# An Examination of the Impact of Long-Term Growth Estimates

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## Introduction

One of the most frequently discussed topics in investment strategy is the distinction between short-term and long-term thinking. One way these approaches theoretically manifest themselves is in the analyst predictions of short-term growth rates and long-term growth rates. As the market has continued its recent plunge, many have called into question the validity and amount of effort that goes into producing the long-term estimates. For example in a Wall Street Journal article entitled "Analysts' Long-Term Estimates For Tech May Prove Idealistic", written by staff reporter Ken Brown and published on January 24, 2001, technology analyst Karl Keirstead of Lehman Brothers is quoted as saying, "Trying to predict over the next five-year period is virtually anyone's guess. Few analysts spend much time calculating these long-term growth numbers. While the number might tell a little bit of a story, it is generally a meaningless, throwaway number for most analysts." In an article called "Long-Term Growth Guesses", published on The Motley Fool web site (fool.com) on January 29, 2001, Brian Graney refers to the "long-term growth rate estimate problem" and states that a takeaway for the individual investor is that "reported secular growth rate estimates from sell-side analysts should be taken with a grain of salt, if not an entire salt dome."

The ongoing debates as to the validity of long-term growth estimates spawned this study that is an analysis of both the consensus analyst short-term and long-term growth estimates. Based on my research with Professor James Ohlson of Stern Business School, I will answer a series of questions about the relationships between these estimates and the way the market is valuing these estimates. The goal is to first examine whether the long-term and short-term growth estimates are significantly

different and second to explore whether market prices seem to be placing more emphasis on the short-term or the long-term estimates.

**Data Manipulation**

Before beginning the study I had to decide on the data that would be necessary and then to obtain this data. I worked closely with Adam Cohen, a vice president at Zacks Investment Research to whom I owe a debt of gratitude for his assistance on this project. Together we decided to start with a data set that consisted of all of the companies in the S&P 500 as of August 31, 2000. We decided on this group of companies as one that was large but manageable.

For each of the 500 companies, Mr. Cohen provided me with following pieces of data, to each of which I attached the following shorthand notations:

-$EPS_1$ - the current fiscal year EPS estimate as of 1/31 for each of the years 1996 through 2000 - e.g. for a company that has a calendar fiscal year, the estimate dated 1/31/00 is for the fiscal year ending on 12/31/00.

-$EPS_2$ - the next fiscal year EPS estimate as of 1/31 for each of the years 1996 through 2000 - e.g. for a company that has a calendar fiscal year, the estimate dated 1/31/00 is for the fiscal year ending on 12/31/01.

-LTG - the longer term growth estimates as of 1/31 for each of the years 1996 through 2000 - these estimates are given as annualized percentages and are 3-5 year growth estimates.

-$EPS_0$ - the actual trailing twelve-month EPS numbers as of 12/31 for each of the years 1995 through 1999.

-$P_0$ - the actual stock price as of 12/31 for each of the years 1995 through 1999.

As a first step in parsing the data, I narrowed my target set to those companies with a calendar fiscal year (January 1 - December 31). I feel comfortable choosing this set for multiple reasons. First, 372 of the 500 companies meet this criterion. There is no reason to believe that by selecting only these companies I have removed any of the independence from the data because there is no evidence that any of the companies with a fiscal year end other than December have some kind of differing characteristics. More importantly, it is necessary to cut down the data set for consistency's sake. Because the date of all the analyst estimates is January 31, if I were to take a company with a fiscal year end of June, the January 31 estimate may have as much as seven months of "real" information priced into the EPS estimate while the company with a fiscal year end of December would have at most one month of "real" information priced into its estimate. So by paring the data, I believe I have maintained the integrity of my data set while also eliminating potential inconsistencies.

With the data in hand, the next step was to determine how to compute the short term growth rates. As noted in the data description, the long-term growth rates are given directly as percentages. However, to compute the short-term growth rates, I had to perform a computation based on the EPS estimates. The two most obvious options were to:

1) take the current fiscal year EPS estimate ($EPS_1$) and divide it by the actual previous year's EPS number ($EPS_0$) or
2) take the next fiscal year EPS estimate ($EPS_2$) and divide it by the current fiscal year EPS estimate ($EPS_1$).

I decided to use the latter because of the inconsistent nature of $EPS_0$. This actual trailing twelve month number includes accounting adjustments that were made, one-time restructuring charges, etc. to which it would be difficult to compare $EPS_1$ in order to compute a meaningful growth rate. By computing each year's short-term percentage growth rate (for which I will use the notation STG) as $(EPS_2/EPS_1 - 1)*100$, we are finding an explicit predicted growth rate. Later in the paper I will do an examination of whether I would have been better off using option 1 above which I will call Alternate STG and which is computed as $(EPS_1/EPS_0 - 1)*100$. I will show then that the results match my intuition that STG is a better choice.

