CREDIT SUISSE

GLOBAL FINANCIAL STRATEGIES
www.credit-suisse.com

The Base Rate Book – Earnings Growth

Integrating the Past to Better Anticipate the Future

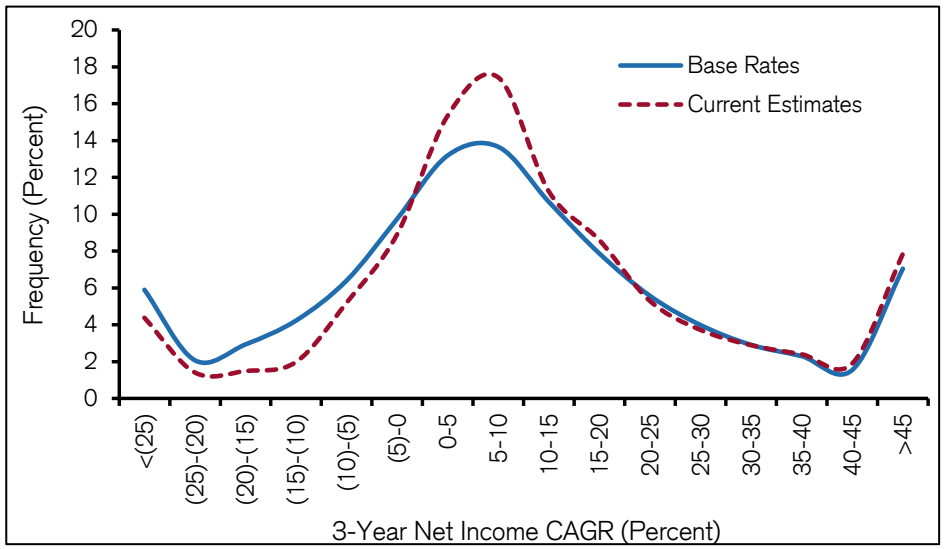
December 16, 2015

Authors

Michael J. Mauboussin
michael.mauboussin@credit-suisse.com

Dan Callahan, CFA
daniel.callahan@credit-suisse.com

Darius Majd
darius.majd@credit-suisse.com



"'Pallid' statistical information is routinely discarded when it is incompatible with one's personal impressions of a case."

Daniel Kahneman[1]

- Executives and investors perceive that earnings are the best indicator of corporate results.
- Earnings announcements convey information to the market, as measured by a rise in stock price volume and volatility, and the impact of that information has risen since 2001.
- Earnings have severe limitations as a measure of shareholder value. As a result, it is possible to increase earnings without creating value.
- This report shows the base rate of net income growth rates for the 1,000 largest global companies since 1950. We sort the companies into deciles, allowing for easy identification of an appropriate reference class.
- We provide a method to integrate company-specific views with the base rates to sharpen the quality of forecasts.

Introduction

Executives and investors perceive that earnings are the best indicator of corporate results. In a survey of financial executives, nearly two-thirds said that earnings are the most important measure that they report to outsiders and gave it a vastly higher rating than other financial metrics such as revenue growth and cash flow from operations.[2] In a separate survey, a majority of investors indicated that quarterly earnings is the disclosure that is most significant.[3] Consistent with these views, many companies provide some form of earnings guidance, and the price-earnings multiple is the most popular way to assign a value to a company's stock.[4]

Yet earnings have severe limitations as a measure of shareholder value. The main reasons include the fact that management can use alternative accounting methods to calculate earnings, that earnings fail to capture the capital needs of the business, and that earnings don't reflect the cost of capital. As a result, it is possible to increase earnings without creating value.[5]

The popularity of earnings has spawned extensive research on the link between earnings per share (EPS) and stock prices.[6] Studies from the late 1960s show that annual earnings announcements convey information to the market, as measured by a rise in trading volume and stock price volatility.[7] Public companies in the United States were not required to file quarterly income statements, through Form 10-Q, until 1970. Further, companies outside the U.S. realized an increase in the information content of their earnings announcements following the adoption of International Financial Reporting Standards.[8]

