Sloan (2000), Lin and McNichols (1998), Teoh and Wong (2002).

Our main variable of interest, consensus analyst long-term growth (LTG), is taken from I/B/E/S and reflects the mean analyst estimate of annualized earnings growth.[7] There are a few challenges associated with using this measure as an estimate of projected growth. First, each individual analyst long-term growth estimate is updated periodically at the discretion of the analyst, which creates the possibility of stale data. However, as we show, consensus analyst growth forecasts are very persistent through time, suggesting that the individual analyst forecasts change very slowly. Second, analysts do not always produce a long-term growth estimate to go alongside their shorter-term forecasts.

The starting sample for this study includes all NYSE, AMEX and NASDAQ stocks listed on both the Center for Research in Security Prices (CRSP) return files and the Compustat annual industrial files from 1982 through 2014. Information on stock returns, market capitalizations and prices are from the CRSP database. Balance and income sheet information, shares outstanding and GICS industry codes are from the COMPUSTAT database. Analyst long-term consensus growth forecasts (LTG), current stock prices, next year's consensus EPS and actual five-year annual EPS growth rates are from Institutional Brokers Estimate System (I/B/E/S) Summary file. I/B/E/S compiles these forecasts on the third Thursday of every month.

We exclude stocks that have negative or missing book equity, missing industry codes, LTG estimates, or missing accounting data required to construct the different variables used in this study. Two of our measures require non-zero information on sales and assets in year *t-2*, which mitigates backfilling biases. While we include financial stocks, excluding those securities has very little impact on the results reported in the paper. Our final sample has an average of 2,213 firms in each year.

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[7]Our empirical results are economically similar using the median consensus forecast instead of the mean.

Following Fama and French (1992), we form all of our variables at the end of June in year *t*, using fiscal year *t-1* accounting information and analyst estimates from June of year *t*. For valuation ratios such as Price/Book, we use market equity from December of year *t-1*. For EPS valuation ratios based on analyst estimates and measures of company size, we use market equity from June of year *t* to measure the information in the numerator and the denominator at the same point in time. Stock returns are adjusted for stock delisting to avoid survivorship bias, following Shumway (1997). Portfolios used in various asset pricing tests are formed once a year on the last day in June, allowing for a minimum of a six-month lag between the end of the financial reporting period and portfolio formation.

Variable definitions are as follows. Realized EPS growth (REAL EPS) is from I/B/E/S and reflects the annualized growth rate in EPS over the past five years. Equity dilution (EQDIL) is measured as the percentage growth in split-adjusted shares outstanding. Sales growth ($\triangle$SALES) is constructed as the year-over-year percentage growth in revenues divided by split-adjusted shares outstanding. Asset growth ($\triangle$ASSETS) is equal to the year-over-year percentage growth in assets divided by split-adjusted shares outstanding. Profitability (ROA) is defined as operating income before depreciation scaled by assets. SIZE is the logarithm of company market capitalization measured at the end of June.[8] P/B is the logarithm of the market equity to book equity. P/E_{t+1} is the logarithm of the forward price to earnings calculated as the analyst consensus EPS for the next year divided by the price per share. Change in analyst long-term earnings forecasts ($\triangle$LTG) is the year-over-year change in analyst consensus long-term earnings forecasts. Each year, variables are cross-sectionally winsorized to reduce the effect of outliers by setting values greater than the 99th percentile and less than the 1st percentile to the 99th and 1st

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[8]To calculate book equity, we use the following logic which is largely consistent with the tiered definitions used by Fama and French (1992). Book equity is equal to shareholders' equity plus deferred taxes less preferred stock. If shareholders' equity is missing, we substitute common equity. If common equity and shareholders' equity are both missing, the difference between assets and liabilities less minority interest is selected. Deferred taxes are deferred taxes and/or investment tax credit. Preferred stock is redemption value if available; otherwise, carry value of preferred stock is used. We set to zero the following balance sheet items, if missing: preferred stock, minority interest, and deferred taxes.

percentile breakpoint values, respectively. All variables are updated annually at the end of June of each year. Our variable definitions are largely consistent with previous studies.

[Insert Figure 1 Here]

Figure 1 reports the average and median annual consensus analyst long-term growth forecast (LTG) from 1982 to 2014 and five-year realized EPS annualized growth rate from 1982 to 2009. The mean estimated growth rate over this period is remarkably stable, increasing from 15.4% in 1982 to 19.7% in 2001 and then decreasing to 14.0% in 2014. The actual five-year growth rate (1982 reflects the five-year growth rate between years 1982 and 1987) fluctuates from slightly higher than 0% to 17.8%. The median cross-sectional forecast and realized earnings growth rates show a similar pattern. Realized growth tends to be high following recessions (1991, 2003, and 2008) and much lower in periods that include recessions in the five-year window.

At the end of June of each year *t* stocks are allocated into quintiles based on LTG. Table 1 reports formation period (using accounting information from year *t-1*) value-weighted summary statistics for various accounting ratios, price-ratio variables and market capitalizations for each of the five quintile portfolios. The first quintile portfolio contains the firms with the lowest expected growth; the fifth quintile portfolio contains the firms with the highest expected growth. Over our sample period, analysts expect the lowest growth firms to average 7% annualized growth in earnings per share, while the top group has average projected EPS growth rates that are four times as large. The distribution of LTG is right-skewed: the middle group (3rd quintile) has close to a 14% lower growth rate than the highest growth group, but only a 7% higher growth rate than the lowest growth group.

[Insert Table 1 Here]

Although the following comparison is plagued with clear survival bias, it is useful to compare the long-term growth forecasts with realized EPS growth. Realized EPS growth does line up with projected growth – increasing monotonically from a low of 3.0% for the quintile portfolio with the lowest LTG to a high of 13.6% for the highest LTG. The average forecast error, defined as the difference between the forecast and the actual growth, also increases monotonically moving from left to right, rising from 3.9% for the lowest LTG growth to 14.4% for the highest LTG group. Even the lowest expected growth firms based on LTG miss their long-term earnings projections, although the misses are relatively small. In contrast, the highest expected growth firms have average realized growth that is more than 50% less than their ex-ante forecast.

The second section of Table 1 Panel B shows that many of the accounting variables used in our study have a meaningful relation with long-term growth forecasts. High expected growth firms tend to have greater equity dilution (EQDIL) and higher past sales (ΔSALES) and asset growth (ΔASSETS). We also observe the same asymmetry associated with expected growth rates – the highest growth group has equity dilution ratios, sales and asset growth rates that are twice as large as the 4th quintile, while the difference between the 3rd and 4th quintile is not as large. Our last non-price variable, profitability (ROA), does not appear to be related to consensus long-term analyst growth.

The third section of Table 1 Panel B examines how price-related variables are related to growth expectations. The results show that low growth rate firms are not the largest firms in our sample, with a time-series average of yearly cross-sectional mean capitalization (SIZE) of 30.9 BN, but are larger than the highest growth rate firms, which have capitalizations of 19.8 BN. High growth firms also tend to have much higher valuation ratios (P/B, P/E_{t+1}) – the highest growth group has a market capitalization that is on average 39x next-period expected earnings, while the lowest growth group has a market capitalization that is only 14x next-period expected earnings. This is consistent with the idea that greater growth opportunities are reflected in higher valuation ratios.

III. Decomposing Growth Expectations

Table 2 presents regressions that document the relation between the hard information variables and long-term growth forecasts. The first four rows of Table 2 display univariate panel regressions of LTG on different firm characteristics using annual data from 1982 to 2014. Errors are clustered by firm and year. Long-term growth is measured as of June of year t, while the independent variables use accounting information from fiscal year $t-1$. Similar to Table 1, equity dilution (EQDIL), sales growth (ΔSALES) and asset growth (ΔASSETS) are all positively related to LTG. The fourth variable, profitability (ROA), is negatively related to long-term growth, but is not reliably different from zero (T-stat=1.65). Past sales growth has the highest explanatory power, explaining 10% of the variation in long-term growth.

[Insert Table 2 Here]

Rows 5 through 8 report our estimates of multivariate cross-sectional regressions of LTG on the four non-price accounting variables. The regressions are run both with and without fixed effects that capture variation in long-term growth forecasts by industry and year. In most regressions, the coefficients of both the accounting variables and the industry and firm fixed effects are statistically significant, indicating that we can explain analyst long-term growth forecasts with hard information.

The positive coefficients on sales growth indicate an expectation that the past sales growth will persist into the future, which should in turn lead to future EPS growth. Higher asset growth, or growth of certain quantities on the balance sheet, such as property, plant and equipment, can indicate the firm is making presumably positive NPV investments that will generate future earnings. Equity issuances can also indicate the presence of growth opportunities due to a need for additional capital, while share repurchases may indicate the lack of growth opportunities. The negative coefficient on

profitability signifies expected mean reversion, as those low profit firms are expected to have the highest growth in EPS when compared to high profit firms.

The panel regressions reported in Table 2 implicitly assumes that the multivariate relation between the hard information variables and analyst long-term consensus growth forecasts are constant over time. Figure 2 displays the time-series Fama-MacBeth coefficients of contemporaneous accounting variables from a regression explaining analyst long-term growth forecasts. As the figure shows, most relationships are stable over time and all of the equity dilution, sales and asset growth coefficients are positive. The profitability coefficient varies the most, reaching a minimum in the late 90s, during which many technology firms had poor profits but high future expected growth. There does not appear to be a large difference in the coefficient estimate before and after the global settlement (August 2002).