As a final data step, I excluded any years for which companies had a negative number for $EPS_1$ or $EPS_2$. In the cases where these numbers are negative, the calculated STG numbers are meaningless. I was surprised to find that there were indeed a few such companies. Appendix 1 shows a list of these companies for each of the years 1996 through 2000. It is interesting to note that the majority of the companies shown in this list are telecommunications companies. It appears that these companies have negative EPS projections because of the highly capital intensive nature of their businesses. Nonetheless, each of these companies has a positive LTG so the analysts seem to be saying that they believe the short term expenditures will eventually yield positive earnings. One of the companies, Nextel Communications has a negative $EPS_1$ and $EPS_2$ for each of the five years. Another company with multiple appearances on the list is Time Warner Inc. in 1996, 1997 and 1998. Time Warner's projections are negative because of the amortization of goodwill from multiple acquisitions. Although it

is interesting to examine the stories behind these data points, removing them does not have a large impact on the data set of well over 300.

With the data prepared, we are ready to begin the actual analysis. I will divide this analysis into a series of questions that I will attempt to answer in order to explore the relationship between STG and LTG and then to examine the effect these growth rates are having on market prices. The point of the first group of comparisons between LTG and STG is to see if there are significant differences between the two measures with the eventual goal of being able to ask the question: do we really need both in explaining the stock price of a company or can LTG essentially be ignored?

**Question 1: How does LTG compare to STG?**

As a first pass at this question I will look at some basic statistics on each of STG and LTG over the five years. The results are shown in Table 1. For the STG table, the companies excluded consist of either companies that had a negative value for either $EPS_1$ or $EPS_2$ or companies that didn't have any value for $EPS_1$ or $EPS_2$. For the LTG table the companies excluded consist of those for which no analyst estimate existed.

**Table 1**

Short Term Growth Statistics

| | Total | Companies | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Variable | Companies | Excluded | Mean | StDev | Q1 | Median | Q3 | Minimum | Maximum |
| STG 1/00 | 349 | 23 | 19.47% | 20.46% | 10.16% | 14.18% | 20.38% | -16.13% | 154.29% |
| STG 1/99 | 340 | 32 | 25.75% | 49.66% | 10.88% | 13.86% | 20.49% | -20.59% | 617.65% |
| STG 1/98 | 341 | 31 | 22.43% | 53.60% | 10.62% | 13.91% | 19.64% | -61.54% | 825.00% |
| STG 1/97 | 339 | 33 | 18.47% | 20.57% | 9.94% | 14.00% | 20.48% | -43.32% | 189.47% |
| STG 1/96 | 345 | 27 | 15.85% | 22.79% | 8.63% | 13.29% | 18.29% | -42.67% | 243.48% |

Long Term Growth Statistics

| | Total | Companies | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Variable | Companies | Excluded | Mean | StDev | Q1 | Median | Q3 | Minimum | Maximum |
| LTG 1/00 | 369 | 3 | 13.89% | 7.13% | 10.01% | 12.61% | 15.52% | 3.10% | 55.15% |
| LTG 1/99 | 364 | 8 | 13.76% | 7.61% | 10.00% | 12.35% | 15.33% | 2.00% | 58.69% |
| LTG 1/98 | 360 | 12 | 13.65% | 7.35% | 10.00% | 12.50% | 15.44% | 2.00% | 61.00% |
| LTG 1/97 | 358 | 14 | 13.42% | 7.05% | 9.90% | 12.00% | 15.63% | 1.81% | 55.00% |
| LTG 1/96 | 349 | 23 | 12.91% | 6.11% | 9.75% | 11.77% | 14.90% | 1.63% | 47.30% |

For all five years, the STG Mean and Median are both significantly larger than the LTG Mean and Median. As would be expected, the Standard Deviation of STG is much greater due to the fact that STG is a computed number based on EPS projections and short-term aberrations tend to be smoothed out over time. Although the third quartile bound for STG is significantly larger than that for LTG, it is interesting to note that the first quartile bounds are very close.

**Question 2: Is STG systematically larger than LTG?**

The answer to this question seems like a foregone conclusion based on the summary data in Table 1, but to get a sense of the magnitude of the differences, I will compare the growth estimates for each company each year. The results of these comparisons are shown in Table 2. Again the companies excluded consist of those for

which a STG estimate couldn't be computed or for which a LTG estimate wasn't available. As an aside, there is only one company (Medimmune, Inc. in 1998 - this is the company that produced the absurd 825% STG shown in Table 1) for which a STG was computed, but for which a LTG estimate wasn't available.