Recent work on the impact of earnings not only confirms the original finding, but also shows that the information content of earnings has risen since 2001.[9] One plausible explanation is that since the adoption of Regulation Fair Disclosure in 2000, which ensures that all investors receive financial information at the same time, companies convey less information between earnings reports. To add context to this discussion, researchers estimate that each quarterly earnings announcement reflects one to two percent of the total new information available in each year.[10]

Companies can increase the information content of their earnings disclosure and guidance by providing more detail about the components of earnings. That detail leads to more timely revisions by analysts, more frequent revisions, and a lower dispersion of forecasts among the analysts. Academics have found that about 40 percent of large companies in the U.S. provide no earnings guidance and less than a quarter provide revenue, expense, and earnings forecasts.[11]

Further, studies show that there has been a growing rift between "Street" earnings and earnings based on generally accepted accounting principles (GAAP). In recent decades, companies have been more liberal in excluding "special" or "non-cash items" from GAAP earnings to come up with Street earnings. Potential motivations for emphasizing Street earnings include an effort by managers and investors to boost corporate value and an attempt to remove transitory elements from earnings so as to improve the ability to estimate future cash flows. While it is unclear which motivation is dominant, the research does demonstrate that Street EPS have a higher correlation with stock price movement than GAAP EPS do.[12]

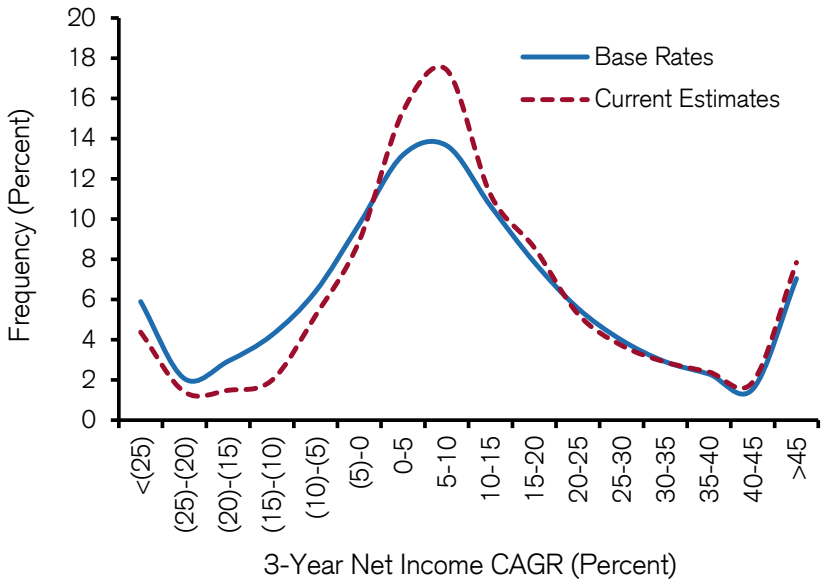
EPS are ubiquitous and provide some information that affect stock prices. Growth in EPS creates shareholder value when a company makes investments that earn a return in excess of the cost of capital. In general, there is a positive correlation between EPS growth and total shareholder return. Indeed, investors who can anticipate earnings in 12 months that are substantially different than today's forecast stand to earn substantial excess returns.[13]

However, earnings growth rates are not very persistent.[14] This suggests that it is hard to predict future growth rates based on the past. You can improve your earnings forecasts by carefully considering accruals. Accruals that are less reliable, such as an estimate for the collection of accounts receivable, are associated with lower earnings persistence than accruals with more persistence such as accounts payable.[15]

The goal of this report is to help guide thinking with regard to earnings growth.[16] Consistent with prior research, we believe that the use of base rates improves the quality of forecasts.[17] This is especially true for growth companies, where analysts tend to be optimistic about the future. Indeed, when sentiment is bullish, earnings forecasts by analysts tend to be optimistic, especially for firms that are difficult to value using conventional measures.[18]

