# The Accuracy of Analysts' Long-Term
# Earnings Per Share Growth Rate Forecasts

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ABSTRACT: In this study we examine the accuracy of analyst long-term and one-year earnings per share growth rate forecasts over the last 20 years.  We find that analysts' earnings growth rate estimates are consistently overly-optimistic and are about two times the level of GDP growth. Analyst predictions of earnings are better for one-year projections than for long-term projections, but are still overly-optimistic.  We find that analyst coverage does not have a significant impact on the optimistic bias in analysts EPS growth rate forecasts. We do find that a contributing factor for the bias in analysts' earnings estimates is the resistance of analysts to project negative earnings growth. Furthermore, we find that earnings estimates have a continued bias after the 2003 Global Analyst Research Settlements.

**Introduction**

The expected growth rate of long-term earnings plays a critical role in investment management and corporate finance. An essential element in valuation modeling and cost of capital estimation, long-term earnings growth is periodically forecasted by Wall Street analysts to provide investors with a better understanding of the current and future cash flows likely to be generated by a firm's operations. Periods of high earnings growth rates are usually accompanied with bull markets, and periods of low or negative earnings growth rates tend to produce bear markets. In addition, companies with high earnings growth rates usually sell at high price-to-earnings (P/E) ratios, and stocks with low earnings growth rates trade at low P/E ratios.

A number of studies have indicated that analysts' forecasts of earnings are upwardly biased. For example, Barefield and Comiskey (1975), DeBondt and Thaler (1990), Butler and Lang (1991), Abarbanall (1991), and Brown (1997) find an overall optimism in analysts' earnings forecasts. Becchetti, Hasan, Santoro, and Anandarajan (2007) find evidence that an over-optimism bias is highest during bull markets. Hong and Kubik (2003) find that brokerage houses reward optimistic analysts who promote stocks. In addition, the popular press occasionally highlights evidence of analysts forecast bias.[1]

However, these studies assessing the accuracy of analysts' earnings estimates are based on forecasts of quarterly earnings. That is, these studies evaluate the accuracy of analysts' earnings forecasts for periods up to one quarter before a quarterly EPS figure is released. Our study examines analysts' long-term (three- to five- year) and one-year

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[1] See for example, Brown (2003) and Smith (2003).

ahead EPS growth rate forecasts. According to financial theory, long-term expected earnings growth drives the valuation of the overall stock market and individual common stocks. As such, long-term EPS growth rate forecasts are an essential component of cash flow valuation models for firms and the market and are used in estimating the cost of capital.

We begin by evaluating historic EPS growth. Many have argued that there is an upward limit on EPS growth as determined by sustainable GDP growth. Bernstein and Arnott (2003) and Arnott (2004) indicate that EPS growth must be below sustainable growth in economic productivity. We show that the historic growth rate in EPS and GDP in the U. S. is in the 7.0% range. As an initial indication of accuracy of analysts' forecasts, we find that analysts' estimates of long-term EPS growth are substantially above this level.

We examine the accuracy of analysts' long-term earnings and one-year ahead EPS growth rate estimates over the last 20 years. We find that analysts' earnings growth rate estimates are consistently overly-optimistic. Analyst predictions of earnings growth are better for one-year growth rate projections than for long-term growth rate projections, but are still significantly overly-optimistic. Analysts only underestimate EPS growth following periods of economic recession which are associated with EPS recovery after large declines in earnings. We also evaluate whether the number of analysts covering a company is associated with the overly-optimistic bias in projected EPS growth rates. We find that analyst coverage does not have a significant impact on the bias in projected EPS growth rates. We do find that a contributing reason for the bias in analysts' long-term and one-year EPS growth rate estimates is the resistance of analysts to project negative earnings growth. We find that analysts rarely project negative EPS growth, despite the fact that companies commonly experience negative earning growth over three- to –five-

year time periods. Based on the research of others, we suggest three explanations for the upward bias in analysts' earnings estimates. The first explanation is based on career concerns or conflicts of interest. Analysts are rewarded for biased forecasts by their employers (brokerage houses) who want them to hype stocks so that the brokerage house can garner trading commissions and win underwriting deals. The second explanation is based on selection bias. Analysts only follow stocks that they recommend and do not issue forecasts on those that they do not like. The third explanation is a cognitive or behavioral bias. Analysts become attached to the companies that they cover and lose objectivity. This would imply that analysts are systematically biased. Since they are only projecting the companies they follow, and not the market, the end result is a strong upward bias on earnings projections.

Finally, we assess the optimistic bias in analysts' EPS growth rate estimates for the period after the Global Analyst Research Settlements in 2003. Presumably, any bias in the research of Wall Street investment firms should have been impacted by New York Attorney General (now Governor) Elliot Spitzer's investigation and the $1.5B payment made by nine major brokerage firms. Nonetheless, we find a continued optimistic bias in long-term earnings growth rate estimates after the Settlements.

This study is organized as follows. Initially, the historic growth of earnings on S&P 500 companies is compared to the growth in GDP to establish the historic relationship between corporate earnings growth and economic growth. Then, analysts' forecasts of earnings growth for long-term and one-year time horizons are compared to actual earnings growth. We also evaluate analyst coverage as a possible contributing factor in earnings forecast bias. Next, negative earnings growth projections are examined as a possible explanation for the earnings estimate bias. Finally we investigate analysts'

earnings estimates following the Global Research Regulatory Settlement to see if analysts have adjusted their bias.

**Data and Methodology**

One of the most common approaches to estimating the long-term earnings growth rates for companies is to use the mean estimates of the forecasts of Wall Street securities' analysts as published by such services as Zack's Investment Research, Thomson First Call Research, or the Institutional Brokers' Estimate System (I/B/E/S). I/B/E/S has a more comprehensive coverage of brokerage firms and financial analysts than the other databases. It includes many more analysts from smaller brokerage firms, and also includes important brokerage firms such as Merrill Lynch, Goldman Sachs, and Donaldson, Lufkin & Jenrette that are not included in Zack's Investment Research.

Using the I/B/E/S database, we collect long-term and one-year ahead annual growth rate estimates for all firms from 1984 to 2006, inclusive. We require that companies not only have projected EPS growth rate estimates, but also have EPS figures for the four-year ahead period (for the long-term forecasts) and the one-year ahead period (for the one-year forecasts) so that forecasted and actual EPS growth rates can be compared. Based on projected and actual earnings per share, we calculate implied geometric growth rates. We compare analysts' projected and actual EPS growth rates for long-term EPS growth rate forecasts and one-year EPS growth rate estimates. The data result in an average of 1,383 firms and 1,275 firms per year, for one-year and long-term growth rates, respectively. The descriptive statistics for the data are reported by year in Table 1.