[Insert Figure 2 Here]

In the tests that follow, we decompose analyst long-term growth forecasts into two parts. The first component, which we call *Hard Growth*, is the fitted values from the regression reported in the last row of Table 2 and reported in Equation 1.

Hard Growth = 0.04 + 0.08 EQDIL + 0.05 ΔSALES + 0.04 ΔASSETS -0.12 ROA   (1)

The second component, denoted *Soft Growth*, is the difference between LTG and Hard Growth. Soft Growth reflects analyst private views or information content in LTG that is unexplained by observable accounting variables.

For our measure of Hard Growth, we use the coefficients of the independent variables from the equation reported above, but we do not include the coefficients on industry or time dummies to avoid any forward-looking bias. This assumption is not

material – when we use only same period information to form hard and soft growth measures, the results presented in later sections are not materially different.

To better understand how growth expectations are incorporated into market prices, Table 3 estimates the relation between the components of long-term growth and two valuation ratios. Panel A reports results for log price-to-book (P/B) and Panel B reports results for log of forward earnings-to-price (P/E_{t+1}). The first four rows of each panel examine the relation between the valuation ratios and the four accounting ratios. For the P/B ratio, each of the four accounting variables is significantly positively related, with R^2 ranging from 0.11 to 0.29. Given P/B ratio reflects the market's expectations of growth opportunities: the coefficients on the positive indicators of growth (EQDIL, ΔASSETS, ΔSALES) have the correct sign, while the coefficient on the negative indicator of growth, ROA, has the incorrect sign, although it has the lowest t-statistics of the four variables. For the P/E_{t+1} ratio displayed in Panel B, the three variables that indicate growth all have the predicted positive sign, although sales growth is not statistically significant. ROA has a negative sign and is statistically significant after controlling for industry variation.

[Insert Table 3 here]

The last four rows of each panel in Table 3 use Hard Growth (the fitted values from the last regression reported in Table 2) and Soft Growth (the difference between LTG and Hard Growth or the residual of the same regression) as independent variables. For both valuation ratios, we find that Soft Growth has a positive and highly significant relation with value. Hard Growth is also positive and significant in most regressions, but the relationships are not as strong. Indeed, all of the regressions are consistent with both the hard and soft information in the analyst forecasts being incorporated into market prices.

IV.   Do Growth Estimates Predict Future Earnings Growth?

We next examine whether the soft and hard components of forecasted earnings growth actually predict realized earnings growth (REAL EPS). I/B/E/S and Dechow and Sloan (1997) estimate realized earnings growth over the past five years using an AR(1) regression of log (EPS) using six annual observations between years t and $t+5$, where year t is the reference year that LTG is measured. Hence, one can estimate the extent to which long term growth forecasts and the various components of expect growth predict actual growth.

Unfortunately, sample selection bias creates a major problem for this analysis. Estimating realized earnings growth requires future realizations of non-negative EPS values, and a number of firms in the sample experience negative earnings and a number of other firms drop out of our sample. Specifically, in our sample from 1982 to 2009, we have five-year earnings growth rates for only two-thirds of the original sample (41,957 out of 63,842 firm-years). For those stocks with five-year earnings growth data (REAL EPS), 97.4% have a full 60 months of stock returns, and the average compound return is 14.4% per year for this sample. In comparison, only 22.5% of stocks with missing REAL EPS data have 60 months of stock returns – those firms with 60 months of data, but missing REAL EPS data, have stock returns that averaged only 5.37% per year.

Clearly, the firms with missing data performed worse than those that stayed in our data base. However, firms leave the sample for a variety of reasons, such as mergers, as well as bankruptcy and negative future earnings. Hence, in addition to losing firms that do very poorly, we lose some because the firms did very well – as a result, the bias should affect both low and high expected growth firms. Indeed, we find that 42% of the high expected growth firms (top quintile based on LTG each year) and 27% of low expected growth firms (lowest quintile) have missing five-year earnings growth information.

Heckman's (1979) two-stage selection model provides a potential solution for this sample selection problem. However, this approach requires an instrument that is

correlated with whether or not REAL EPS is missing but which is uncorrelated with actual EPS growth. Unfortunately, we have not been able to come up with a good instrument. What we do instead is come up with proxies for the missing data.   Specifically, we calculate the five-year market-adjusted return $R_{i,MAR(t,t+5)}$ as the difference between the compound annual five-year stock return $R_{i(t,t+5)}$ measured from July of year t to June of year $t+5$ less the compound annual market return $R_{Mkt(t,t+5)}$ measured over the same period.[9]

$$R_{i,MAR(t,t+5)} = R_{i(t,t+5)} - R_{Mkt(t,t+5)} \qquad [2]$$

Figure 3 reports value-weighted, market-adjusted returns $R_{MAR(t,t+5)}$ for decile portfolios formed by ranking stocks on I/B/E/S five-year realized EPS growth rate (REAL EPS). We include all stocks that have non-missing EPS data. Moving from left-to-right, the average five-year market-adjusted return rises from -19.0% to 8.6%. The monotonic relation between the EPS growth and stock returns is consistent with Ball and Brown (1968), Ball, Kothari and Watts (1993), Daniel and Titman (2006) and suggests that return information is a good proxy for EPS growth.

[Insert Figure 3 Here]

The approach we take fills in missing earnings data, which reflect close to 1/3 of our sample, with estimates based on observed stock returns. Specifically, our matching process involves calculating the percentile rank of $R_{MAR(t,t+5)}$ for a given year using all firms (including those with missing REAL EPS), defined as the percent of firms with a lower $R_{MAR(t,t+5)}$, and takes values between 0 and 100. We then do the same exercise calculating the percentile rank of REAL EPS using the sample of non-missing firms from Figure 3.

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[9] When a firm has less than 60 months of data, we use the available return data to estimate compound annual market-adjusted returns.

For each missing REAL EPS observation, we then assign the average five-year EPS growth rate estimated in the same year for the REAL EPS percentile rank that corresponds to the same percentile rank of $R_{MAR(t,t+5)}$. Our procedure matches a distressed firm with poor stock returns and missing EPS growth rate, potentially due to negative earnings or a bankruptcy a low EPS growth rate. Similarly, the procedure matches a firm that has high stock returns and a missing five-year EPS growth rate, possibly due to a corporate action such as a merger, with a high EPS growth rate.

Figure 4 displays a histogram of $R_{MAR(t,t+5)}$ for those firms with missing REAL EPS data. This figure provides a sense of the distribution of market-adjusted stock returns for the sample with missing data and whether firms are matched to low or high realized EPS growth rates. The matched firms often have very low or very high market-adjusted returns – 22% of the missing sample in which $R_{MAR(t,t+5)}$ was in the bottom decile of future average returns, while 19% were in the top decile. In contrast, only 11% of the missing sample had future five-year returns that were either in the fifth or sixth deciles.

We examine why firms have missing REAL EPS. For those firms in the highest decile of market-adjusted returns, 93% were delisted because of a merger or acquisition. Among those in the lowest decile of market-adjusted returns, almost all of those firms were either delisted over the next five years because of bankruptcy or had negative earnings over the five-year period.

[Insert Figure 4 Here]

Table 4 reports results for a panel regression of 5-year realized EPS growth (REAL EPS) on our measures of hard and soft information. When REAL EPS is missing, we assign a future EPS growth rate as described above. Errors are clustered by industry and firm, which help to correct for the overlapping nature of estimating realized EPS growth over five years. The first two rows display results without inclusion of LTG; the third and fourth rows include LTG. In our fourth specification reported on the fourth row, we find

equity dilution (T-stat=7.41), sales growth (T-stat=2.67) and asset growth (T-stat=2.16) are all significantly negatively related to actual growth, despite being positively related to forecasted growth. Profitability is also reliably positively related to actual growth (T-stat=5.02), even though profitability loads negatively on forecasted growth. We also find a negative relation between LN (P/B) ratio (T-stat=3.11) and realized growth, suggesting that growth stocks have lower earnings growth when compared to value stocks. After including industry and year dummies, the coefficient on analyst long-term growth (T-stat=1.00) is no longer significant, indicating that analyst long-term estimates are relatively poor predictors of actual earnings growth after controlling for hard information, and industry and year fixed effects.

[Insert Table 4 Here]

The last two rows of Table 4 report regression results of hard and soft growth on realized five-year earnings growth. In our first specification in row 5, we find a negative and significant relation between hard growth (T-stat=4.39), and realized earnings growth. We also find a significant positive relation between soft growth (T-stat=2.58) and realized earnings growth. After including industry and year dummies reported in the last row of Table 4, the coefficient on soft growth declines from 0.11 to 0.02 and is no longer significantly different from zero (T-stat=0.63). A straightforward extension of our analysis (which, for the sake of brevity, we do not report) is that hard accounting information also explains analyst forecast errors; i.e. the difference between the realized 5-year earnings growth and the analyst long-term consensus growth forecast.

To understand the importance of these results, recall that Table 2 shows that sales and asset growth and equity dilution variables are positively related to analyst long-term growth expectations, while profitability is negatively related. Table 4 illustrates the opposite: profitability is positively related to actual earnings growth, but sales and asset growth and equity dilution is negatively related. These results are consistent with a bias

in how analysts and markets perceive hard information when making earnings growth forecasts and setting prices.

Analysts, and by extension financial markets, may make mistakes due to the way they interpret the persistence of certain accounting variables. Increasing sales and high profitability is generally associated with greater earnings growth. Similarly, endogenous variables such as asset growth and equity dilution may indicate future investment or the presence of growth opportunities. In Figure 3, we report Spearman rank correlations for each variable and their future values to examine the persistence of different variables that are related to growth expectations. The x-axis reflects the number of years between the current and future variable values. Correlations for each measure decline as more time elapses.