Analysts tend to be too sanguine when they forecast net income growth.[19] The current mean estimate for companies in the S&P 1500 is 13.3 percent annual net income growth over the next three years. That rate almost one-third higher than the average growth rate of 10.4 percent for the largest 1,000 global companies since 1950. All figures are adjusted for inflation. The median estimate is for 8.0 percent annual growth, which is almost one-fifth higher than the historical median of 6.9 percent. (See Exhibit 1.) Of particular note is the optimism on the left side of the distribution: few companies or analysts think that earnings will decline at the rate that is consistent with the past.

Exhibit 1: Overconfidence—Range of Net Income Growth Rates Too Narrow



Source: Credit Suisse HOLT® and FactSet Estimates.
Note: FactSet consensus estimates as of December 4, 2015; S&P 1500 sample includes 1,211 companies after excluding companies with negative beginning or ending net income and companies for which 3-year estimates are not available.

Base Rates of Earnings Growth

An investor's primary task is to determine whether the expectations for future financial performance, as implied by the stock price, are too optimistic or pessimistic relative to how the company is likely to perform. In other words, the intelligent investor seeks gaps between expectations and fundamentals.[20] This approach does not require forecasts of pinpoint accuracy, but rather only judgments as to whether the expectations embedded in the shares are too high or low.

Sales are the most important driver of corporate value, while earnings are the most common metric to communicate results and to establish value. Sales growth is more persistent than earnings growth, but less predictive of total shareholder return.[21] The sample throughout this report includes the net income growth of the top 1,000 global companies by market capitalization since 1950. These companies currently represent about 60 percent of the global market capitalization. The data include all sectors. The sample size is somewhat smaller than 1,000 in the early years but reaches 1,000 by the late 1960s. The population includes companies that are now dead.

We use a definition of net income that is before extraordinary items. We calculate the compound annual growth rates (CAGR) of net income for 1, 3, 5, and 10 years for each firm. We adjust all of the figures to remove the effects of inflation, which translates all of the numbers to 2014 dollars.

Exhibit 2 shows the results for the full sample. In the panel on the left, the rows show net income growth rates and the columns reflect time periods. Say you want to know what percent of the universe grew net income at a CAGR of 15-20 percent for five years. You start with the row marked "15-20" and slide to the right to find the column "5-Yr." There, you'll see that 8.0 percent of the companies achieved that rate of growth. The panel on the right shows the sample sizes for each growth rate and time period, allowing us to see where the 8.0 percent comes from: 3,537 instances out of the total of 44,062 (3,537/44,062 = 8.0 percent).

Exhibit 2: Base Rates of Net Income Growth (1950-2014)