**Table 1**
**Number of Companies and Average Number of Analysts:**
**One-Year and Long-Term Analyst Forecast Data**

| Year | One-Year Forecasts | | Long-Term Forecasts | |
|---|---|---|---|---|
| | Number of Companies | Average Number of Analysts | Number of Companies | Average Number of Analysts |
| 1984 | 1,245 | 8.61 | -- | -- |
| 1985 | 1,154 | 10.30 | -- | -- |
| 1986 | 1,140 | 10.44 | -- | -- |
| 1987 | 1,047 | 11.02 | -- | -- |
| 1988 | 1,095 | 10.70 | 808 | 6.09 |
| 1989 | 1,245 | 10.64 | 899 | 6.29 |
| 1990 | 1,260 | 10.78 | 892 | 6.49 |
| 1991 | 1,138 | 10.01 | 921 | 6.34 |
| 1992 | 1,192 | 9.60 | 1,003 | 5.49 |
| 1993 | 1,314 | 9.55 | 1,125 | 5.90 |
| 1994 | 1,475 | 9.71 | 1,175 | 5.69 |
| 1995 | 1,557 | 9.11 | 1,148 | 5.86 |
| 1996 | 1,652 | 8.74 | 1,158 | 5.68 |
| 1997 | 1,489 | 8.33 | 1,218 | 5.51 |
| 1998 | 1,375 | 7.75 | 1,466 | 4.99 |
| 1999 | 1,258 | 8.54 | 1,490 | 4.95 |
| 2000 | 1,176 | 8.26 | 1,503 | 5.08 |
| 2001 | 1,469 | 7.68 | 1,467 | 5.26 |
| 2002 | 1,367 | 7.13 | 1,518 | 5.39 |
| 2003 | 1,464 | 7.78 | 1,577 | 5.56 |
| 2004 | 1,565 | 8.60 | 1,663 | 5.24 |
| 2005 | 1,620 | 8.73 | 1,578 | 5.07 |
| 2006 | 2,502 | 6.92 | 1,628 | 5.59 |
| **Mean** | 1,383 | 9.08 | 1,275 | 5.61 |
| **Median** | 1,314 | 8.74 | 1,218 | 5.56 |

**Source:** I/B/E/S.  Long-term numbers are based on the average of quarterly numbers for each year.

*Analysts Long-Term EPS Growth Rate Forecasts*

For the analysts' long-term growth rate estimates, I/B/E/S reports the number of analysts as well as the mean and median EPS growth rate estimates for a 'three-to-five' year period.  Given that I/B/E/S projected EPS growth rate is for a 'three-to-five' year period, the projected EPS growth rate is assumed to be four years.  For each company in the I/B/E/S database with long-term analysts' EPS growth rate forecasts, as of the end of

each quarter we obtain the annual EPS, $EPS_t$, as the sum of the trailing four quarters' EPS and the mean projected three-to-five year projected EPS growth rate, $g$. As an example, assume that $EPS_t$ for a particular company as of the end of the fourth quarter of 2000 is $1.00 and $g$ is 10%, as shown in Table 2. The projected EPS in four years, $EPS_{t+4}$, for this company is calculated as:

$$EPS_{t+4} = (EPS_t)(1+ g)^4$$

**Table 2**
**Example: EPS and Projected Growth for a Hypothetical Company**

| Actual Quarterly EPS | | | | | |
|---|---|---|---|---|---|
| First Quarter 2000 | Second Quarter 2000 | Third Quarter 2000 | Fourth Quarter 2000 | Actual Annual EPS | I/B/E/S Projected EPS Growth |
| 0.25 | 0.35 | 0.25 | 0.15 | 1.00 | 10.0% |

In this example, the company's projected EPS is calculated as:

$$EPS_{t+4} = (1.00)(1.10)^4 = \$1.46.$$

This figure is compared to the company's actual annual EPS growth rate from the end of 2000 to the end of 2004. The actual EPS growth rate is calculated as the compound annual growth rate in earnings over the time period, $g_a$, as shown below:

$$g_a = 1 - \left( \frac{EPS_{t+4}}{EPS_t} \right)^{.25}$$

As an example, if the company's actual annual EPS as of the fourth quarter of 2004 is $1.25; the company's actual four-year EPS growth rate is calculated as 5.74%. This is shown in Table 3. In this example, analysts projected this company to grow EPS at 10% over the four-year time period, and the company had an actual EPS growth rate of 5.74%. This procedure is repeated on a quarterly basis for each company in the I/B/E/S database.

**Table 3**
**Example: Actual Long-Term EPS**
**Growth Rate Calculation for a Hypothetical Company**

| Actual Quarterly EPS | | | | | |
|---|---|---|---|---|---|
| First Quarter 2004 | Second Quarter 2004 | Third Quarter 2004 | Fourth Quarter 2004 | Actual Annual EPS | Actual EPS Growth (2000 – 2004) |
| 0.30 | 0.35 | 0.25 | 0.35 | 1.25 | 5.74% |

*Analysts' One-Year EPS Growth Rate Estimates*

For one-year EPS estimates, I/B/E/S reports the number of analysts as well as the mean and median one-year EPS estimates. We compare the growth rates associated with the one-year projected EPS estimates with the actual EPS as of the end of the calendar year. For this reason, we limit this analysis to firms with December 31$^{st}$ fiscal year-ends.

As an example, using the hypothetical company in Table 4, of the end of the fourth quarter of 2004, the company's $EPS_t$ is \$1.00. If the analysts' projected one-year growth in EPS, $EPS_{t+1}$, is \$1.15, the company's projected one-year EPS growth rate is calculated as 15.0%. This figure is compared to the company's actual EPS growth rate based on quarterly earnings in 2005. In the example in Table 4, the company's actual one-year EPS growth rate is 10.0%. This procedure is then repeated on an annual basis for each company in the I/B/E/S database

**Table 4**
**Example: Actual Annual EPS Growth**
**Rate Calculation for a Hypothetical Company**

| Actual EPS | | | | | | |
|---|---|---|---|---|---|---|
| First Quarter 2004 | Second Quarter 2004 | Third Quarter 2004 | Fourth Quarter 2004 | 2004 Actual Annual EPS | 2005 Actual Annual EPS | Projected One-Year EPS Growth (2004 – 2005) |
| 0.30 | 0.30 | 0.20 | 0.20 | 1.00 | 1.10 | 15.0% |

We calculate forecast errors, *FE*, based on the ratio of the forecasted and actual estimated growth rates, as follows:

$$FE = \frac{g}{g_a} - 1$$

Based on this calculation, a positive forecast error indicates an upward bias in forecasted earnings and a negative forecast error indicates a downward bias in forecasted earnings.

The tabulated growth rates are based only on firms who survive for the following one or four years, for one-year and long-term growth rates, respectively. The survivorship bias may induce an upward bias in actual earnings growth rates. Moreover, we do not calculate growth rates when the base-year value is negative.

**Historic Growth Rate in Earnings**

The historic record for EPS and GDP growth provides a benchmark for long term growth estimates. Ibbotson and Cheng (2003) show that growth in earnings is in line with overall growth in economic productivity. Bernstein and Arnott (2003) and Arnott (2004) make the point that corporate earnings growth rates cannot exceed sustainable GDP growth, even though analysts consistently forecast growth rates that indicate the opposite.

We begin by examining the actual five-year earning per share (EPS) growth for the S&P 500 and five-year Gross Domestic Product (GDP) growth from 1960 to 2006. EPS for the S&P 500 has averaged 7.02% with a median of 7.08%. GDP has averaged 7.42% with median of 7.40%. The results are presented in Figure 1.

Historically, EPS growth has been is more volatile than GDP growth. EPS growth rates range from -2.71% to 16.89% with a standard deviation of 4.51%. Growth rates for GDP range from 4.62% to 11.38% with a standard deviation of 2.03%. In addition, average GDP growth has exceeded EPS growth. This result corresponds with

previous research.