[Insert Figure 3 Here]

Our results suggest that analysts make mistakes when interpreting the persistence of accounting information while setting growth expectations. The "level" variables based on ratios of balance sheet information or market prices (ROA, P/B, P/E_{t+1}) tend to have high persistence, initially ranging from 0.70 to 0.84 for a one-year lag (t+1) and falling to 0.43 to 0.62 for a five-year lag (t+5). Value companies tend to stay value companies, and profitable firms tend to stay profitable. In contrast, the "change" variables, or those variables based on differences in balance sheet quantities (EQDIL, ΔASSETS, ΔSALES), exhibit far less persistence: one-year lag correlations are between 0.41 to 0.27 and decline to 0.20 to 0.11 for a five-year lag. Analyst long-term growth (LTG) is also very persistent, with serial correlations that decline from 0.84 (one-year) to 0.61 (five-year).

The correlations reported in Table 2 and Equation 1 show how analysts expect certain accounting quantities will affect future earnings growth. For example, profitability has a negative loading on LTG, indicating that analysts believe that low profit firms today will have higher earnings growth and hence high future profits. In reality, profitability is

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fairly persistent and low profit firms do not have higher earnings growth when compared to high profit firms. Sales growth also has a positive correlation with analyst long-term earnings growth forecasts indicating that analysts expect sales growth will persist in the future, even though it is actually not very persistent and a negative (weak) indicator of actual earnings growth. Similarly, endogenous variables such as asset growth and equity dilution which should reflect growth opportunities load positively on LTG. However, these indicators of growth are also not very persistent and are actually negatively related to actual earnings growth.

As we show, there is a tendency for these mistakes to at least partially correct over the following year. Table 5 reports regressions of year-over-year changes in analyst consensus long-term growth (LTG) on accounting and manager choice variables. The first four rows show that change variables (equity dilution, asset and sales growth) are associated with strong negative revisions in LTG. The coefficient on the fourth variable, ROA, does not predict innovations in LTG. Our composite variable, Hard Growth, also predicts when LTG forecasts will be revised downwards.

[Insert Table 5 Here]

If LTG forecasts do in fact reflect market beliefs, and if their revisions can be predicted with the Hard Growth component, then one might conjecture that the Hard Growth component also predicts returns. As we show in the next section, this is indeed the case.

V.   Do Errors in Growth Forecasts Lead to Return Predictability?

Our final analysis, reported in Table 6, examines how the different components of long-term growth forecasts explain differences in average stock returns. Panel A of the Table reports average value-weighted returns for portfolios formed on LTG, Hard Growth and Soft Growth for those firms with available LTG and accounting data. Consistent with

Jung, Shane and Yang (2012), we find that analysts' consensus long-term growth expectations are unrelated to future stock returns. Our measure of Hard Growth, however, is strongly negatively related to average returns. Average returns for value-weighted portfolios formed on Hard Growth reported in the 2nd row of Table 6 Panel A decline from 1.19 for decile 1 (lowest growth) to 1.04 for decile 9. The last decile, which includes the firms with the highest Hard Growth indicators (low profitability, high external financing, high asset and sales growth), has monthly returns that are 55 basis points lower than the previous decile; the difference between the top and bottom decile is -0.60% per month (T-stat=2.66). In contrast, the last row of Table 6 Panel A shows that Soft Growth, which reflects analysts' views that is unrelated to accounting information, is unrelated to stock returns.

[Insert Table 6 Here]

Panels B and C of the table report these same portfolio returns for smaller firms and for a larger sample that also includes firms that do not have LTG data. Panel B, which reports returns on the smallest half of the firms (based on market capitalization), shows stronger results – the average return of the top decile is 0.86% less per month (T-stat=3.88) when compared to the average return of the bottom decile. Panel C examines a larger data on firms with data available to measure Hard Growth, but including firms that may not have LTG forecasts. Not requiring LTG estimates doubles the sample size to an average of 4,045 firms per month. As we show, with this larger sample that more closely reflects the samples used in earlier studies of these return anomalies, we find a very strong relation between our estimate of hard growth and stock returns – the average return of a portfolio that is long the highest decile of hard growth firms and short the lowest decile of hard growth firms is -0.79% (T-stat = 3.38).

[Insert Table 7 Here]

Table 7 reports results from Fama-MacBeth regressions of monthly returns on our hard and soft growth measures, with controls for firm size and book-to-market. There is evidence of a weak size (insignificant in all regressions) and stronger value effect (significant in every regression except one) in our sample. In the first regression on the left of the table, LTG is not related to average returns. The second regression includes variables that capture accounting information and manager decisions. We find a significant and positive relation between equity dilution (T-stat=5.25) and asset growth (T-stat=4.39) and average returns. The coefficient of sales growth (T-stat=1.86) is positive and the coefficient of profitability (T-stat=1.66) is negative, the significance of each is marginal. Including LTG in the third regression causes the significance of all the variables to increase – with sales growth (T-stat=2.12) and profitability (T-stat=2.16) now significantly different from zero at the 5% level. The t-statistics and coefficients on the hard information variables reported in the 4th regression are even stronger after including fixed effects that capture differences in industry returns each month.

The final two regressions examine how hard and soft growth relate to average returns. The results largely mirror those reported in Table 6, with LTG and soft growth not related to average returns while hard growth is strongly negatively related to average returns. The Fama-MacBeth approach equal-weights stock returns in each cross-section, compared to the value-weighted portfolio returns reported in the previous table. Our results suggest that hard growth generates a larger difference in returns among smaller stocks when compared to larger stocks, which is consistent with the results presented in Table 6 Panels B and C.

VI. The Effect of the Global Analyst Research Settlement on Long-term Growth Forecasts

The results presented in the previous sections suggest the market misinterprets hard information that signals high growth leading to underperformance, particularly for firms with the most extreme growth forecasts. One possibility explored in Dechow, Hutton

and Sloan (2000) is that analysts hype those firms to gain more investment banking business and make it easier for firms to issue equity or debt. An alternative explanation is that managers tend to invest when intangible information is positive and that investors tend to over-react to intangible information (Daniel and Titman (2006)). Manager choice variables such as equity dilution and asset growth signal favorable or unfavorable intangible information, which leads to return predictability.

Rule NASD 2711 and NYSE 472, better known as the Global Analyst Research Settlement, were regulations to reduce the ability of investment banks to influence analysts' stock recommendations. The ruling required the analysts to provide disclosure of any conflict they (or their firm) may have with the recommended stock. We follow Kadan, Madureira and Wang (2009), Clarke, Khorana, Patel and Rau (2011) and Loh and Stulz (2011) by assigning the period starting with September 2002 as the post-global settlement. Analyzing our tests pre- and post-global settlement allows us to better understand how analysts change how (i) analysts form their forecasts, (ii) forecasts are incorporated into market prices, (iii) actual earnings growth is related to hard and soft information, and (iv) whether hard and soft information still has the ability to predict future stock returns.

Our decomposition is important, as we are able to explain how analysts, markets and actual earnings growth differentially react to information on long-term growth forecasts. The competing explanations provided by Dechow, Hutton and Sloan (2000) and Daniel and Titman (2006) are more relevant for managerial decisions related to capital issuance and retirements, or the level of capital expenditures and are less relevant for firm characteristics that are largely out of the control of the manager, such as sales growth or profitability.

Returning to Figure 2, we do not find meaningful differences in the way analysts form their long-term growth expectations: changes in sales and asset growth and equity

dilution is positively related to LTG, while ROA is negatively related to LTG. Our results suggest that Global Settlement did not change how analysts process hard information.

[Insert Table 8 Here]

Table 8 replicates the main analyses in our paper for the pre-Global Settlement period from July 1982 to August 2002 and the post-Global Settlement period from September 2002 to December 2014. In our analysis presented in Table 8, we do not include ΔSALES and ROA as independent variables and instead focus on the manager choice variables that related to the competing explanations for our results: EQDIL and ΔASSETS. Table 8 Panel A reports our split-sample results for the panel regressions from Tables 3 and 4. In the early period, we find a very strong correlation between asset growth and the natural log of the price-to-book ratio (T-stat=12.79), consistent with Fama and French (2015), who find a high correlation between HML (low price-to-book less high price-to-book factor) and CMA (low asset growth less high asset growth), and a weaker but still statistically positive relation between log price-to-book and equity dilution (T-stat=2.75). In the later period, we find the coefficient on equity dilution becomes negative (T-stat=6.54), and there is still a positive relation with asset growth (T-stat=7.67). The weaker results in the post-global settlement period for manager choice variables help explain why Hard Growth (T-stat=0.49) is insignificantly positively related to price-to-book ratio.

For the natural log of forward earnings-to-price ratios reported in rows 5 through 8 of Table 8 Panel A, we find a positive correlation between both manager choice variables and price-to-book ratio in the pre-GS period, but the asset growth's coefficient sign flips in the post-GS period. Despite the negative relation between △ASSETS and LN (P/B), the coefficient on Hard Growth (T-stat=2.21) in the later period is still significantly different from zero.

The next four rows display regression results for the pre- and post-GS periods for regressions predicting five-year realized earnings growth. Before global settlement, price-to-book ratio is significantly negative related to actual EPS growth (T-stat=2.66, 3.70), while after global settlement price-to-book is unrelated to actual EPS growth (T-stat=0.64, 0.70). The coefficient on asset growth is significantly negative in the early period (T-stat=2.14), but becomes insignificant in the later period (T-stat=0.50). Equity dilution is a little stronger in the later period, when compared to the earlier period. We find a slightly higher Hard Growth coefficient estimate in the post-global settlement period (0.64) when compared to the pre-global settlement period (0.70).