**Table 2**

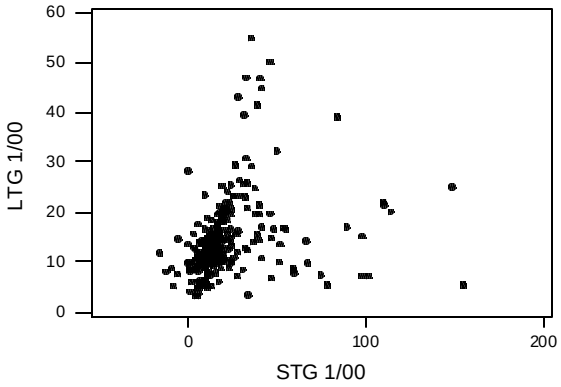
| | Companies | Companies | | |
|---|---|---|---|---|
| Variable | Included | Excluded | # LTG > | Pct LTG > |
| LTG > 1/00 | 349 | 23 | 136 | 39.0% |
| LTG > 1/99 | 340 | 32 | 123 | 36.2% |
| LTG > 1/98 | 340 | 32 | 132 | 38.8% |
| LTG > 1/97 | 339 | 33 | 120 | 35.4% |
| LTG > 1/96 | 345 | 27 | 144 | 41.7% |

The table illustrates that LTG is consistently smaller than STG. Even in 1996, less than 42% of the companies exhibited a higher LTG rate. Clearly STG is systematically larger than LTG.

**Question 3: What does the graphical relationship between STG and LTG show?**

To further examine the relationship between STG and LTG I plotted the growth rates against each other with STG on the horizontal axis and ran a regression each year of LTG on STG. I have included in Table 3 the resulting graph and the results of the regression for the year 2000. The graphs and regressions for the four other years are included in Appendix 2.

**Table 3**

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The regression equation is LTG 1/00 = 11.9 + 0.102 STG 1/00

Predictor        Coef       StDev          T        P
Constant      11.9002      0.5037      23.63    0.000
STG 1/00      0.10167     0.01785       5.70    0.000

S = 6.812       R-Sq = 8.6%      R-Sq(adj) = 8.3%
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The plots and regression results indicate a predictive relationship between STG and LTG but perhaps not as strong a relationship as one might think. The t-statistic on the STG independent variable is significant (greater than 2) in four of the five years but the R-Squared values range only from a low of 1.0% to a high of 12.7% indicating that the variables are not as highly correlated as one might think.

**Question 4: Does a rank correlation provide more information about the relationship between STG and LTG?**

In the analysis in Question 3, it is possible that the "noisiness" of STG could have affected the results (i.e. some of the strange results that could happen in one year's data might be skewing the predictive effects on LTG) so here we will look at another test. To do a rank correlation, I sorted all the STG and LTG estimates for each of the

five years. Then for each year, each company was given both an STG Rank and an LTG Rank. I then ran a regression of the LTG Rank on the STG Rank. The results from the five years are shown in Table 4.

**Table 4**

| | Regression Equation | STG T-stat. | R-Squared |
|---|---|---|---|
| Jan-00 | LTG RANK 1/00 = 87.4 + 0.560 STG RANK 1/00 | 11.70 | 28.3% |
| Jan-99 | LTG RANK 1/99 = 94.5 + 0.532 STG RANK 1/99 | 10.51 | 24.6% |
| Jan-98 | LTG RANK 1/98 = 70.8 + 0.645 STG RANK 1/98 | 14.16 | 37.2% |
| Jan-97 | LTG RANK 1/97 = 70.2 + 0.630 STG RANK 1/97 | 13.82 | 36.2% |
| Jan-96 | LTG RANK 1/96 = 74.3 + 0.585 STG RANK 1/96 | 13.02 | 33.1% |

Here all five t-statistics are strongly significant and the R-Squared values are also very strong, producing correlations (the square root of the R-Squared values) ranging from .496 to .610. It is clear that there is a strong relationship between STG and LTG.

**Question 5: Does Alternate STG appear more closely linked to LTG than STG does?**

To revisit the focus of the paper we are trying to find out if LTG provides any extra information when we look at the current level of stock prices. As a preliminary step we have been examining the relationship between STG and LTG. In the introduction of the paper I proposed that there could be another measure of short-term growth that I denoted by Alt STG - computed as $(EPS_1/EPS_0 - 1)*100$. In this and the next question I will examine whether Alt STG does a better job in predicting LTG. Once again I will perform a rank correlation (sorting Alt STG as well as STG and LTG and producing a rank number for each company for each year), this time to compare how

well correlated Alt STG is with LTG as compared to the correlation between STG and LTG. The results of the test are shown in Table 5.

**Table 5**

| STG Rank W/ LTG Rank Correlation | Alt STG Rank W/ LTG Rank Correlation |
|---|---|
| 0.532 | 0.369 |
| 0.496 | 0.433 |
| 0.610 | 0.389 |
| 0.602 | 0.495 |
| 0.575 | 0.494 |

It is clear from these results that in all five years, STG is much more closely correlated with LTG than is Alt STG. As noted in the introduction, I perceive Alt STG as fairly unreliable because of the potential volatility in $EPS_0$.

**Question 6: Does a regression analysis of Alternate STG vs. STG with LTG as the dependent variable also show STG to be the clear winner?**

Despite the strong results of Question 5, I will do an additional test to be sure that Alt STG wasn't a better choice. The test I will perform here is a regression of LTG on the independent variables of STG and Alt STG for each of the five years. The results of these regressions are shown in Table 6.