**Figure 1**
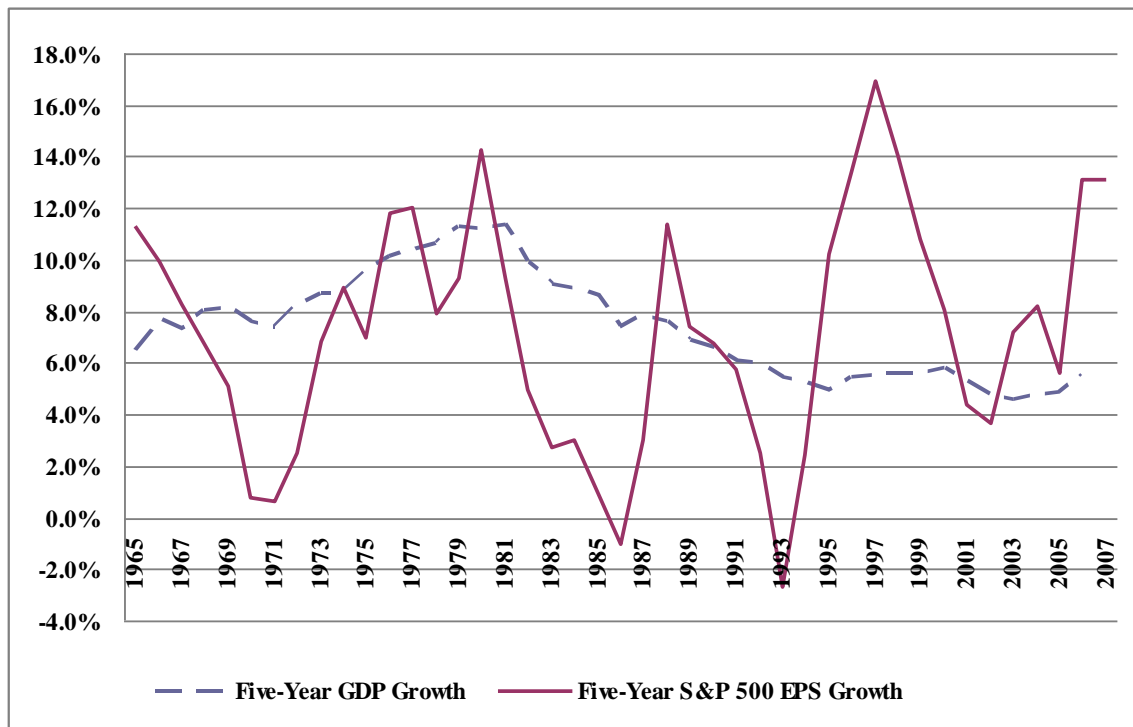**Five-Year S&P 500 EPS Growth Versus Five-Year GDP Growth**



Figure 2 shows the mean and median long-term analysts EPS forecasts from 1988 through the first quarter of 2007. Although GDP growth has averaged 7.42% with median of 7.40% over the last 40 years, analysts over our sample period project long-term growth at an average rate of 14.71%. This suggests that analysts consistently forecast long-term EPS growth at a level that is two times that of historic GDP growth.

Several observations can be made from Figure 2. First, analysts consistently project long-term growth rates in a range of 13% to 18%. Second, mean and median observations are practically identical suggesting that these results are not driven by outliers. Finally, analysts' forecasts have increased over time, even though GDP growth has decreased over time.

In the sections that follow, we examine analysts' long-term and one- year ahead

forecasts relative to actual EPS growth rates.

**Figure 2**
**Long-Term IBES Forecasted EPS Growth Rates**
**1988-2006**
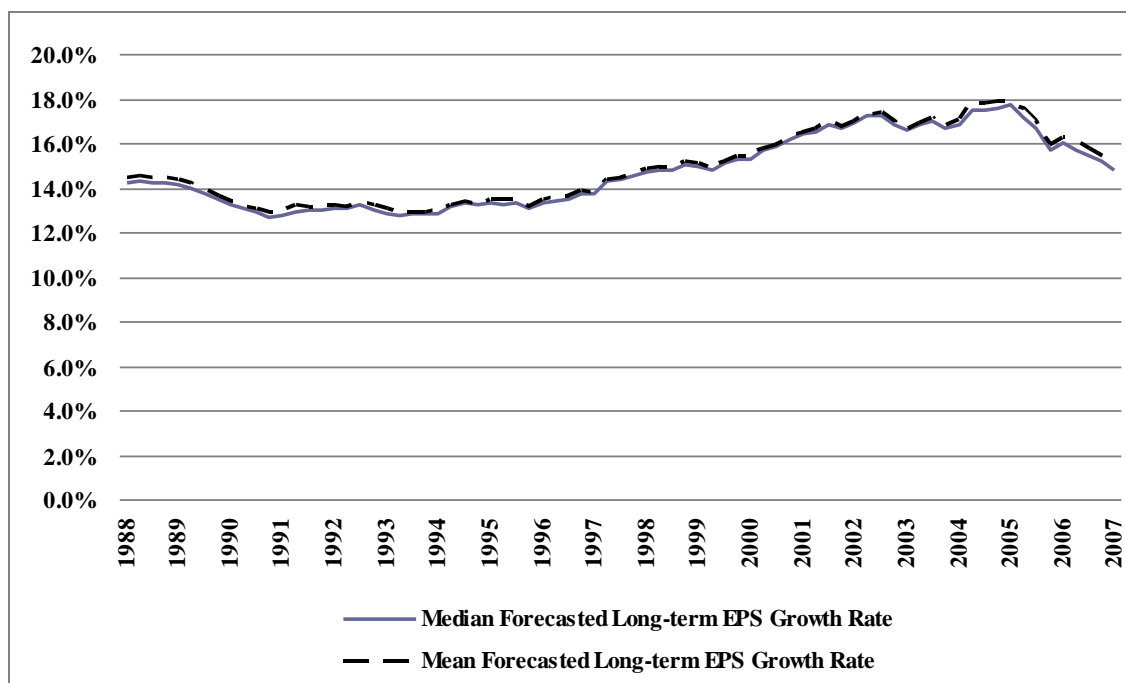


**Analysts IBES Forecast Versus Actual EPS Growth Rates: Long-Term Projections**

We examine forecasted long-term EPS growth versus actual three-to-five-year EPS growth based on IBES data from 1984 to 2006. The results are presented by quarter in Table 5 and Figure 3.

. Over the entire time period, analysts continually forecast long-term EPS growth for the sample between 13% and 18%. Actual EPS growth for the sample ranges between 1.23% and 19.93%. Firm's meet or exceed analysts' expectations in periods around 1996 and 2006, both of which followed a large decline in corporate earnings. This is the most likely scenario for corporations to attain the lofty growth rates projected by analysts. This pattern is seen clearly in Figure 3.

Over the entire period analysts' long-term forecasted EPS growth averaged

14.71% per year, but companies only averaged long-term EPS growth of 9.10%.  The

analyst bias is obvious and clearly significant.  A test for a difference in means--the null

hypothesis is the difference in the mean actual EPS growth is equal to the mean projected

EPS growth--has a t-stat of -10.68 which is significant at the .005 level (n=77).