The last four rows reports split-sample regression results predicting year-over-year changes in LTG. In both sub-periods, we find that equity dilution and asset growth predict negative innovations in LTG, but the coefficient on equity dilution in the post-GS period while significantly different from zero is roughly half of what it was in the pre-GS period. We also find that hard growth is associated with negative future changes in LTG in both sub-periods.

Table 8 Panels B and C report pre- and post-GS period average returns for value-weighted portfolios formed on various growth measures. The return earned by going long firms in the highest decile of equity dilution and going short the lowest decile of equity dilution declines from -0.90% (T-stat=4.47) in the earlier period to -0.43% (T-stat=1.81) in the later period. The long/short return for asset growth is negative and marginally significant in the early period (-0.53), but is positively and insignificant in the later period (0.24%). These results help explain why the difference between the highest decile portfolio and lowest decile portfolio of Hard Growth in the early period is -0.74% (T-stat=2.25) in the early period, but shrinks to -0.36% (T-stat=1.49) in the later period.

As we show, soft growth which reflects analysts' private views are positively related to valuations (P/B, P/E_{t+1}), is (weakly) positively related to actual growth, and does not explain stock returns. Our findings suggest that this component of analyst long-term

growth is accurately incorporated into market prices, and that when those growth expectations are met there is no material return predictability. There is also very little change in how soft growth is related to valuations and actual earnings growth pre- and post-global settlement.

In contrast, analysts in the post-global settlement period still assign higher growth expectations to firms with low profitability, high past sales and asset growth and high external financing *despite the regulation*'s *potential influence* on the bias of these estimates. Firms with these characteristics also experience negative revisions in long-term growth forecasts in the post-GS period. Our evidence suggests regulation did not materially change how analysts interpret hard information when making long-term growth forecasts – thus, either the analysts are still trying to gain investment banking business by issuing overly optimistic growth forecasts, or are making genuine mistakes when setting long-term earnings growth expectations. However, it is hard to draw conclusions due to the small sample size of the post-GS period.

Our findings suggest the market, however, isn't fooled by this analyst behavior after August 2002 and potentially learned from the mistakes made when setting prices during the dot-com period between 1998 and 2002 as the relation between hard growth and the log of the price-to-book ratio is weaker. Hard information is a negative predictor of realized earnings growth in both sample periods. In the post-GS period, we find weaker evidence that hard information predicts future returns, which suggests our results are driven by former hypothesis related to analysts hyping stock prices to win investment banking business. However, there is an alternative explanation related to certain market participants exploiting profitability, asset growth or external financing factors to correct and profit from investor mistakes related to mispricing associated with long-term growth forecasts. Of course, we cannot rule out that the weaker results in the latter period are a result of a small sample size instead of a shift in investor behavior or other informed traders exploiting this mispricing.

VII. Conclusion

There is now substantial evidence linking various income statement and balance sheet items to future excess stock returns. While it is possible that these excess returns are associated with systematic sources of risk that investors wish to avoid, the magnitudes of the observed abnormal returns and the Sharpe ratios that can be obtained by exploiting the strategies are simply too large to be consistent with equilibrium risk premia. In other words, during our sample period, the evidence suggests that the consensus views of investors were incorrect along some meaningful dimensions.

To explore this hypothesis, we use the consensus analyst long-term earnings growth forecast as a proxy for growth expectations and examine how these expectations are influenced by various accounting variables. Our focus is on two variables that are under the direct control of a firm's management – the extent to which the firm issued or repurchased its shares and the extent to which it grew is assets and two variables that management can only indirectly control – the sales growth and profitability of the firm. As we show, these variables explain the consensus long-term growth forecasts of analysts, and as such, they also influence stock prices. However, the sign of the correlation between these variables and realized earnings growth is inconsistent with the correlation between these variables and both analyst long-term earnings growth forecasts and firm valuations. Thus, high market prices reflect faulty growth expectations and sorting stocks on these accounting variables produces meaningful differences in average returns.

It would be nice to have better intuition about why the analysts and investors made these mistakes. One possibility, explored in a number of papers, is that analysts bias their earnings forecasts to cater to firms that are likely to need future investment banking services. Another possibility is that market prices influence management choices. If the market and the analyst community view the firm favorably, the firm is more likely to raise capital, grow its assets, and may feel less compelled to increase sales and

profitability. In other words, the favorable view of the market may in some cases sow its own seeds of destruction. Finally, it's possible that the analysts simply made mistakes in our sample period.

While we have made a preliminary exploration of these issues by looking at how long-term earnings growth forecasts have changed over time, our results are not conclusive. Hopefully, future research can help better understand the cause of these earnings forecast errors.

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Figure 1. Average Consensus Analyst Long-term Growth Estimates and Realized 5-year EPS Growth Rate from 1982 to 2014. The figure plots cross-sectional mean and median estimates for LTG and REAL EPS by year. LTG is the mean estimate of all analysts' expectations of the future EPS annual growth rate measured in the 3rd week of June of year *t*. REAL EPS is the five-year average annualized realized EPS growth rate between year *t* and year *t+5*.
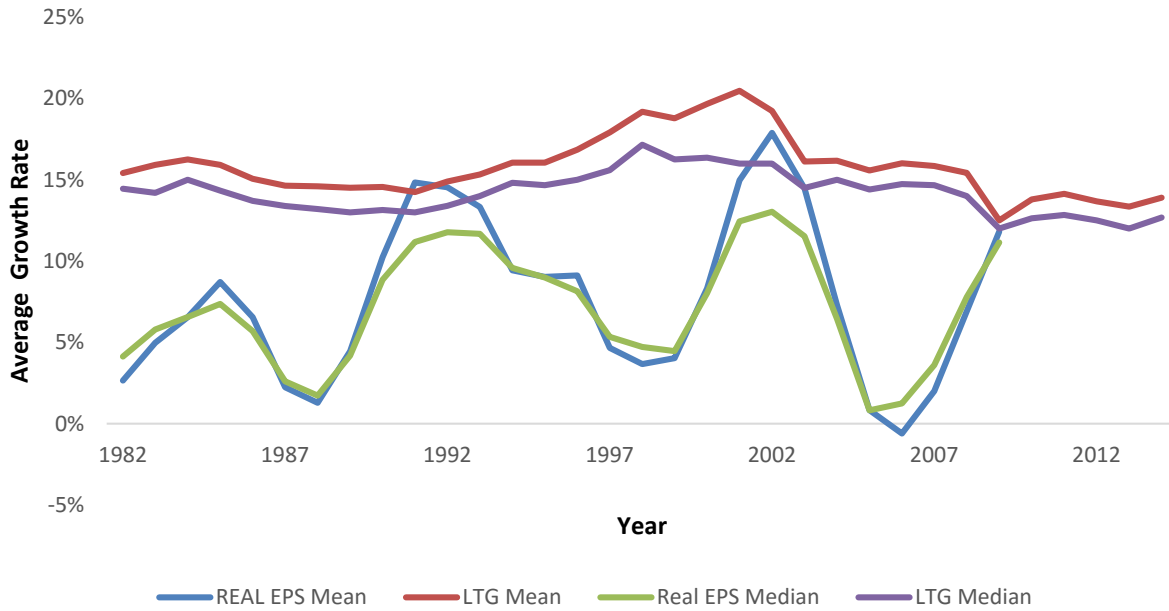
Table 1. Sample Summary Statistics from 1982 to 2014. This table presents summary statistics for firms that meet the restrictions described in the data section. The first panel describes the distribution of analyst long-term growth forecasts, LTG. At the end of June of each year *t*, stocks are ranked on LTG and then allocated to five groups, each with an equal number of stocks. The second panel reports value-weighted averages for LTG, 5-year realized earnings growth, accounting ratios, valuation ratios and market capitalization for each quintile portfolio using information available at the portfolio formation date. Variable definitions are as follows. LTG measures the mean estimate of all analysts' expectations of the future EPS annual growth rate measured in the 3rd week of June of year *t*. REAL EPS is the five-year average annualized future EPS growth rate between year *t* and year *t+5*. EqDil (equity dilution) is the percentage change in split-adjusted shares outstanding from year *t-2* to year *t-1*. ΔSales (sales growth) is the percentage change in revenues per split-adjusted share from year *t-2* to year *t-1*. ΔAssets (asset growth) is the percentage change in assets per split-adjusted share from year *t-2* to *t-1*. ROA (profitability) is operating income in year *t-1* divided by assets for year *t-1*. SIZE x 10^9 is market capitalization (in millions) as of June of year *t*. P/B (price/book ratio) is market capitalization as of December of year t-1, divided by book equity in year *t-1*. P/E$_{t+1}$ (price/forward earnings ratio) is price per share divided by fiscal year 1 analyst consensus earnings per share measured in the 3rd week of June of year *t*. The sample has an average of 2,213 firms per year.