**Table 6**

| | Regression Equation | STG T-stat. | Alt STG T-stat. | R-Squared |
|---|---|---|---|---|
| Jan-00 | LTG 1/00 = 11.3 + 0.136 STG 1/00 - 0.00072 Alt STG 1/00 | 6.73 | -0.60 | 11.7% |
| Jan-99 | LTG 1/99 = 13.3 + 0.00509 STG 1/99 + 0.00313 Alt STG 1/99 | 0.59 | 0.92 | 0.4% |
| Jan-98 | LTG 1/98 = 12.0 + 0.101 STG 1/98 - 0.00181 Alt STG 1/98 | 5.93 | -2.19 | 9.8% |
| Jan-97 | LTG 1/97 = 10.3 + 0.129 STG 1/97 + 0.0315 Alt STG 1/97 | 6.84 | 2.73 | 18.6% |
| Jan-96 | LTG 1/96 = 10.8 + 0.141 STG 1/96 + 0.00016 Alt STG 1/96 | 8.65 | 0.11 | 18.4% |

For four of the five years, the STG t-statistic is significantly stronger. The only year that it isn't, the entire regression is worthless, with an R-Squared of only .4%. As

an aside, the 1999 regression here is actually worse (lower R-Squared) than the regression in Appendix 2 where STG is the only independent variable because more companies have been excluded here (because they had a negative $EPS_0$).

Again it appears that the volatility of Alt STG makes STG a better choice in predicting LTG. I now feel comfortable going ahead in the next two steps in examining LTG's impact on the price levels of the companies' stocks. It appears that STG and LTG are fairly closely linked and I am now ready to examine in Questions 7 and 8 whether LTG really provides anything that I couldn't infer from STG alone.

**Question 7: How are STG and LTG related to the Earnings/Price ratios?**

To begin to examine the relationship between the two growth estimates and price levels, I have decided to use the ratio of $EPS_1/P_0$ for each company for each year. This ratio is commonly called the forward Earnings/Price ratio. Again, I have made the choice because of the volatility inherent in $EPS_0$. It is important that we use a ratio when examining relationships to the price of the stock because the absolute level of the stock price is a meaningless number (one that is dependent on the number of shares outstanding).

The goal of this step is to determine which of STG and LTG seems more closely tied to the $EPS_1/P_0$ ratios. The first step that I performed after computing the ratio for each company for each year was to again perform a rank test. From previous tests, I already had sorted STG and LTG to produce ranks and so next I performed the same operation on the $EPS_1/P_0$ ratios for each of the five years. With these ranks computed, I am able to produce a rank correlation between $EPS_1/P_0$ and STG and between $EPS_1/P_0$ and LTG for each of the five years. The resulting correlations are shown in Table 7.

**Table 7**

| | $EPS_1/P_0$ w/ STG Rank Correlation | $EPS_1/P_0$ w/ LTG Rank Correlation |
|---|---|---|
| Jan-00 | -0.458 | -0.574 |
| Jan-99 | -0.541 | -0.487 |
| Jan-98 | -0.501 | -0.509 |
| Jan-97 | -0.608 | -0.603 |
| Jan-96 | -0.441 | -0.416 |

As would be expected, all of the correlations are negative because the higher the projected growth of a company, the lower the E/P ratio (or conversely the higher the growth, the higher the P/E ratio). However, somewhat surprisingly, there isn't a clear winner between STG and LTG over the five years. Based on the articles quoted in the introduction and my general intuition, I had expected to see that the market was essentially focused on STG. As a result I would have expected STG to be consistently more highly (in absolute value terms) correlated with E/P. However, these correlations show that in 2000, LTG was much more highly correlated with the E/P ratios, in 1999 and 1996 STG was significantly more highly correlated with the E/P ratios and in 1998 and 1997 it was essentially a tie.

One could argue that because STG and LTG are highly correlated (as we showed previously in Tables 3, 4 and 5) the lack of a clear winner here is not surprising. Thus, as another test to try to determine which of the two is a better predictor of E/P levels, I will perform a series of regressions with the $EPS_1/P_0$ ratios as the dependent variable. As a first pass I will perform three regressions: first with both STG and LTG as independent variables and then with just LTG and just STG. The results of these regressions for the January 2000 data are shown in Table 8.

**Table 8**

| First Regressions - w/o adjustment for STG outliers | Missing Values | STG T-stat. | LTG T-stat. | R-Squared |
|---|---|---|---|---|
| EPS1/P0 1/00 = 0.114 -0.000297 STG 1/00 - 0.00260 LTG 1/00 | 23 | -3.21 | -9.76 | 28.1% |
| EPS1/P0 1/00 = 0.0832 -0.000561 STG 1/00 | 23 | -5.63 | --- | 8.4% |
| EPS1/P0 1/00 = 0.113 - 0.00282 LTG 1/00 | 7 | --- | -10.71 | 24.0% |

Here, again somewhat surprisingly based on my initial hypothesis that LTG doesn't provide any "extra" information, LTG comes out as the clear winner. In the first regression using both STG and LTG, LTG has a much stronger t-statistic. Then, in comparing one regression using just STG and one using just LTG, the LTG regression comes out with a t-statistic almost three times as large.