**Table 5**
**Summary of Forecasted and Actual Long-Term EPS Growth Rates by Quarter**

| Year | Quarter Ended | Mean Actual Long-term EPS Growth Rate | Mean Forecasted Long-term EPS Growth Rate | Forecast Error for Mean (%) | Number of Companies | Average Number of Analyst Estimates |
|------|---------------|------|------|------|------|------|
| 1988 | Mar-88 | 5.36% | 14.47% | 170.07% | 768 | 6.24 |
|      | Jun-88 | 6.61% | 14.55% | 120.32% | 797 | 6.26 |
|      | Sep-88 | 7.12% | 14.45% | 102.96% | 817 | 5.96 |
|      | Dec-88 | 8.12% | 14.46% | 78.13% | 850 | 5.88 |
| 1989 | Mar-89 | 8.20% | 14.35% | 75.08% | 910 | 6.09 |
|      | Jun-89 | 8.92% | 14.21% | 59.34% | 892 | 6.36 |
|      | Sep-89 | 10.28% | 13.88% | 35.03% | 889 | 6.57 |
|      | Dec-89 | 8.81% | 13.65% | 55.00% | 905 | 6.15 |
| 1990 | Mar-90 | 7.94% | 13.41% | 68.98% | 907 | 6.42 |
|      | Jun-90 | 8.66% | 13.23% | 52.76% | 863 | 6.46 |
|      | Sep-90 | 7.84% | 13.05% | 66.44% | 880 | 6.48 |
|      | Dec-90 | 7.10% | 12.89% | 81.48% | 916 | 6.62 |
| 1991 | Mar-91 | 6.35% | 12.89% | 103.13% | 939 | 6.70 |
|      | Jun-91 | 8.21% | 13.19% | 60.63% | 914 | 6.68 |
|      | Sep-91 | 5.20% | 13.14% | 152.80% | 897 | 6.07 |
|      | Dec-91 | 3.84% | 13.18% | 243.60% | 932 | 5.90 |
| 1992 | Mar-92 | 1.25% | 13.22% | 955.21% | 950 | 5.58 |
|      | Jun-92 | 1.57% | 13.18% | 737.49% | 986 | 5.41 |
|      | Sep-92 | 2.75% | 13.40% | 387.75% | 1008 | 5.47 |
|      | Dec-92 | 1.83% | 13.22% | 621.01% | 1068 | 5.52 |
| 1993 | Mar-93 | 1.64% | 13.04% | 697.33% | 1062 | 5.79 |
|      | Jun-93 | 1.81% | 12.90% | 612.01% | 1183 | 5.93 |
|      | Sep-93 | 3.76% | 12.89% | 243.17% | 1115 | 5.98 |
|      | Dec-93 | 1.23% | 12.92% | 951.11% | 1140 | 5.90 |
| 1994 | Mar-94 | 5.31% | 12.98% | 144.61% | 1143 | 5.66 |
|      | Jun-94 | 6.27% | 13.21% | 110.79% | 1158 | 5.56 |
|      | Sep-94 | 6.61% | 13.42% | 103.17% | 1207 | 5.75 |
|      | Dec-94 | 8.89% | 13.34% | 49.99% | 1192 | 5.81 |
| 1995 | Mar-95 | 11.88% | 13.47% | 13.39% | 1166 | 5.88 |
|      | Jun-95 | 12.20% | 13.44% | 10.21% | 1144 | 5.84 |
|      | Sep-95 | 13.37% | 13.45% | 0.61% | 1147 | 5.87 |

| | | | | | |
|---|---|---|---|---|---|
| | Dec-95 | 14.14% | 13.18% | -6.78% | 1134 | 5.87 |
| 1996 | Mar-96 | 15.88% | 13.47% | -15.20% | 1115 | 5.76 |
| | Jun-96 | 15.05% | 13.59% | -9.74% | 1154 | 5.62 |
| | Sep-96 | 15.07% | 13.65% | -9.38% | 1177 | 5.70 |
| | Dec-96 | 15.42% | 13.87% | -10.04% | 1185 | 5.63 |
| 1997 | Mar-97 | 14.62% | 13.83% | -5.37% | 1213 | 5.55 |
| | Jun-97 | 13.82% | 14.36% | 3.92% | 1223 | 5.55 |
| | Sep-97 | 13.72% | 14.49% | 5.61% | 1260 | 5.48 |
| | Dec-97 | 13.52% | 14.69% | 8.67% | 1174 | 5.45 |
| 1998 | Mar-98 | 13.67% | 14.88% | 8.85% | 1477 | 5.14 |
| | Jun-98 | 13.13% | 14.95% | 13.85% | 1448 | 4.92 |
| | Sep-98 | 11.33% | 14.91% | 31.68% | 1475 | 4.98 |
| | Dec-98 | 10.27% | 15.22% | 48.16% | 1462 | 4.93 |
| 1999 | Mar-99 | 9.37% | 15.13% | 61.49% | 1510 | 4.88 |
| | Jun-99 | 8.50% | 14.90% | 75.28% | 1480 | 4.96 |
| | Sep-99 | 8.89% | 15.20% | 70.90% | 1490 | 4.89 |
| | Dec-99 | 9.70% | 15.39% | 58.64% | 1481 | 5.06 |
| 2000 | Mar-00 | 10.21% | 15.45% | 51.25% | 1491 | 5.00 |
| | Jun-00 | 10.48% | 15.78% | 50.53% | 1515 | 4.94 |
| | Sep-00 | 10.48% | 15.93% | 51.96% | 1503 | 5.12 |
| | Dec-00 | 3.19% | 16.31% | 412.19% | 1502 | 5.25 |
| 2001 | Mar-01 | 9.30% | 16.53% | 77.61% | 1502 | 5.26 |
| | Jun-01 | 8.09% | 16.63% | 105.58% | 1485 | 5.26 |
| | Sep-01 | 6.36% | 16.97% | 166.79% | 1465 | 5.33 |
| | Dec-01 | 4.72% | 16.76% | 255.42% | 1414 | 5.18 |
| 2002 | Mar-02 | 3.63% | 17.02% | 369.17% | 1461 | 5.37 |
| | Jun-02 | 4.28% | 17.35% | 305.30% | 1517 | 5.26 |
| | Sep-02 | 5.27% | 17.38% | 229.93% | 1541 | 5.45 |
| | Dec-02 | 5.98% | 16.98% | 183.88% | 1553 | 5.50 |
| 2003 | Mar-03 | 6.37% | 16.68% | 161.92% | 1537 | 5.55 |
| | Jun-03 | 6.11% | 16.92% | 177.12% | 1566 | 5.46 |
| | Sep-03 | 5.52% | 17.15% | 210.57% | 1598 | 5.58 |
| | Dec-03 | 7.25% | 16.85% | 132.37% | 1605 | 5.65 |
| 2004 | Mar-04 | 6.93% | 17.08% | 146.39% | 1629 | 5.70 |
| | Jun-04 | 6.80% | 17.76% | 161.30% | 1664 | 5.18 |
| | Sep-04 | 8.28% | 17.81% | 115.12% | 1687 | 5.23 |
| | Dec-04 | 8.70% | 17.84% | 104.95% | 1670 | 4.87 |
| 2005 | Mar-05 | 10.11% | 17.92% | 77.23% | 1616 | 4.93 |
| | Jun-05 | 12.45% | 17.53% | 40.74% | 1578 | 4.87 |
| | Sep-05 | 14.39% | 16.96% | 17.82% | 1599 | 5.16 |
| | Dec-05 | 15.15% | 15.95% | 5.32% | 1517 | 5.33 |
| 2006 | Mar-06 | 19.82% | 16.22% | -18.18% | 1563 | 5.33 |
| | Jun-06 | 19.93% | 16.07% | -19.40% | 1580 | 5.65 |
| | Sep-06 | 19.45% | 15.75% | -19.05% | 1644 | 5.83 |
| | Dec-06 | 18.60% | 15.41% | -17.14% | 1723 | 5.57 |
| 2007 | Mar-07 | 17.81% | 15.07% | -15.39% | 1734 | 5.25 |
| | **Mean** | **9.10%** | **14.89%** | **143.06%** | **1,281** | **5.60** |
| | **Median** | **8.50%** | **14.55%** | **75.08%** | **1,223** | **5.56** |

Also presented in Table 5 are forecast errors. Previous studies based on quarterly estimates (see, for example, Kwag and Shrieves (2006)) find that forecast errors are mixed. Our findings indicate that forecast errors for long-term estimates are predominantly positive, which indicates an upward bias in growth estimates. The mean and median forecast errors over the observation period are 143.06% and 75.08%, respectively. They are only negative for 11 time periods: five consecutive quarters starting at the end of 1995 and six consecutive quarters starting in 2006. As can be seen in Figure 3, the negative forecast errors clearly follow periods of declined earnings growth when higher growth rates can be attained. Overall, there is evidence of a persistent upward bias in long-term EPS growth forecasts.