Panel A. Average Analyst Long-Term Growth Statistics					
	p1	Median	Mean	p99	σ
	0.010	0.142	0.158	0.484	0.084

Panel B. Average Firm Characteristics by Analyst Long-Term Growth Quintile					
	1	2	3	4	5
Growth Variables					
LTG	0.070	0.111	0.141	0.181	0.280
REAL EPS	0.030	0.057	0.070	0.087	0.136
Non-Price Variables					
EQDIL	0.024	0.018	0.015	0.037	0.076
ΔSALES	0.048	0.070	0.098	0.155	0.311
ΔASSETS	0.059	0.091	0.122	0.181	0.335
ROA	0.140	0.145	0.170	0.188	0.171
Price Variables					
SIZE x 10^9	30.91	32.93	26.55	23.34	19.80
P/B	1.98	3.18	3.70	4.80	6.54
P/E$_{t+1}$	14.31	16.15	19.04	23.60	39.00

Table 2. Panel Regression Explaining Long-Term Growth from 1982 - 2014. This table reports results from panel regressions of analyst long-term growth (LTG) on past accounting growth measures. LTG is the mean estimate of all analysts' expectations of the EPS annual growth rate between year $t+2$ to year $t+5$ measured in the 3rd week of June of year t. EQDIL (equity dilution) is the percentage change in split-adjusted shares outstanding from fiscal year-end in $t-2$ to $t-1$. ΔSALES (sales growth) is the percentage change in revenues per split-adjusted share from $t-2$ to $t-1$. ΔASSETS (asset growth) is the percentage change in assets per split-adjusted share from year $t-2$ to year $t-1$. ROA (profitability) is operating income in year $t-1$ divided by assets in year $t-1$. N is the average number of stocks each year. Certain regressions use industry (Based on GICs 10 sector definitions) and year fixed effects. T-statistics are reported in parentheses based on robust standard errors that are clustered by firm and industry. The number of firm-year observations is 74,130.

	Intercept	EQDIL	ΔSALES	ΔASSETS	ROA	R^2	Industry Fixed Effect?	Year Fixed Effect?
Coefficient	0.16	0.12				0.04	No	No
t-stat	(11.75)	(4.02)						
Coefficient	0.15		0.08			0.10	No	No
t-stat	(11.35)		(13.56)					
Coefficient	0.15			0.08		0.07	No	No
t-stat	(10.62)			(12.68)				
Coefficient	0.17				-0.11	0.02	No	No
t-stat	(8.23)				(1.65)			
Coefficient	0.15	0.10	0.06	0.05	-0.11	0.17	No	No
t-stat	(8.23)	(9.36)	(13.99)	(8.12)	(1.87)			
Coefficient	0.07	0.09	0.05	0.04	-0.12	0.34	Yes	No
t-stat	(20.92)	(7.50)	(10.46)	(13.40)	(4.54)			
Coefficient	0.14	0.09	0.06	0.05	-0.10	0.20	No	Yes
t-stat	(10.77)	(11.18)	(15.13)	(7.68)	(1.85)			
Coefficient	0.04	0.08	0.05	0.04	-0.12	0.37	Yes	Yes
t-stat	(7.56)	(8.43)	(10.52)	(14.23)	(4.64)			

Figure 2. Coefficient Estimates from Annual Regressions Explaining Long-Term Growth from 1982 - 2014. This figure plots the time-series of coefficients from a Fama-Macbeth regression of analyst long-term growth on equity dilution, sales growth, asset growth, profitability variables and industry dummies. LTG measures the mean estimate of all analysts' expectations of the EPS annual growth rate between year $t+2$ to year $t+5$ measured in the 3rd week of June of year t. EQDIL (equity dilution) is the percentage change in split-adjusted shares outstanding from fiscal year-end in $t-2$ to $t-1$. ΔSales (sales growth) is the percentage change in revenues per split-adjusted share from $t-2$ to $t-1$. ΔAssets (asset growth) is the percentage change in assets per split-adjusted share from $t-2$ to $t-1$. ROA (profitability) is operating income in $t-1$ divided by assets in $t-1$.
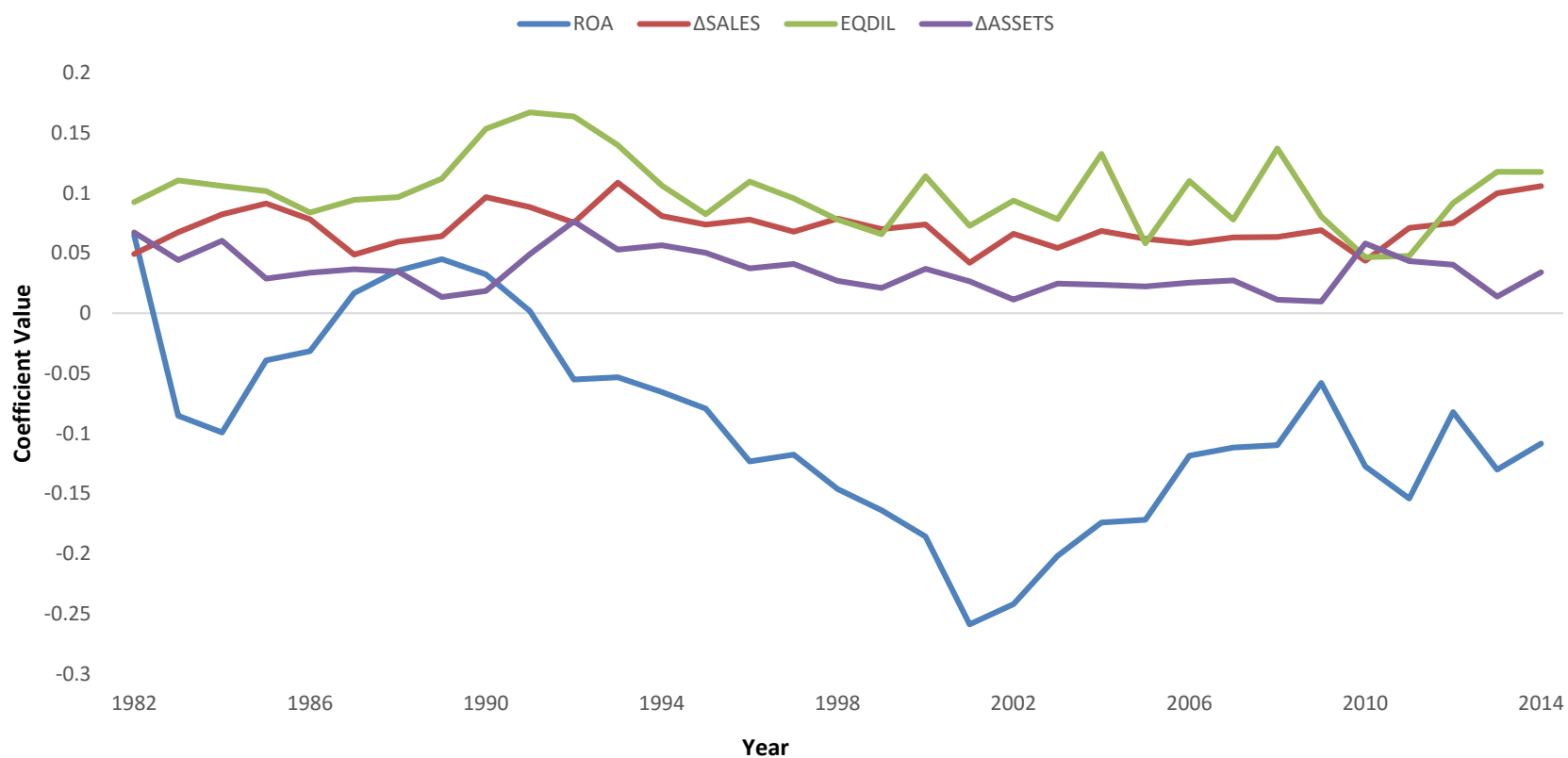
Table 3. Panel Regression Explaining Price-to-Book and Price-to-Forward Earnings Valuation Ratios from 1982 to 2014. The dependent variable for the regression is either the natural log of P/B ratio (Panel A) or the natural log of the P/E_{t+1} ratio (Panel B). P/B (price/book ratio) is market capitalization as of December of year t-1, divided by book equity in year $t-1$. P/E_{t+1} (price/forward earnings ratio) is price per share divided by fiscal year 1 analyst consensus earnings per share measured in the 3rd week of June of year t. EqDil (equity dilution) is the percentage change in split-adjusted shares outstanding from fiscal year-end in $t-2$ to $t-1$. ΔSales (sales growth) is the percentage change in revenues per split-adjusted share from $t-2$ to $t-1$. ΔAssets (asset growth) is the percentage change in assets per split-adjusted share from $t-2$ to $t-1$. ROA (profitability) is operating income in $t-1$ divided by assets for $t-1$, Hard Growth is the fitted value from the last regression listed in Table 2 and Soft Growth is equal to LTG minus Hard Growth. The independent variables are constructed using financial statement data from the fiscal period ending in year t-1. N is the average of firms each year. For brevity, the intercept is not reported. Robust standard errors are clustered by firm and industry.