Considering that perhaps the STG results are being unfairly biased by outliers, I will further pare down the data to eliminate, for each year, any companies with a STG value that is either negative or greater than 100%. I will call the new variable STG Adj and rerun the regression. The results are shown in Table 9.

**Table 9**

| Second Regressions - w/ STG adjustment (STG Adj) for outliers - Eliminated STG < 0% and STG > 100% | Missing Values | STG Adj T-stat. | LTG T-stat. | R-Squared |
|---|---|---|---|---|
| EPS1/P0 1/00 = 0.116 -0.000446 STG Adj 1/00 - 0.00250 LTG 1/00 | 36 | -3.35 | -9.08 | 28.2% |
| EPS1/P0 1/00 = 0.0886 -0.000865 STG Adj 1/00 | 36 | -6.21 | --- | 10.1% |

The missing values column now shows 36 instead of 23, indicating that I eliminated 13 companies with STG values outside of the 0 to 100% range. Even with these extreme values eliminated, LTG remains the clear winner. The new R-Squared for the regression run just on STG Adj moves up to 10.1% from 8.4%, but is still nowhere near the 24.0% provided by LTG.

I have focused here on a discussion of the data from January of 2000, but the data from the previous four years shows very similar results. I have included the same five regressions for each of the previous four years in Appendix 3. Additionally, Table 10 shows the average results for each of the five regressions across the full five years.

**Table 10**

| | Missing | | | |
|---|---|---|---|---|
| First Regressions - w/o adjustment for STG outliers | Values | STG T-stat. | LTG T-stat. | R-Squared |
| | 29.8 | -6.238 | -9.21 | 32.8% |
| AVERAGES OF 1996 - 2000 | 29.6 | -7.726 | --- | 15.2% |
| | 17 | --- | -10.536 | 23.9% |
| | | | | |
| Second Regressions - w/ STG adjustment (STG Adj) for outliers - | Missing | STG Adj | | |
| Eliminated STG < 0% and STG > 100% | Values | T-stat. | LTG T-stat. | R-Squared |
| AVERAGES OF 1996 - 2000 | 49.8 | -4.242 | -8.024 | 30.6% |
| | 49.8 | -7.932 | --- | 16.6% |

The key point to note is that the average R-Squared for the regression run just on LTG is 23.9% while the average R-Squared for the regression run on STG (or even on the Adjusted STG) is less than 17%. It is clear from these averages that LTG is explaining more of the variation in E/P ratios than is STG. Again, this is a somewhat surprising result given the intuition that because analysts really don't do anything when they estimate long-term growth rates the market should just ignore them.

**Question 8: Does a "band analysis" confirm that LTG is providing extra information about the level of E/P ratios?**

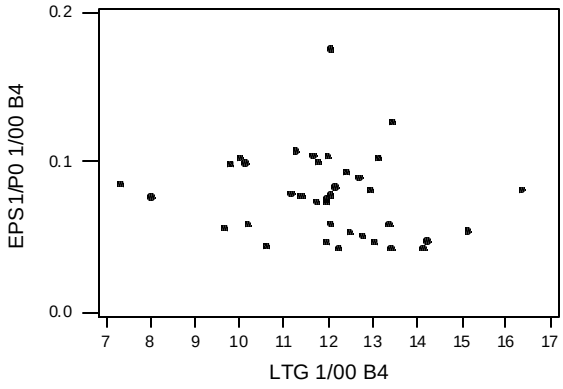
To build on question 7, I decided to perform what I've called a "band analysis". For each of the five years, I have sorted the data by the short-term growth rates and then divided the data into ten bands. For each of the five years this produces ten bands

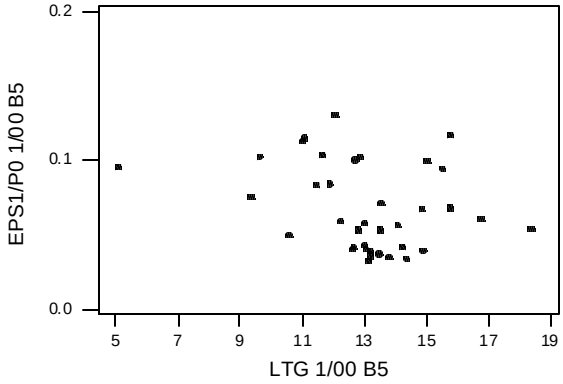
of about 34 companies (there are 372 companies total and about 30 companies a year were excluded for having either non-existent or negative values for $EPS_1$ and/or $EPS_2$). The goal is to look at each band and ask the question: "given that the companies in this band have essentially the same value for STG, do their LTGs provide any information about the E/P ratios?"