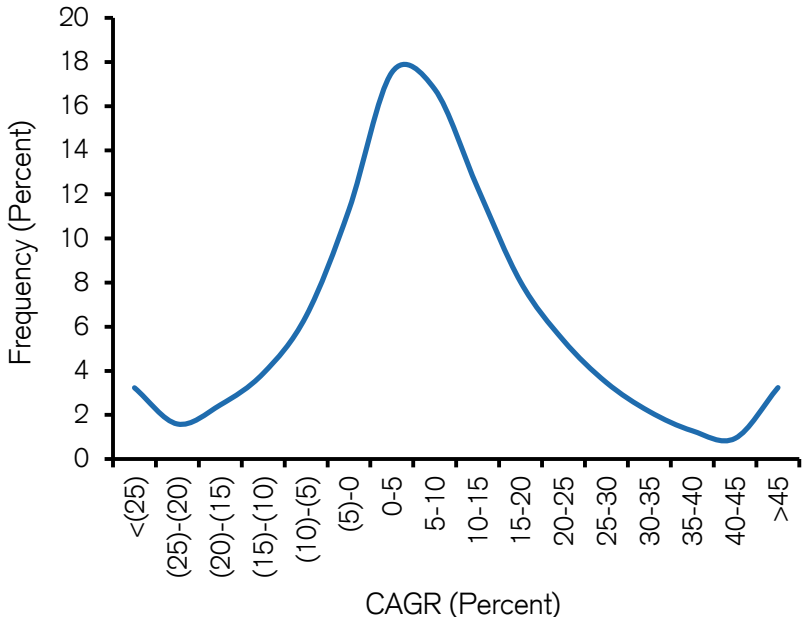
Full Universe	Base Rates			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	11.5%	5.9%	3.2%	0.7%
(25)-(20)	2.5%	2.1%	1.6%	0.6%
(20)-(15)	3.1%	2.9%	2.5%	1.4%
(15)-(10)	3.8%	4.2%	3.9%	2.8%
(10)-(5)	4.9%	6.4%	6.5%	5.7%
(5)-0	7.0%	9.8%	11.3%	12.7%
0-5	9.0%	13.2%	17.5%	24.5%
5-10	9.5%	13.7%	16.8%	23.3%
10-15	8.5%	10.7%	12.3%	13.9%
15-20	6.6%	7.9%	8.0%	6.8%
20-25	5.0%	5.6%	5.4%	3.4%
25-30	4.0%	4.0%	3.5%	1.7%
30-35	3.2%	2.9%	2.2%	0.9%
35-40	2.7%	2.3%	1.3%	0.6%
40-45	2.1%	1.5%	0.9%	0.4%
>45	16.5%	7.0%	3.2%	0.6%
Mean	56.8%	10.4%	7.5%	5.9%
Median	9.3%	6.9%	6.0%	5.3%
StDev	2,540.8%	34.6%	20.2%	10.9%

Full Universe	Observations			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	5,985	2,810	1,423	242
(25)-(20)	1,277	985	700	229
(20)-(15)	1,588	1,398	1,081	519
(15)-(10)	1,993	2,016	1,710	1,008
(10)-(5)	2,547	3,052	2,855	2,089
(5)-0	3,612	4,648	4,981	4,637
0-5	4,697	6,288	7,724	8,944
5-10	4,934	6,508	7,385	8,530
10-15	4,405	5,083	5,415	5,075
15-20	3,432	3,747	3,537	2,491
20-25	2,614	2,652	2,369	1,253
25-30	2,082	1,897	1,528	617
30-35	1,680	1,385	950	338
35-40	1,410	1,093	565	214
40-45	1,095	737	412	135
>45	8,560	3,356	1,427	212
Total	51,911	47,655	44,062	36,533

Source: Credit Suisse HOLT®.
Note: CAGR = compound annual growth rate.

Exhibit 3 is the distribution for the five-year net income growth rate. This shows, in a graph, what the numbers say in exhibit 2. The mean, or average, growth rate was 7.5 percent per year and the median growth rate was 6.0 percent. The median is a better indicator of the central location of the results because the distribution is skewed to the right. The standard deviation, 20.2 percent, gives an indication of the width of the bell curve.

Exhibit 3: Five-Year CAGR of Net Income (1950-2014)



Source: Credit Suisse HOLT®.
Note: CAGR = compound annual growth rate.

While the data for the full sample are a start, we want to sharpen the reference class of base rates to make the results more relevant and applicable. One way to do that is to break the universe into deciles based on a company's starting annual sales. Within each size decile, we sort the observations of growth rates into bins in increments of 5 percentage points (except for the tails).

The heart of this analysis is exhibit 4, which shows each decile, the total population, and an additional analysis of mega companies (those with sales in excess of $50 billion). Here's how you use the exhibit. Determine the base sales level for the company that you want to model. Then go to the appropriate decile based on that size. You now have the proper reference class and the distribution of growth rates for the various time horizons.