**Figure 3**
**Long-Term Forecasted Versus Actual EPS Growth Rates**
**1988-2006**
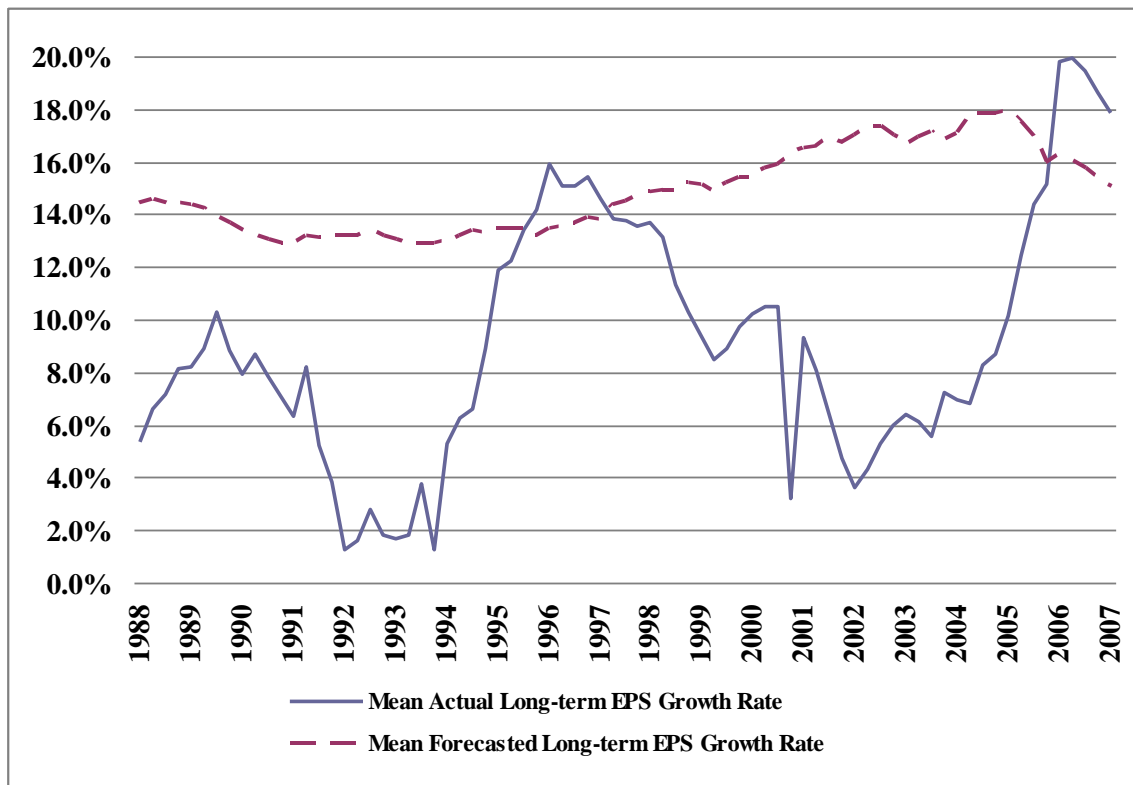
### Long-Term EPS Forecasts: Breakdown by Number of Analysts

It is possible that the results from the previous section are affected by the level of analyst coverage. Smaller and newly-traded companies tend to have less analyst coverage. It is possible that companies with fewer analysts would bias the results. Earnings for small or newly-traded companies are more difficult to forecast and would be expected to lead to higher forecasted earnings growth rates. For this reason we divide the sample into two groups: companies with three or fewer analysts and companies with more than three analysts.

While our data averages 5.61 analysts per company, many companies have three or fewer analysts. The two groups evenly divide the data. On average, of 1,273 companies, 628 have three or fewer analysts and 645 have more than three analysts. The data is described in Table 6 and displayed in Figure 4.

The results indicate that the group of companies with more than three analysts has lower long-term earnings growth rate forecasts. However, that group also has significantly lower actual growth in earnings, as indicated by a difference in means test (t-stat = -5.77, n = 77). Furthermore, while there is no significant difference between the forecasted growth rates by group since 2002, actual earnings continue to be lower for the group with more than three analysts. Overall, the forecast errors by group are very close. The median forecast error for the group with fewer than three analysts is 48.65%. For the group with more than three analysts the median forecast error is 48.68%.

**Table 6**
**Number of Companies by**
**Analyst Coverage for Long-Term IBES Data**

| Year | Total Number of Companies | Companies with 3 and fewer Analysts | Companies with more than 3 Analysts |
|---|---|---|---|
| 1988 | 808 | 325 | 485 |
| 1989 | 899 | 379 | 522 |
| 1990 | 892 | 389 | 508 |
| 1991 | 921 | 410 | 511 |
| 1992 | 1,003 | 502 | 505 |
| 1993 | 1,125 | 535 | 577 |
| 1994 | 1,175 | 561 | 615 |
| 1995 | 1,148 | 533 | 616 |
| 1996 | 1,158 | 530 | 633 |
| 1997 | 1,218 | 576 | 646 |
| 1998 | 1,466 | 731 | 735 |
| 1999 | 1,490 | 735 | 756 |
| 2000 | 1,503 | 747 | 756 |
| 2001 | 1,467 | 759 | 707 |
| 2002 | 1,518 | 825 | 693 |
| 2003 | 1,577 | 871 | 705 |
| 2004 | 1,663 | 875 | 788 |
| 2005 | 1,578 | 809 | 769 |
| 2006 | 1,628 | 898 | 730 |
| **Mean** | **1,273** | **628** | **645** |
| **Median** | **1,218** | **576** | **646** |