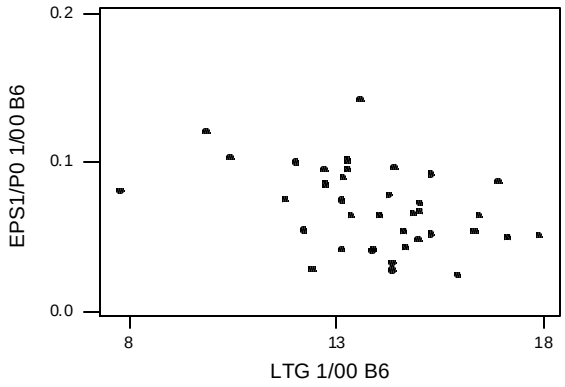
In the interest of space and due to the fact that this process created 50 bands, I'll focus here on some of the bands from the 2000 data. These bands are representative of those not shown as well.

The first step I took was to produce some plots for each band. Table 11 shows the plots for three of the middle bands (B4, B5 and B6) for the year 2000 data.

**Table 11**




As opposed to exhibiting an essentially flat trend (that would imply no relationship with LTG) these three plots do indeed show a downward sloping trend indicating again that the larger the LTG, the smaller the E/P ratio seems to be, even in a group of companies where the STG values are essentially identical. To support the visual evidence, Table 12 shows a regression of the E/P ratios on LTG for each of the graphs shown above.

**Table 12**

| | Regression Equation | LTG T-stat. | R-Squared |
|---|---|---|---|
| Band 4 1/00 | EPS1/P0 1/00 B4 = 0.110 - 0.00267 LTG 1/00 B4 | -0.99 | 2.7% |
| Band 5 1/00 | EPS1/P0 1/00 B5 = 0.115 - 0.00357 LTG 1/00 B5 | -1.74 | 7.9% |
| Band 6 1/00 | EPS1/P0 1/00 B6 = 0.143 - 0.00534 LTG 1/00 B6 | -2.51 | 15.3% |

The results of the regression are not overwhelmingly strong but Bands 5 and 6 show relatively strong t-statistics. It is clear that LTG is providing insight into the E/P ratios above and beyond what we could get just from looking at STG values.

**Conclusion**

I began this study with the hypothesis that LTG estimates are really nothing but window dressing that the analysts are forced to produce by convention. Some anecdotal evidence supported the idea that analysts really don't put much effort into producing these estimates. One analyst for Lehman Brothers even described these estimates as "meaningless, throwaway numbers."

However as we stepped our way through the eight questions in this paper, I showed that although the STG and LTG estimates are closely tied together, the LTG estimates do provide extra insight in describing the E/P ratios. At the very least there appears to be a meaningful correlation between LTG estimates and E/P ratios. These results do not say anything about the causality of LTG driving prices, but only state that there is a correlational relationship between the two beyond what STG provides. One possible interpretation is even that analysts look at stock prices and STG rates for companies and say to themselves, "The projected short-term growth rates aren't real strong, but the market price reflects a positive sentiment so the key variable must be long-term growth. As such I better project a strong long-term growth rate". In other

words, it is possible that analysts may predict LTG reactively. An interesting follow up study to this one would be an examination of both the process that analysts go through in producing the LTG estimates and the process that analysts go through in revising LTG estimates. Further examination could perhaps produce a causal relationship of some sort.