Panel A. P/B

	EQDIL	ΔSALES	ΔASSETS	ROA	Hard Growth	Soft Growth	R^2	Industry Fixed Effect?	Year Fixed Effect?	N
Coefficient	0.38	0.40	0.26	1.60			0.11	No	No	2,213
t-stat	(5.98)	(6.18)	(7.16)	(2.59)						
Coefficient	0.33	0.40	0.26	1.81			0.20	No	Yes	2,213
t-stat	(4.43)	(6.53)	(7.46)	(3.02)						
Coefficient	0.33	0.31	0.22	1.71			0.21	Yes	No	2,213
t-stat	(5.06)	(7.75)	(9.95)	(2.82)						
Coefficient	0.28	0.31	0.22	1.85			0.29	Yes	Yes	2,213
t-stat	(3.84)	(7.92)	(9.38)	(3.11)						
Coefficient					2.02	3.74	0.16	No	No	2,213
t-stat					(3.14)	(11.74)				
Coefficient					1.38	3.01	0.27	Yes	Yes	2,213
t-stat					(2.89)	(11.73)				

Panel B. P/E$_{t+1}$

	EQDIL	ΔSALES	ΔASSETS	ROA	Hard Growth	Soft Growth	R^2	Industry Fixed Effect?	Year Fixed Effect?	N
Coefficient	0.21	0.06	0.14	-0.62			0.02	No	No	2,022
t-stat	(5.34)	(0.90)	(3.16)	(0.86)						
Coefficient	0.21	0.06	0.14	-0.43			0.13	No	Yes	2,022
t-stat	(4.94)	(0.84)	(3.87)	(0.61)						
Coefficient	0.14	0.01	0.09	-1.25			0.14	Yes	No	2,022
t-stat	(3.39)	(0.16)	(2.71)	(3.69)						
Coefficient	0.14	0.01	0.10	-1.10			0.23	Yes	Yes	2,022
t-stat	(3.05)	(0.12)	(3.41)	(3.53)						
Coefficient					2.20	2.80	0.14	No	No	2,022
t-stat					(3.44)	(7.85)				
Coefficient					2.10	2.32	0.28	Yes	Yes	2,022
t-stat					(4.24)	(8.39)				

Figure 3. Value-weighted Average Market-Adjusted Return for Portfolios Formed on Realized EPS Growth Rate from 1982 to 2009. At the end of June of year *t*, stocks are allocated to ten portfolios according to realized EPS growth rate (REAL EPS). The figure reports the average value-weighted (using market capitalization as of the end of June in year *t*), market-adjusted five-year return measured over the 60 months starting in July of year *t*. There is an average of 1,498 firms per year with non-missing five-year EPS growth rates.

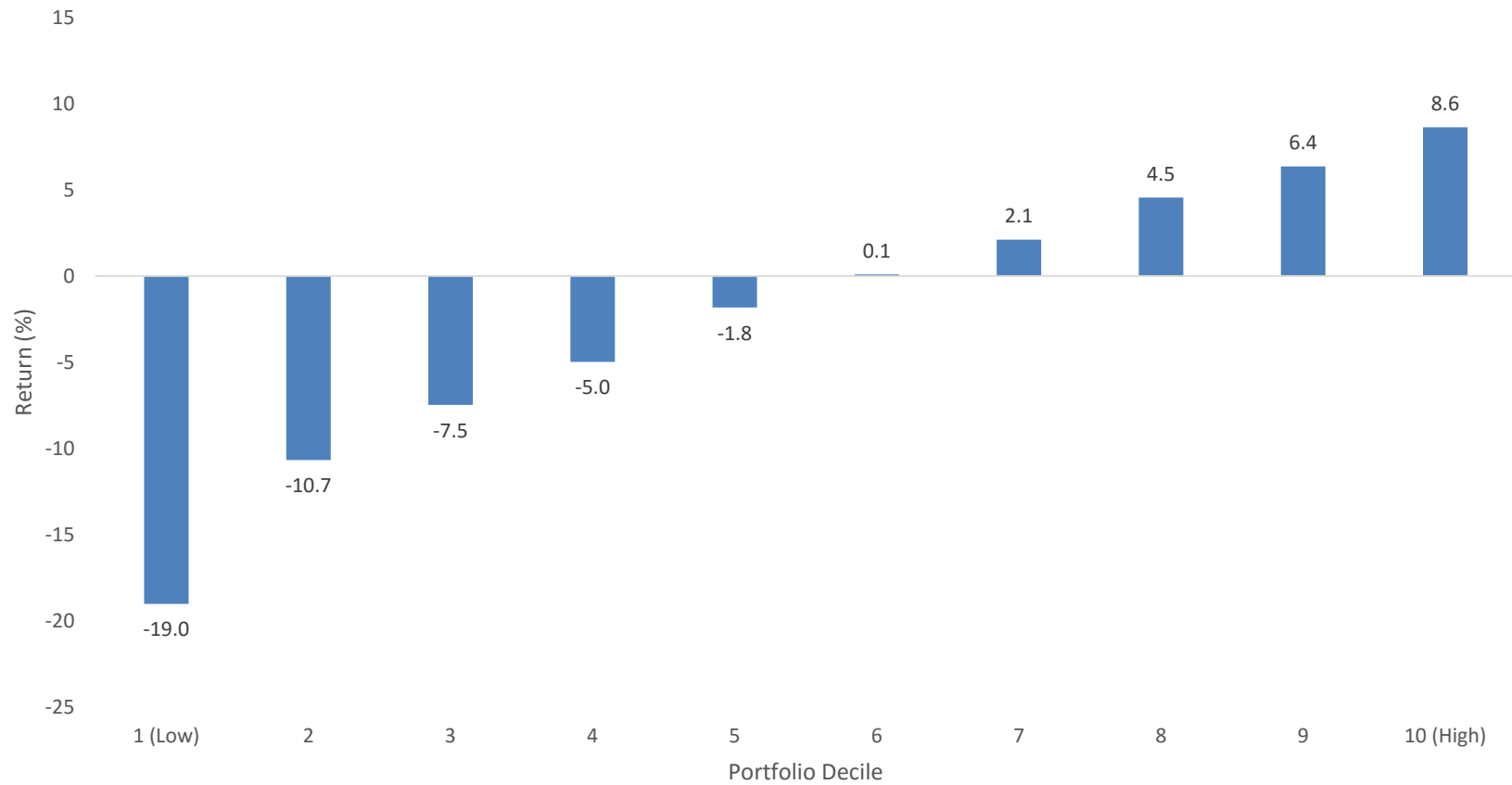**Figure 4. Histogram of Five-year Market-adjusted Returns with Missing EPS Five-year Growth Rates from 1982 to 2009.** This figure reports the percentage of firm-years with missing realized earnings (REAL EPS) information, by market-adjusted return decile. There are 21,885 firm-years with future stock returns that have missing five-year EPS growth rates that were assigned EPS growth rates using our matching technique.
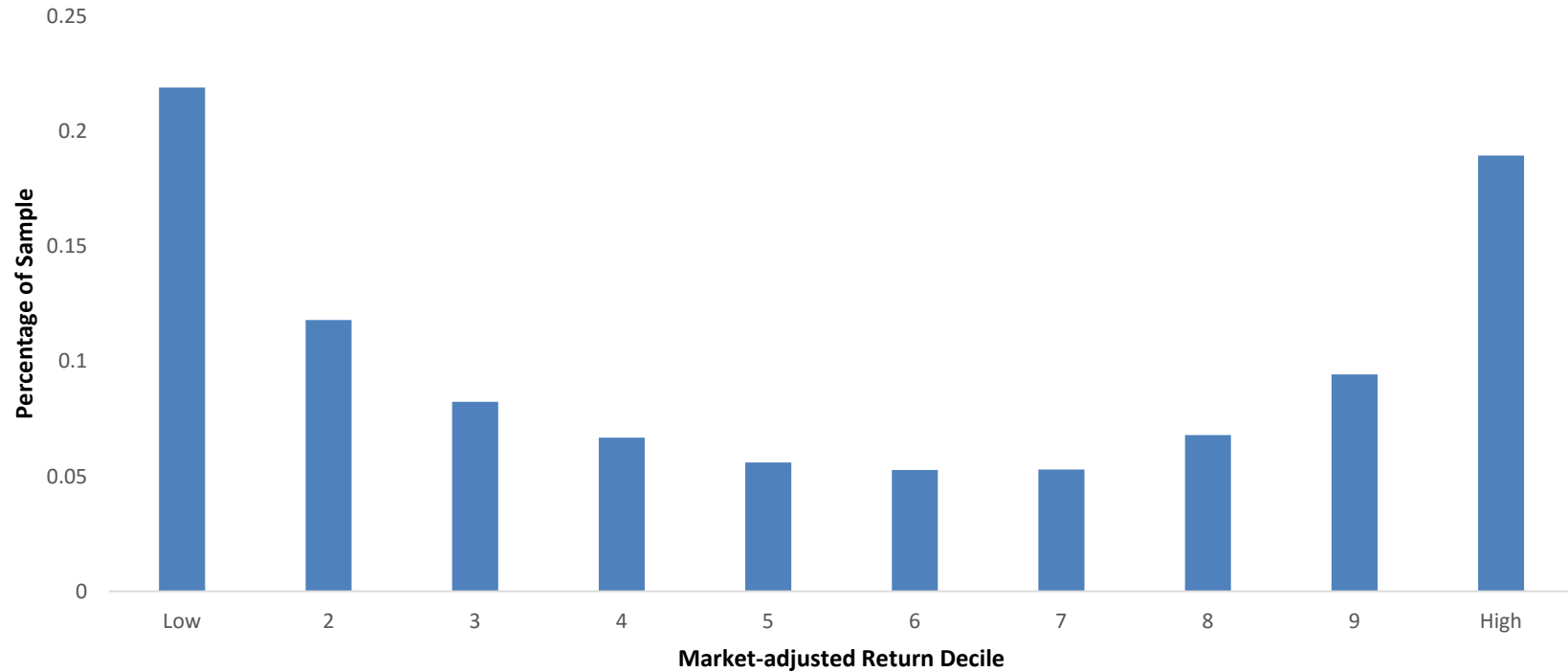
Table 4. Panel Regression Explaining Realized Earnings Growth from 1982 to 2014. The dependent variable for the regression is realized earnings growth (REAL EPS), which is the five-year annualized EPS growth rate. EQDIL is equity dilution measured as the percentage change in adjusted shares outstanding over the previous year. ΔSALES is the percentage change in split-adjusted revenues over the previous year. ΔASSETS is the percentage change in split-adjusted assets over the previous year. ROA is profitability, measured as operating income before depreciation divided by assets. LTG is measured as of the 3rd week in June of year t, while the independent variables are constructed using financial statement data from the fiscal period ending in year t-1. T-statistics, reported in parentheses, are based on robust standard errors that are clustered by firm and industry. For brevity, the intercept is not reported.