**Source:** I/B/E/S. Based on the average of quarterly numbers for each year.

**Figure 4**
**Long-Term IBES Forecasted EPS Growth Rates by Analysts Coverage**
**Panel A: Greater Than Three Analysts**
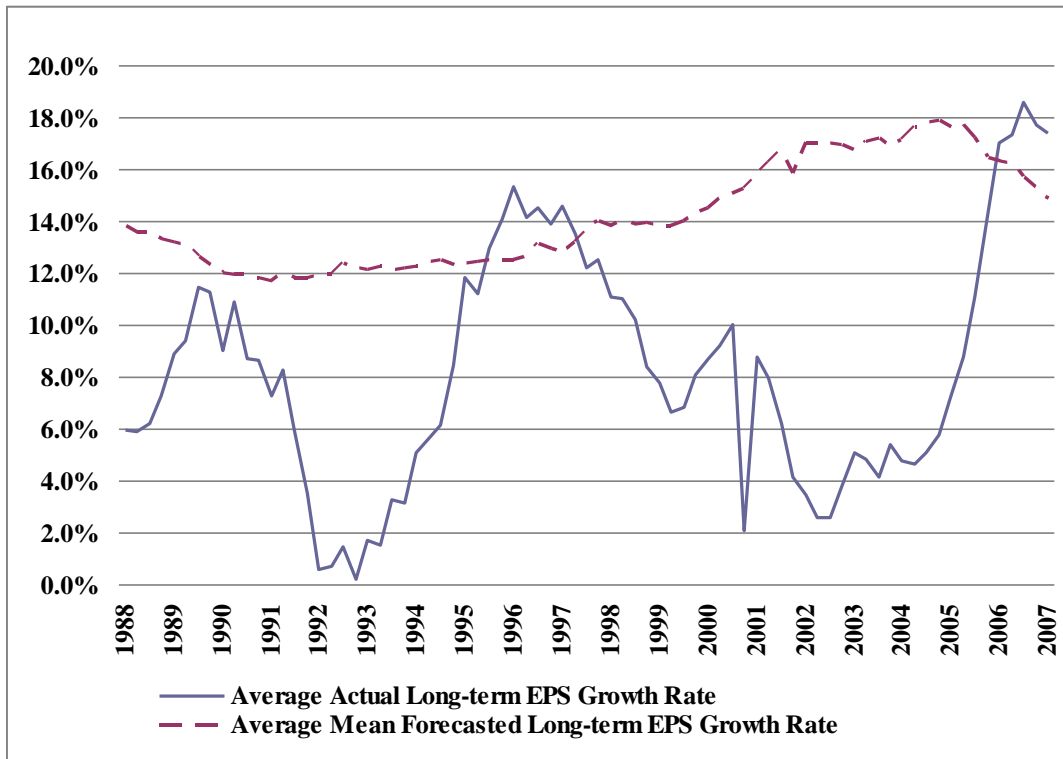


**Panel B: Three Analysts of Fewer**
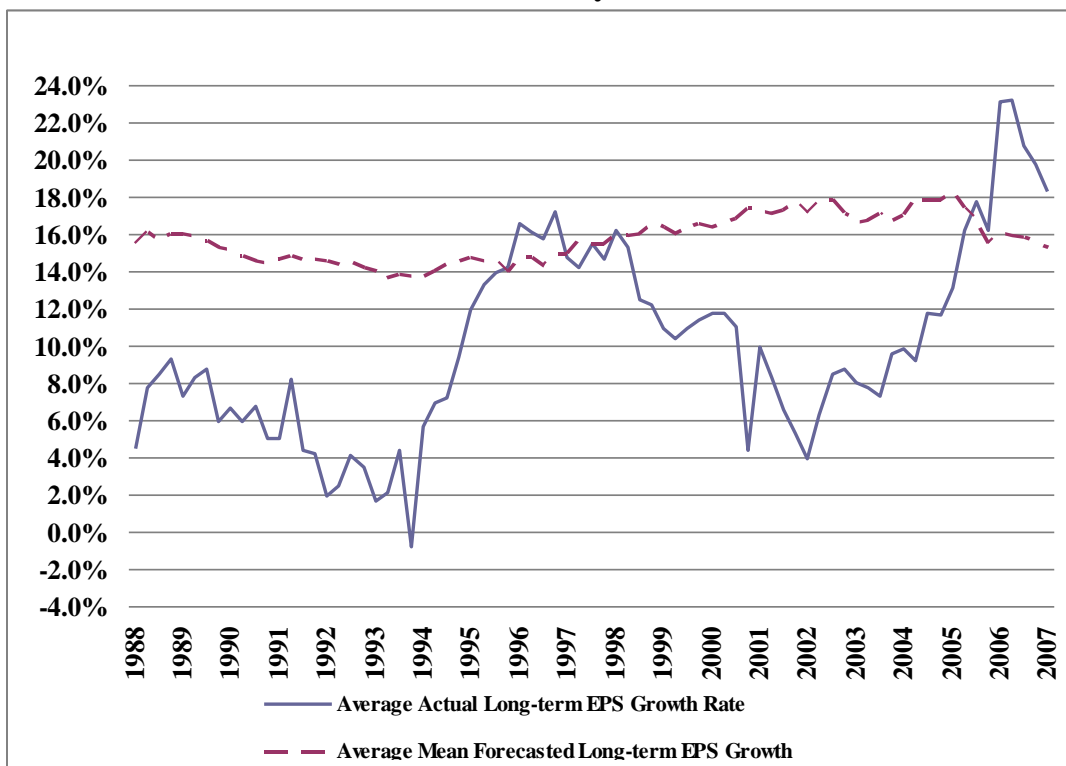
**Analysts IBES Forecast Versus Actual EPS Growth Rates: One-Year Projections**

Although we have shown a significant bias in growth rate forecasts, we realize that long-term growth is difficult to forecast. Over longer forecast periods, analysts face a greater probability of unexpected events that will lead to inaccurate estimates. One possible explanation for the persistent bias is that analysts consistently project long-term growth estimates higher than short-term estimates to allow for the possibility of unforeseen events. For this reason, we extend the analysis to one-year EPS growth rate forecasts, expecting that analysts' estimates will be more accurate over a shorter period of time with less event risk.

We collect forecasted and actual one-year EPS growth rate data for firms from 1984 to 2006. We compare the analysts' forecasted EPS growth rates to the actual annual growth rates over the year. The results are presented by year in Table 7.

Analysts consistently project upwardly biased growth rates, even for shorter time horizons. Analysts forecasted one-year EPS growth at an average rate of 13.80% while the actual EPS growth rate over the time period averaged 9.77%. These growth rates are significantly different as indicated by a difference in means test (t-stat = -4.91, n=23).

Although the one-year forecast errors are lower, they are still large and predominantly positive. The mean and median forecast errors over the observation period are 165.94% and 32.51%, respectively. Forecast errors are only negative for the last three years, indicating an overall negative bias to earnings estimates.

**Table 7**
**Summary of IBES Forecasted and Actual One-Year Growth Rates by Year**

| Year | Mean Annual Actual EPS Growth Rate | Mean Annual Forecasted EPS Growth Rate | Forecast Error for Mean Growth Rate | Number of Companies | Average Number of Analyst Estimates |
|---|---|---|---|---|---|
| 1984 | 3.79% | 6.10% | 61.24% | 1245 | 8.61 |
| 1985 | 8.33% | 10.77% | 29.40% | 1154 | 10.30 |
| 1986 | 9.96% | 13.43% | 34.84% | 1140 | 10.44 |
| 1987 | 11.68% | 16.67% | 42.71% | 1047 | 11.02 |
| 1988 | 13.22% | 15.62% | 18.16% | 1095 | 10.70 |
| 1989 | 4.32% | 10.81% | 150.19% | 1245 | 10.64 |
| 1990 | 1.15% | 13.60% | 1082.97% | 1260 | 10.78 |
| 1991 | 2.97% | 12.20% | 311.26% | 1138 | 10.01 |
| 1992 | 10.98% | 16.72% | 52.24% | 1192 | 9.60 |
| 1993 | 11.66% | 17.49% | 50.09% | 1314 | 9.55 |
| 1994 | 12.42% | 15.31% | 23.34% | 1475 | 9.71 |
| 1995 | 12.05% | 15.97% | 32.51% | 1557 | 9.11 |
| 1996 | 12.88% | 15.15% | 17.63% | 1652 | 8.74 |
| 1997 | 12.50% | 14.26% | 14.11% | 1489 | 8.33 |
| 1998 | 7.52% | 15.38% | 104.62% | 1375 | 7.75 |
| 1999 | 10.76% | 14.46% | 34.32% | 1258 | 8.54 |
| 2000 | 11.20% | 14.51% | 29.55% | 1176 | 8.26 |
| 2001 | 0.77% | 14.08% | 1730.98% | 1469 | 7.68 |
| 2002 | 12.64% | 13.27% | 5.04% | 1367 | 7.13 |
| 2003 | 10.16% | 12.23% | 20.37% | 1464 | 7.78 |
| 2004 | 16.46% | 13.40% | -18.62% | 1565 | 8.60 |
| 2005 | 14.25% | 13.79% | -3.20% | 1620 | 8.73 |
| 2006 | 13.10% | 12.17% | -7.09% | 2502 | 6.92 |
| **Mean** | **9.77%** | **13.80%** | **165.94%** | **1383** | **9.08** |
| **Median** | **11.20%** | **14.08%** | **32.51%** | **1314** | **8.74** |

The one-year analysts' forecasts and actual EPS growth rates are presented in Figure 5. The persistent upward bias is evident from the graph. As with long-term analyst forecasts, the only negative forecast errors follow a period of lower actual EPS growth. Higher growth is most likely to be attained after such a period.