## Appendix 1

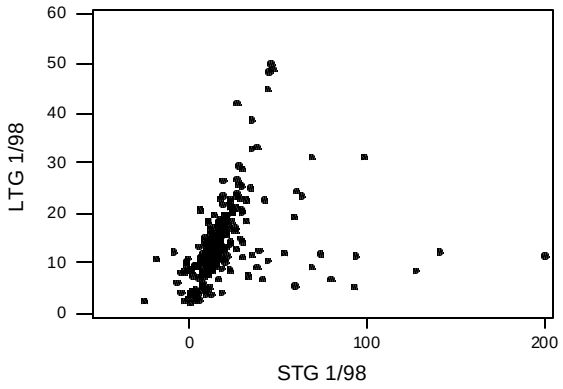
| | Company Name | Ticker | $EPS_1$ | $EPS_2$ |
|---|---|---|---|---|
| | Global Cross | GBLX | -$0.68 | -$0.92 |
| Jan 2000 | Nextel Comms -A | NXTL | -$1.30 | -$0.15 |
| | Sprint (Pcs Gp) | PCS | -$2.03 | -$1.06 |
| | | | | |
| | Homestake Mng | HM | -$0.05 | $0.05 |
| | Comcast Cla Spl | CMCSK | -$0.22 | -$0.15 |
| Jan 1999 | Inco Ltd | N | -$0.47 | -$0.12 |
| | Nextel Comms -A | NXTL | -$2.28 | -$1.80 |
| | Sprint (Pcs Gp) | PCS | -$2.47 | -$1.99 |
| | | | | |
| | Viacom Inc Cl B | VIA.B | -$0.01 | $0.17 |
| | Time Warner Inc | TWX | -$0.03 | $0.32 |
| Jan 1998 | Qwest Comm Intl | Q | -$0.08 | -$0.11 |
| | Homestake Mng | HM | -$0.14 | -$0.06 |
| | Comcast Cla Spl | CMCSK | -$0.28 | -$0.04 |
| | Nextel Comms -A | NXTL | -$2.05 | -$2.13 |
| | | | | |
| | Yahoo! Inc | YHOO | $0.00 | $0.03 |
| | Boise Cascd Cp | BCC | -$0.02 | $2.19 |
| | Comcast Cla Spl | CMCSK | -$0.02 | $0.01 |
| Jan 1997 | Medimmune Inc | MEDI | -$0.25 | -$0.08 |
| | Time Warner Inc | TWX | -$0.33 | -$0.07 |
| | Mcdermott Intl | MDR | -$0.58 | $0.77 |
| | Nextel Comms -A | NXTL | -$1.46 | -$1.54 |
| | Bethlehem Steel | BS | $0.54 | -$0.12 |
| | | | | |
| | Comcast Cla Spl | CMCSK | -$0.11 | -$0.01 |
| Jan 1996 | Medimmune Inc | MEDI | -$0.14 | $0.00 |
| | Time Warner Inc | TWX | -$0.20 | -$0.03 |
| | Nextel Comms -A | NXTL | -$1.17 | -$1.22 |

## Appendix 2

The regression equation is LTG 1/99 = 13.5 + 0.0155 STG 1/99

| Predictor | Coef | StDev | T | P |
|---|---|---|---|---|
| Constant | 13.4822 | 0.4720 | 28.56 | 0.000 |
| STG 1/99 | 0.015490 | 0.008448 | 1.83 | 0.068 |

S = 7.724 R-Sq = 1.0% R-Sq(adj) = 0.7%

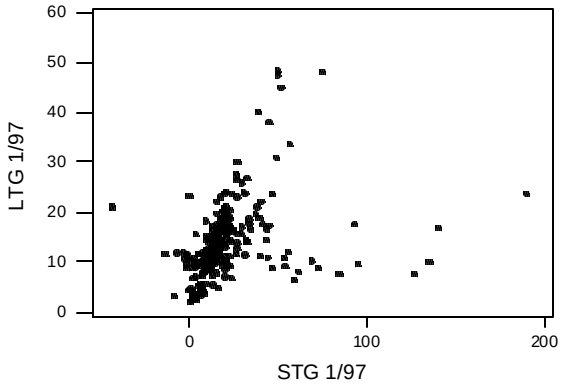



The regression equation is LTG 1/98 = 12.7 + 0.0472 STG 1/98

| Predictor | Coef | StDev | T | P |
|---|---|---|---|---|
| Constant | 12.6982 | 0.4667 | 27.21 | 0.000 |
| STG 1/98 | 0.04716 | 0.01258 | 3.75 | 0.000 |

S = 7.236 R-Sq = 4.0% R-Sq(adj) = 3.7%

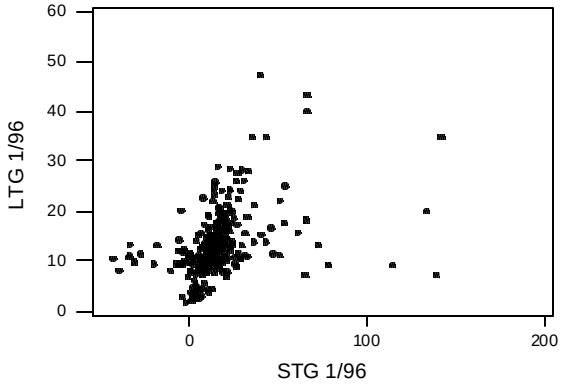
## Appendix 2 (cont.)




The regression equation is LTG 1/97 = 11.1 + 0.114 STG 1/97

| Predictor | Coef | StDev | T | P |
|---|---|---|---|---|
| Constant | 11.0663 | 0.4511 | 24.53 | 0.000 |
| STG 1/97 | 0.11436 | 0.01633 | 7.00 | 0.000 |

S = 6.175 R-Sq = 12.7% R-Sq(adj) = 12.4%




The regression equation is LTG 1/96 = 11.5 + 0.0899 STG 1/96

| Predictor | Coef | StDev | T | P |
|---|---|---|---|---|
| Constant | 11.5026 | 0.3801 | 30.26 | 0.000 |
| STG 1/96 | 0.08992 | 0.01371 | 6.56 | 0.000 |