	LTG	EQDIL	ΔSALES	ΔASSETS	ROA	Hard Growth	Soft Growth	LN(P/B)	R^2	Ind & Year Fixed Effect?	N
Coefficient		-0.09	-0.02	-0.03	0.05			0.00	<.01	No	2,280
t-stat		(6.33)	(1.67)	(2.44)	(1.83)			(0.79)			
Coefficient		-0.10	-0.02	-0.03	0.12			-0.01	0.05	Yes	2,280
t-stat		(7.37)	(2.19)	(2.12)	(5.13)			(2.79)			
Coefficient	0.11	-0.10	-0.02	-0.03	0.07			-0.01	0.02	No	2,280
t-stat	(2.60)	(6.78)	(2.61)	(2.62)	(3.21)			(1.91)			
Coefficient	0.03	-0.10	-0.02	-0.03	0.13			-0.02	0.05	Yes	2,280
t-stat	(0.99)	(7.40)	(2.66)	(2.12)	(5.06)			(3.11)			
Coefficient						-0.52	0.11	-0.01	<.01	No	2,280
t-stat						(4.39)	(2.58)	(1.84)			
Coefficient						-0.61	0.02	-0.01	0.05	Yes	2,280
t-stat						(6.09)	(0.63)	(2.24)			

Figure 5. Persistence of Variables that Explain Growth from 1982 to 2009. This figure plots the average time-series Spearman correlation for different variables and their 1-, 2-, 3-, 4- and 5-year lag values using annual data. LTG measures the mean estimate of all analysts' expectations of the EPS annual growth rate between year *t+2* to year *t+5* measured in the 3rd week of June of year *t*. EQDIL (equity dilution) is the percentage change in split-adjusted shares outstanding from fiscal year-end in *t-2* to *t-1*. ΔSALES (sales growth) is the percentage change in revenues per split-adjusted share from *t-2* to *t-1*. ΔASSETS (asset growth) is the percentage change in assets per split-adjusted share from *t-2* to *t-1*. ROA (profitability) is operating income in *t-1* divided by assets for *t-1*. B/M (book/market ratio) is book equity in year *t-1* divided by market equity in December of *t-1*. P/B is market capitalization in December *t-1* divided by book equity in year *t-1*. P/E_{t+1} is the price per share in June *t*, divided by analyst EPS estimate for the next year *t+1*.
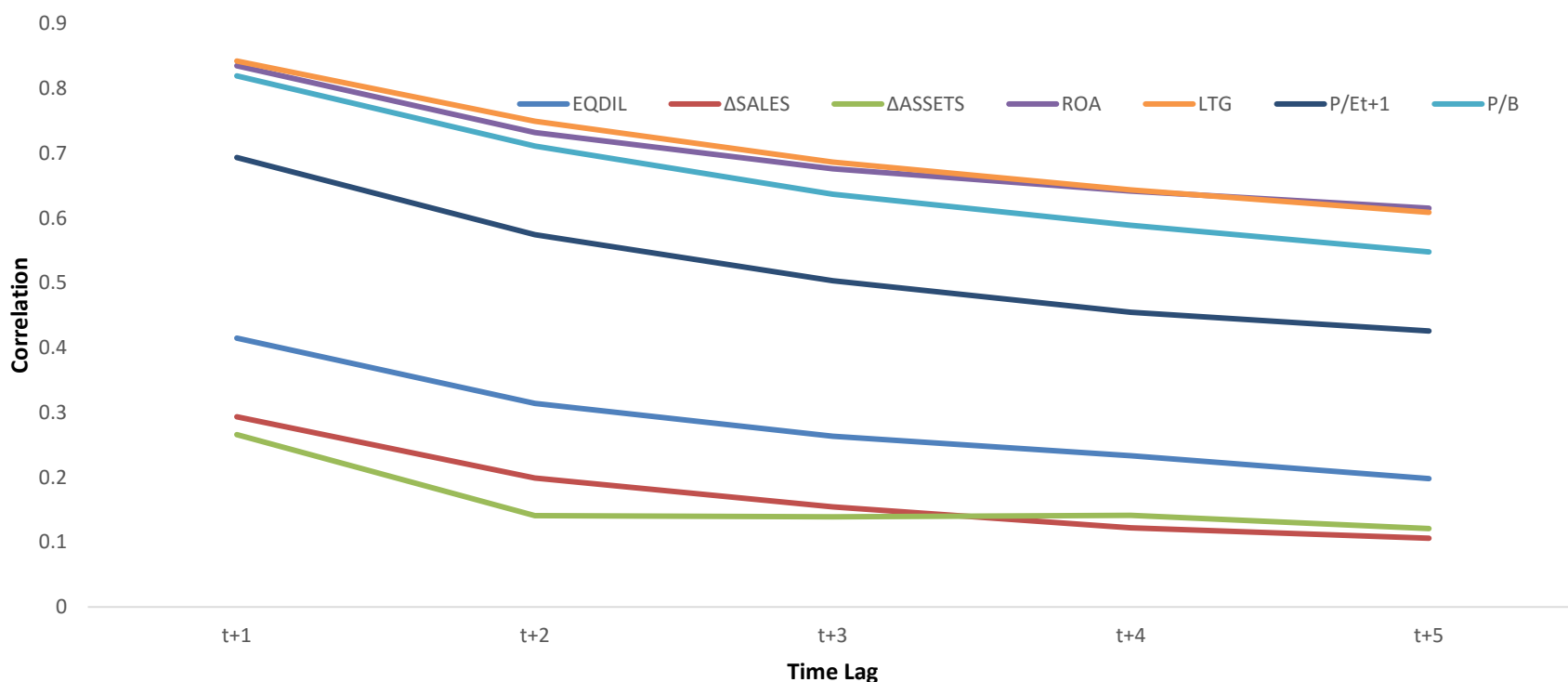
Table 5. Panel Regression Explaining Changes in Long-term Growth Estimates from 1982 to 2013. The dependent variable for the regression is the year-over-year change in analyst long-term growth forecasts (LTG$_{t+1}$ − LTG$_t$) measured in the 3rd week of June of year t. EqDil (equity dilution) is the percentage change in split-adjusted shares outstanding from fiscal year-end in $t-2$ to $t-1$. ΔSales (sales growth) is the percentage change in revenues per split-adjusted share from $t-2$ to $t-1$. ΔAssets (asset growth) is the percentage change in assets per split-adjusted share from $t-2$ to $t-1$. ROA (profitability) is operating income in $t-1$ divided by assets for $t-1$, Hard Growth is the fitted value from the last regression listed in Table 2. The independent variables are constructed using financial statement data from the fiscal period ending in year t-1. N is the average of firms each year. For brevity, the intercept is not reported. Robust standard errors are clustered by firm and industry.

	EQDIL	ΔSALES	ΔASSETS	ROA	Hard Growth	R²	Industry Fixed Effect?	Year Fixed Effect?	N
Coefficient	-0.02	-0.02	-0.01	0.00		0.03	No	No	1,929
t-stat	(7.81)	(5.91)	(8.21)	(0.31)					
Coefficient	-0.02	-0.02	-0.01	0.00		0.05	No	Yes	1,929
t-stat	(8.44)	(6.13)	(7.85)	(0.11)					
Coefficient	-0.02	-0.02	-0.01	0.00		0.03	Yes	No	1,929
t-stat	(7.62)	(5.74)	(7.82)	(0.41)					
Coefficient	-0.02	-0.02	-0.01	0.00		0.05	Yes	Yes	1,929
t-stat	(8.31)	(5.91)	(7.32)	(0.25)					
Coefficient					-0.24	0.02	No	No	1,929
t-stat					(5.40)				
Coefficient					-0.23	0.05	Yes	Yes	1,929
t-stat					(6.30)				

Table 6. Value-weighted Monthly Returns for Portfolios Formed on Long Term Growth Measures from July 1982 to December 2014. At the end of June of year *t*, stocks are allocated to ten portfolios based on the decile breakpoints for LTG (analyst long-term growth estimate), Hard Growth (fitted values from the last regression in Table 2) and Soft Growth (LTG minus Explained Growth). Panel A presents results for the original sample of firms with non-missing LTG. Panel B presents results for the bottom half of firms in the original sample based on market capitalization at the end of June of each year. Panel C reports results for all firms listed in CRSP/Compustat (including those with missing LTG data) that have valid data to construct EQDIL, ΔSALES, ΔASSETS, ROA and positive book equity. T-statistics are reported in parentheses to the right of each estimate. Monthly returns are reported in percentages.