**Figure 5**
**One-Year Forecasted versus Actual EPS Growth Rates**
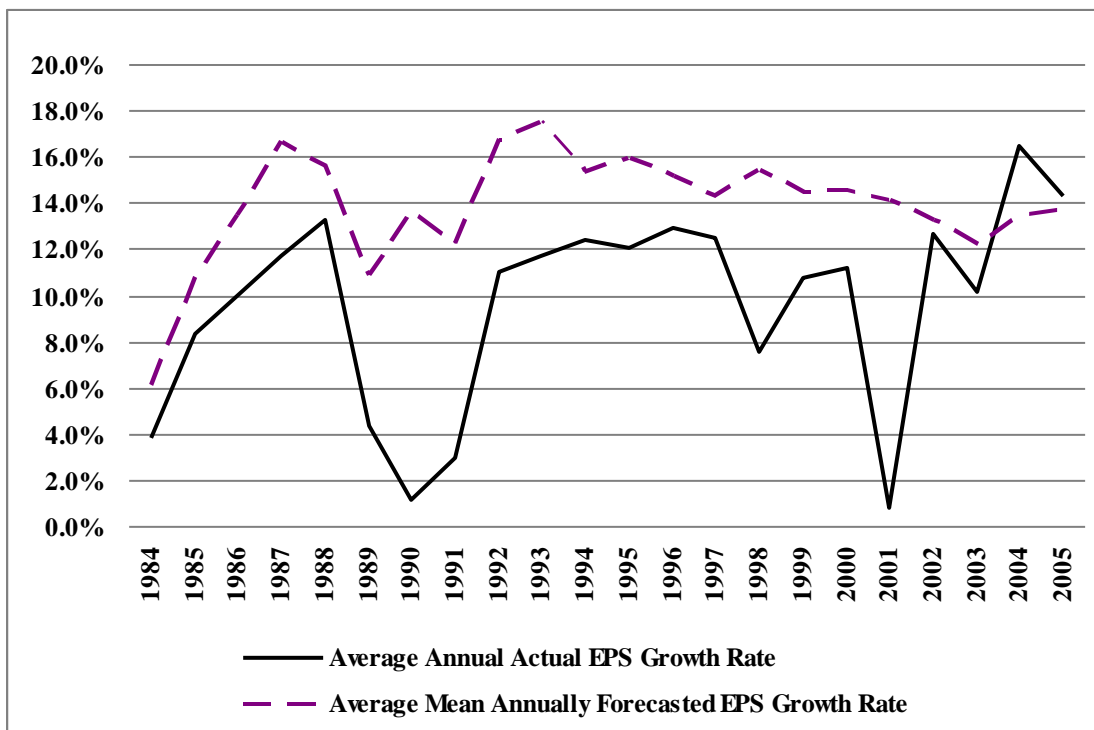


**Negative Earnings Growth Rate Forecasts**

One explanation of the persistent bias of analysts' projections is a resistance to report negative earnings growth rates. A resistance to report negative earnings growth could be linked to the investment banking influences addressed by the Global Analyst Research Settlements. It could also be caused by a cognitive bias often called familiarity. Familiarity is a behavioral flaw common to investors. Investors have a tendency to favor investments they know, such as the common stock of their employer. Similarly, analysts

may become attached to companies they follow and lose objectivity.

Using long-term growth projections, we begin by comparing the number of companies with projected negative EPS growth rates to those with actual negative EPS growth rates in each time period. The differences are striking. The results are summarized in Panel A and Panel B of Figure 6.

Panel A shows the percent of companies with actual negative EPS growth. The average number of companies with actual negative EPS growth is 391 with a minimum of 227 and a maximum of 644. An average of 31.12% of all companies had negative earnings growth in each quarter.

Shown in Panel B is the percent of companies with forecasted negative EPS growth. The average number of companies with forecasted negative EPS growth by quarter is only 2.10 with a minimum of 0 and a maximum of 13. Only 0.17% of all companies were projected to have negative earnings growth. [2]

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[2] We also examine the percentage of negative earnings growth that is captured by analysts' projections. We begin by collecting all companies that experienced negative long-term growth in each time period. Then we calculate the percentage of those companies that were project to have long-term negative EPS growth. An average of 0.55% of companies that reported negative EPS growth was captured by analysts' estimates. The average number of companies with negative earnings growth that were missed by analysts was 389 out of an average 391 companies that reported an actual decline in earnings. There is clear resistance by analysts to project negative growth.