S = 5.794 R-Sq = 11.2% R-Sq(adj) = 10.9%

## Appendix 3

1999 Results:

| | Missing | | | |
|---|---|---|---|---|
| First Regressions - w/o adjustment for STG outliers | Values | STG T-stat. | LTG T-stat. | R-Squared |
| EPS1/P0 1/99 = 0.0795 -0.000157 STG 1/99 - 0.00144 LTG 1/99 | 33 | -7.22 | -10.29 | 34.2% |
| EPS1/P0 1/99 = 0.0601 -0.000180 STG 1/99 | 33 | -7.22 | --- | 13.4% |
| EPS1/P0 1/99 = 0.0779 - 0.00155 LTG 1/99 | 12 | --- | -10.31 | 22.9% |
| | | | | |
| | | | | |
| | | | | |
| Second Regressions - w/ STG adjustment (STG Adj) for outliers - | Missing | STG Adj | | |
| eliminated STG < 0% and STG > 100% | Values | T-stat. | LTG T-stat. | R-Squared |
| EPS1/P0 1/99 = 0.0828 -0.000407 STG Adj 1/99 - 0.00136 LTG 1/99 | 53 | -4.94 | -8.95 | 34.9% |
| EPS1/P0 1/99 = 0.0695 -0.000710 STG Adj 1/99 | 53 | -8.46 | --- | 18.4% |

1998 Results:

| | Missing | | | |
|---|---|---|---|---|
| First Regressions - w/o adjustment for STG outliers | Values | STG T-stat. | LTG T-stat. | R-Squared |
| EPS1/P0 1/98 = 0.0790 -0.000201 STG 1/98 - 0.00116 LTG 1/98 | 32 | -6.56 | -8.91 | 31.1% |
| EPS1/P0 1/98 = 0.0620 -0.000131 STG 1/98 | 31 | -6.56 | --- | 11.3% |
| EPS1/P0 1/98 = 0.0775 - 0.00133 LTG 1/98 | 19 | --- | -10.07 | 22.4% |
| | | | | |
| | | | | |
| | | | | |
| Second Regressions - w/ STG adjustment (STG Adj) for outliers - | Missing | STG Adj | | |
| eliminated STG < 0% and STG > 100% | Values | T-stat. | LTG T-stat. | R-Squared |
| EPS1/P0 1/98 = 0.0791 -0.000336 STG Adj 1/98 - 0.00100 LTG 1/98 | 53 | -4.39 | -6.89 | 28.1% |
| EPS1/P0 1/98 = 0.0695 -0.000587 STG Adj 1/98 | 53 | -8.13 | --- | 17.3% |

## Appendix 3 (cont.)

1997 Results:

| | Missing | | | |
|---|---|---|---|---|
| First Regressions - w/o adjustment for STG outliers | Values | STG T-stat. | LTG T-stat. | R-Squared |
| EPS1/P0 1/97 = 0.0926 -0.000370 STG 1/97 - 0.00157 LTG 1/97 | 33 | -8.13 | -11.06 | 46.3% |
| EPS1/P0 1/97 = 0.0752 -0.000550 STG 1/97 | 33 | -11.07 | --- | 26.7% |
| EPS1/P0 1/97 = 0.0903 - 0.00190 LTG 1/97 | 21 | --- | -13.46 | 34.2% |
| | | | | |
| | | | | |
| | | | | |
| Second Regressions - w/ STG adjustment (STG Adj) for outliers - | Missing | STG Adj | | |
| eliminated STG < 0% and STG > 100% | Values | T-stat. | LTG T-stat. | R-Squared |
| EPS1/P0 1/97 = 0.0925 -0.000395 STG Adj 1/97 - 0.00157 LTG 1/97 | 48 | -5.52 | -10.32 | 44.1% |
| EPS1/P0 1/97 = 0.0782 -0.000756 STG Adj 1/97 | 48 | -10.5 | --- | 25.5% |

1996 Results:

| | Missing | | | |
|---|---|---|---|---|
| First Regressions - w/o adjustment for STG outliers | Values | STG T-stat. | LTG T-stat. | R-Squared |
| EPS1/P0 1/96 = 0.0945 -0.000340 STG 1/96 - 0.00126 LTG 1/96 | 28 | -6.07 | -6.03 | 24.3% |
| EPS1/P0 1/96 = 0.0800 -0.000453 STG 1/96 | 28 | -8.15 | --- | 16.3% |
| EPS1/P0 1/96 = 0.0945 - 0.00167 LTG 1/96 | 26 | --- | -8.13 | 16.1% |
| | | | | |
| | | | | |
| | | | | |
| Second Regressions - w/ STG adjustment (STG Adj) for outliers - | Missing | STG Adj | | |
| eliminated STG < 0% and STG > 100% | Values | T-stat. | LTG T-stat. | R-Squared |
| EPS1/P0 1/96 = 0.0922 -0.000368 STG Adj 1/96 - 0.00116 LTG 1/96 | 59 | -3.01 | -4.88 | 17.8% |
| EPS1/P0 1/96 = 0.0821 -0.000683 STG Adj 1/96 | 59 | -6.36 | --- | 11.5% |