Panel A. Original Sample

	1	2	3	4	5	6	7	8	9	10	10-1	*t-stat*	n
LTG	1.14%	1.10%	1.15%	1.12%	1.03%	1.08%	1.13%	1.25%	0.89%	1.15%	0.01%	(0.02)	2,153
Hard Growth	1.19%	1.18%	1.07%	1.22%	1.08%	1.23%	0.95%	1.05%	1.04%	0.59%	-0.60%	(2.66)	2,153
Soft Growth	0.98%	1.06%	1.15%	1.06%	1.22%	0.96%	1.06%	1.21%	1.02%	1.31%	0.33%	(0.96)	2,153

Panel B. Small Firms Only

	1	2	3	4	5	6	7	8	9	10	10-1	*t-stat*	n
LTG	1.24%	1.29%	1.23%	1.30%	1.29%	1.39%	1.28%	1.10%	1.17%	1.06%	-0.18%	(0.54)	1,077
Hard Growth	1.41%	1.44%	1.49%	1.27%	1.28%	1.37%	1.13%	1.36%	1.12%	0.55%	-0.86%	(3.88)	1,077
Soft Growth	1.18%	1.18%	1.14%	1.24%	1.25%	1.28%	1.32%	1.32%	1.23%	1.22%	0.05%	(0.15)	1,077

Panel C. All Firms (Includes Missing LTG Data Firms)

	1	2	3	4	5	6	7	8	9	10	10-1	*t-stat*	n
Hard Growth	1.16%	1.18%	1.11%	1.12%	1.11%	1.20%	1.02%	0.99%	0.98%	0.37%	-0.79%	(3.38)	4,045

Table 7. Fama-MacBeth Regressions of Monthly Returns on Growth, Size and Book/Market Measures from July 1982 to December 2014. This table reports the results of a set of Fama-MacBeth regressions of monthly returns on lagged growth measures, equity dilution, sales and asset growth, profitability, size and the book-to-market ratio. N is the average number of firms in the sample each year. LTG is the mean estimate of all analysts' expectations of the EPS annual growth rate between year *t+2* to year *t+5* measured in the 3rd week of June of year *t*. EQDIL (equity dilution) is the percentage change in split-adjusted shares outstanding from fiscal year-end in *t-2* to *t-1*. ΔSALES (sales growth) is the percentage change in revenues per split-adjusted share from *t-2* to *t-1*. ΔASSETS (asset growth) is the percentage change in assets per split-adjusted share from year *t-2* to year *t-1*. ROA (profitability) is operating income in year *t-1* divided by assets in year *t-1*. LN (Size) is the natural log of the market capitalization. LN (P/B) is the natural log of the price-to-book ratio. Hard Growth is the fitted value from the last regression listed in Table 2 and Soft Growth is equal to LTG minus Hard Growth. N is the average number of stocks each year. Certain regressions use industry dummies (based on GIC's 10 sector definitions). T-statistics are reported in parentheses to the right of each estimate and are based on Newey West corrected standard errors with a lag of 12 months. Monthly returns are reported in percentages.

	1		2		3		4		5		6	
Intercept	0.016	(2.18)	0.019	(2.52)	0.015	(2.16)	0.013	(2.33)	0.019	(2.72)	0.017	(3.19)
LTG	0.002	(0.17)			0.012	(1.25)	0.007	(1.11)				
EQDIL			-0.014	(5.25)	-0.015	(5.58)	-0.013	(5.62)				
ΔSALES			-0.002	(1.86)	-0.003	(2.12)	-0.003	(3.13)				
ΔASSETS			-0.005	(4.39)	-0.005	(4.51)	-0.005	(4.55)				
ROA			0.009	(1.66)	0.010	(2.18)	0.015	(2.96)				
Hard Growth									-0.072	(4.65)	-0.079	(5.54)
Soft Growth									0.012	(1.20)	0.007	(0.97)
Ln(SIZE)	0.000	(0.43)	0.000	(0.95)	0.000	(0.59)	0.000	(0.43)	0.000	(0.60)	0.000	(0.49)
Ln(P/B)	-0.001	(1.98)	-0.001	(1.01)	-0.002	(2.39)	-0.001	(1.98)	-0.002	(2.26)	-0.002	(2.81)
Ind Fixed Effect?	No		No		No		Yes		No		Yes	
R^2	0.03		0.03		0.04		0.08		0.03		0.08	
N	2,154		2,154		2,154		2,154		2,154		2,154	

Table 8. Pre- and Post-Global Settlement (August 2002) Split-Sample Regressions and Value-weighted Portfolio Returns from July 1982 to December 2014. This table replicates key results in earlier tables for different sample periods. Pre-GS refers to the period from July 1982 to August 2002, and post-GS refers to the period from September 2002 to December 2014. Panel A displays panel regression results similar to Tables 3 and 4; Panels B and C display average value-weighted returns for portfolios formed on various growth forecasts similar to analysis presented in Table 5. LTG is the mean estimate of all analysts' expectations of the EPS annual growth rate between year $t+2$ to year $t+5$ measured in the 3rd week of June of year t. EQDIL (equity dilution) is the percentage change in split-adjusted shares outstanding from fiscal year-end in $t-2$ to $t-1$. ΔASSETS (asset growth) is the percentage change in assets per split-adjusted share from year $t-2$ to year $t-1$. LN (Size) is the natural log of the market capitalization. LN (P/B) is the natural log of the price-to-book ratio. Hard Growth is the fitted value from the last regression listed in Table 2 and Soft Growth is equal to LTG minus Hard Growth. N is the average number of stocks each year. The regressions in Panel A include year and industry fixed effects (based on GIC's 10 sector definitions). T-statistics reported are double-clustered by firm and industry. Monthly returns shown in Panels B and C are reported in percentages.

Panel A. Panel Regression Split-Sample Results

	Dependent Variable	EQDIL	ΔASSETS	Hard Growth	Soft Growth	LN (P/B)	R^2	Time Period	N	Table Reference
Coefficient	LN (P/B)	0.09	0.42				0.23	Pre-GS	2,250	3A
t-stat		(2.75)	(12.79)							
Coefficient	LN (P/B)	-0.37	0.62				0.20	Post-GS	2,140	3A
t-stat		(6.54)	(7.67)							
Coefficient	LN (P/B)			1.60	3.38		0.30	Pre-GS	2,250	3A
t-stat				(5.04)	(12.08)					
Coefficient	LN (P/B)			0.66	2.27		0.21	Post-GS	2,140	3A
t-stat				(0.49)	(8.18)					
Coefficient	LN (P/E_{t+1})	0.19	0.12				0.24	Pre-GS	2,078	3B
t-stat		(3.06)	(2.94)							
Coefficient	LN (P/E_{t+1})	0.36	-0.13				0.11	Post-GS	1,923	3B
t-stat		(3.85)	(2.57)							
Coefficient	LN (P/E_{t+1})			2.09	2.37		0.32	Pre-GS	2,078	3B
t-stat				(4.66)	(12.28)					
Coefficient	LN (P/E_{t+1})			2.36	3.18		0.18	Post-GS	1,923	3B
t-stat				(2.21)	(4.85)					
Coefficient	REALEPS	-0.10	-0.03			-0.01	0.05	Pre-GS	2,255	4

t-stat		(6.39)	(2.14)			(2.66)				
Coefficient	REALEPS	-0.13	-0.01			0.01	0.08	Post-GS	2,357	4
t-stat		(5.18)	(0.50)			(0.64)				
Coefficient	REALEPS			-0.57	0.04	-0.02	0.05	Pre-GS	2,255	4
t-stat				(4.77)	(0.90)	(3.70)				
Coefficient	REALEPS			-0.75	0.04	0.01	0.08	Post-GS	2,357	4
t-stat				(4.40)	(0.62)	(0.70)				
Coefficient	ΔLTG	-0.02	-0.02				0.04	Pre-GS	1,962	5
t-stat		(7.59)	(11.16)							
Coefficient	ΔLTG	-0.01	-0.02				0.03	Post-GS	1,842	5
t-stat		(3.54)	(11.54)							
Coefficient	ΔLTG			-0.24			0.05	Pre-GS	1,962	5
t-stat				(6.03)						
Coefficient	ΔLTG			-0.20			0.03	Post-GS	1,842	5
t-stat				(6.29)						

Panel B. Table 6 Pre-GS (July 1982 - August 2002)

	1	2	3	4	5	6	7	8	9	10	10-1	*t-stat*	N
LTG	1.30%	1.25%	1.37%	1.30%	1.23%	1.19%	1.35%	1.20%	0.84%	1.15%	-0.15%	(0.28)	2,173
Hard Growth	1.37%	1.31%	1.21%	1.37%	1.17%	1.46%	1.09%	1.22%	1.06%	0.63%	-0.74%	(2.25)	2,173
Soft Growth	1.15%	1.24%	1.36%	1.23%	1.37%	1.12%	1.12%	1.14%	1.11%	1.37%	0.23%	(0.48)	2,173
EQDIL	1.65%	1.40%	1.31%	1.21%	1.24%	1.43%	1.33%	1.05%	0.81%	0.75%	-0.90%	(4.47)	2,173
ΔASSETS	1.33%	1.21%	1.10%	1.48%	1.23%	1.22%	1.44%	1.29%	1.08%	0.81%	-0.53%	(1.78)	2,173

Panel C. Table 6 Post-GS (September 2002 – December 2014)

	1	2	3	4	5	6	7	8	9	10	10-1	*t-stat*	N
LTG	0.88%	0.85%	0.78%	0.83%	0.72%	0.91%	0.78%	1.35%	0.98%	1.15%	0.27%	(0.70)	2,122
Hard Growth	0.89%	0.98%	0.85%	0.98%	0.95%	0.87%	0.72%	0.76%	0.99%	0.53%	-0.36%	(1.49)	2,122
Soft Growth	0.72%	0.72%	0.80%	0.73%	0.92%	0.79%	1.02%	1.19%	0.98%	1.20%	0.48%	(1.20)	2,122
EQDIL	0.94%	0.68%	0.86%	0.92%	0.85%	1.10%	1.17%	0.80%	0.95%	0.51%	-0.43%	(1.81)	2,122
ΔASSETS	1.13%	1.26%	1.36%	1.26%	1.40%	1.07%	1.09%	1.22%	1.05%	1.38%	0.24%	(0.48)	2,122