**Figure 6**
**Comparison of Companies with**
**Actual and Forecasted Negative EPS Growth**
**Panel A: Percent of Companies with Actual Negative EPS Growth**
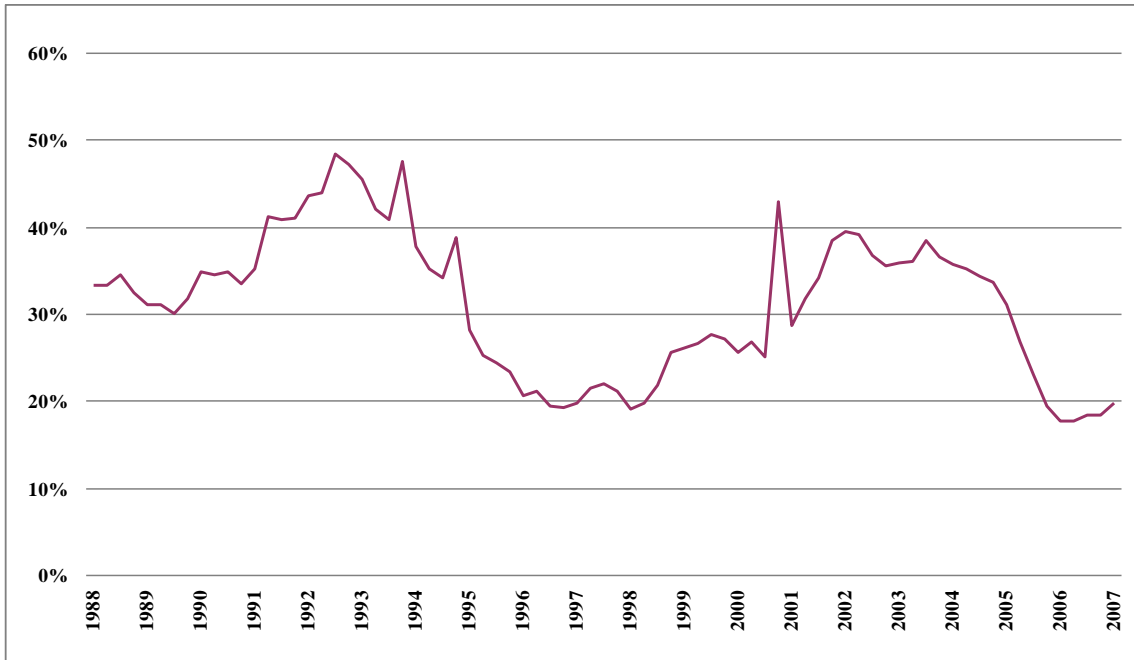
**Panel B: Percent of Companies with Forecasted Negative EPS Growth**
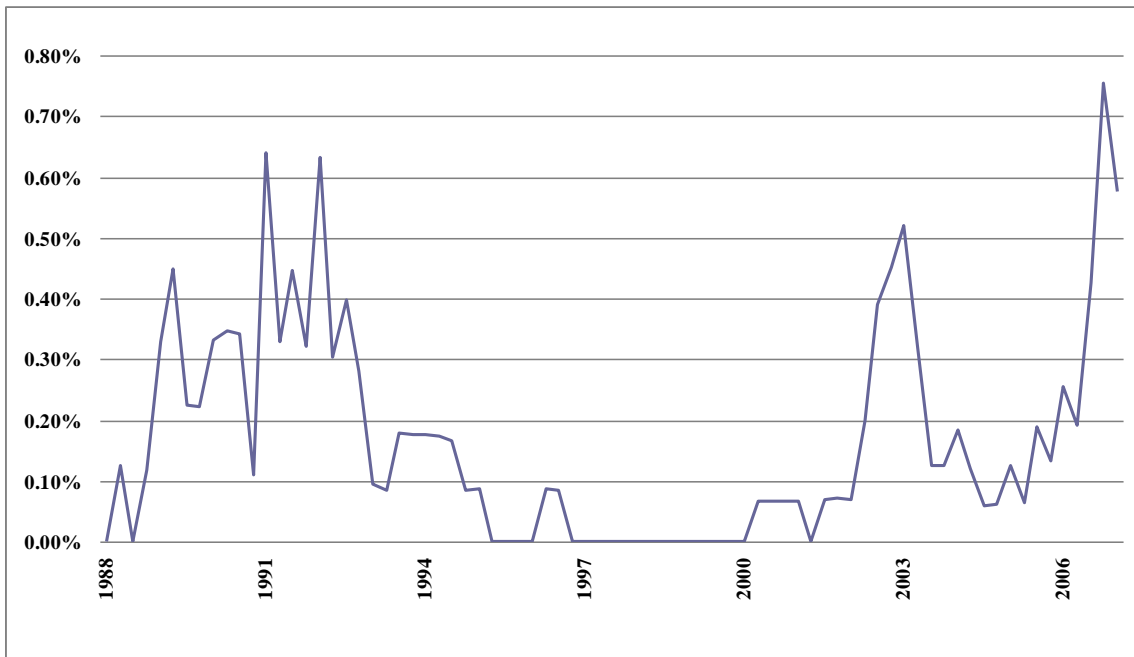
**Results after the Global Analyst Research Settlements**

The Global Analysts Research Settlements (GARS) is a set of agreements reached on April 23, 2003 between the SEC, NASD, NYSE and ten of the largest U.S. investment firms. GARS, as outlined by the Securities and Exchange Commission (2003), addresses conflicts of interest within firms that have investment banking and analysts operations. A conflict of interest can exist between the investment banking and analysis departments of the large investment firms. The investment firms involved in the settlement had engaged in practices involving the influence by investment bankers seeking favorable analysts' projections within their firm.

As part of the settlement decision several regulations were introduced to prevent investment bankers from pressuring analysts to provide favorable projections. These regulations include (1) firms must separate their investment banking and analysis departments with firewalls; (2) budget allocation to management in research departments must be independent of investment departments; (3) research analysts are prohibited from attending pitches with investment bankers during advertising and promotion of IPOs; and (4) historical analysts' ratings must be made available to investors.

One possible explanation for the upward bias in analysts' forecasts is the conflict of interest that exists between analysts and investment bankers. This presumably would have been removed by the GARS. For this reason, we compare long-term actual and forecasted growth rates for the periods prior to and following the GARS. The persistence of a bias following the GARS would indicate another explanation for the bias.

Table 8 shows descriptive statistics for long-term analysts' earnings growth rates

estimates before and after the GARS.  Actual and forecasted growth rate estimates are higher since the GARS and forecast errors have decreased.  While forecast errors have decreased, they are still significantly positive.

It is evident that analysts' growth rate forecasts have remained around their historic levels of about 15%.  Growth rates remain at levels that are unattainable given historic and expected GDP growth.  Hence, there is no evidence that analyst behavior has changed since the GARS.

**Table 8**
**Comparison of Long-Term Analysts' EPS**
**Growth Rate Forecasts Before and After GARS**

| 1988 – 2002(1) | | | |
|---|---|---|---|
| | Actual | Forecasted | FE |
| Mean | 8.25% | 14.40% | 141.65% |
| Median | 8.20% | 13.88% | 65.29% |
| SD | 4.06% | 1.36% | 197.57% |
| n | 61 | 61 | 61 |
| 2003 – 2007(2) | | | |
| Mean | 12.33% | 16.77% | 66.94% |
| Median | 11.28% | 16.94% | 51.60% |
| SD | 5.49% | 0.92% | 61.70% |
| n | 16 | 16 | 16 |

(1) Based on data beginning in 1984. (2) From April 2003 to and including the first quarter of 2007.

**Possible Explanations for the Upward Bias**

There are three suggested explanations for the upward bias. The first, as suggested by previous research, is based on career concerns or conflicts of interest.  Analysts are rewarded for biased forecasts by their employers who want them to hype stocks so that the brokerage house can garner trading commissions and win underwriting deals. However, the scrutiny of the GARS should have removed this influence.  We find little evidence of a change in forecast bias following the GARS.  Therefore another

explanation is likely.

A second explanation is based on selection bias. Analysts only follow stocks that they recommend and do not issue forecasts on those that they do not like. A third explanation is a cognitive or behavioral bias commonly called familiarity. Analysts become attached to the companies that they follow and lose objectivity.

The second and third explanations imply that analysts are systematically biased. If analysts systematically believe that they follow companies that are superior to others, they will be reluctant to issue negative earnings forecasts. Since they are only projecting the companies they follow, and not the market, the end result is a strong upward bias on earnings projections.

**Summary**

In this study we examine the accuracy of analysts' long-term and one-year ahead EPS growth rate forecasts over the last 20 years. Unlike previous studies, we examine long-term and one-year analysts' earnings growth rate forecasts and not quarterly EPS forecasts. Long-term EPS growth rate projections are consistently overly-optimistic. Analysts' growth rate forecasts of earnings are better for one-year than for three- to five-years, but are still over-optimistic. We discover that analysts only underestimate EPS growth rates for periods of earnings recoveries after economic recession. We find that analyst coverage does not have an impact on the overly-optimistic bias in projected EPS growth rates. We do discover that a contributing factor in the bias in analysts' long-term and one-year EPS growth rate estimates is the resistance of analysts to project negative earnings growth rates. We show that analysts' projections fail to capture the majority of negative earnings growth realized by corporations they follow. Finally, we examine the

level of long-term analysts' EPS growth rate forecasts following the GARS. We find that

analysts' forecasts have not significantly changed and continue to be overly-optimistic.

Analysts' long-term EPS growth rate forecasts before and after the GARS, are about two

times the level of historic GDP growth.

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