Let's use Alphabet Inc. as an example. As of early December 2015, the consensus for net income growth over the next three years, according to FactSet's consolidated estimate of analysts, is about 24 percent per year. Growth in non-GAAP earnings per share is expected to be close to 15 percent. We first find the correct reference class. In this case, it's the bin that has a sales base in excess of $50 billion. Next we examine the row of growth that is marked "20-25," representing a net income growth rate of between 20 and 25 percent. Going out to the column under "3-Yr," we see that 5.2 percent of companies achieved this feat.

In total, exhibit 4 shows results for 44 reference classes (11 size ranges times 4 time horizons) that should cover the vast majority of possible outcomes for net income growth. The appendix contains the sample sizes for each of the reference classes. We will show how to incorporate these base rates into your forecasts for net income growth in a moment, but for now it's useful to acknowledge the utility of these data as an analytical guide and a valuable reality check.

Exhibit 4: Base Rates by Decile (1950-2014)

Sales: $0-325 Mn	Base Rates			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	8.4%	3.4%	1.7%	0.4%
(25)-(20)	1.8%	1.1%	1.0%	0.3%
(20)-(15)	2.5%	1.9%	1.1%	0.9%
(15)-(10)	3.2%	3.2%	2.5%	1.7%
(10)-(5)	4.1%	4.7%	3.7%	3.1%
(5)-0	6.4%	8.5%	9.3%	8.4%
0-5	9.9%	11.8%	15.4%	19.8%
5-10	10.2%	14.0%	15.5%	22.6%
10-15	9.0%	10.6%	13.4%	15.5%
15-20	6.1%	8.0%	9.8%	10.4%
20-25	5.1%	6.4%	6.8%	6.6%
25-30	4.2%	5.2%	5.1%	3.5%
30-35	4.0%	3.7%	3.4%	2.1%
35-40	3.4%	3.2%	2.0%	1.7%
40-45	2.8%	2.1%	1.7%	1.3%
>45	18.9%	12.2%	7.7%	2.0%
Mean	42.3%	17.9%	14.1%	10.5%
Median	11.7%	10.5%	9.9%	8.3%
StDev	284.2%	35.6%	23.3%	13.2%

Sales: $325-700 Mn	Base Rates			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	8.8%	3.8%	1.9%	0.5%
(25)-(20)	1.9%	1.5%	0.9%	0.3%
(20)-(15)	2.7%	2.2%	1.4%	0.9%
(15)-(10)	3.6%	3.7%	3.0%	1.9%
(10)-(5)	5.0%	5.5%	4.8%	4.4%
(5)-0	7.8%	10.2%	11.4%	9.8%
0-5	11.1%	15.4%	19.0%	26.5%
5-10	10.8%	15.0%	18.7%	25.0%
10-15	9.6%	11.6%	13.7%	15.9%
15-20	7.7%	8.9%	9.4%	8.0%
20-25	5.3%	6.1%	6.1%	3.0%
25-30	4.1%	4.0%	3.4%	1.9%
30-35	3.4%	2.8%	2.0%	0.8%
35-40	2.7%	1.9%	1.1%	0.4%
40-45	2.1%	1.3%	0.6%	0.2%
>45	13.3%	6.2%	2.6%	0.5%
Mean	45.3%	11.1%	8.5%	6.8%
Median	9.0%	7.3%	6.8%	6.0%
StDev	1,314.6%	29.6%	17.3%	9.9%

Sales: $700-1,250 Mn	Base Rates			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	8.9%	4.4%	2.5%	0.8%
(25)-(20)	2.5%	2.1%	1.3%	0.4%
(20)-(15)	2.8%	2.5%	1.9%	1.5%
(15)-(10)	3.4%	4.2%	3.6%	2.3%
(10)-(5)	4.4%	5.8%	6.0%	5.5%
(5)-0	7.7%	9.9%	10.5%	11.8%
0-5	10.8%	14.3%	18.8%	25.7%
5-10	10.8%	15.0%	18.9%	25.4%
10-15	9.2%	11.2%	13.0%	13.6%
15-20	7.1%	8.5%	8.7%	6.8%
20-25	4.9%	5.9%	5.0%	2.8%
25-30	3.9%	3.8%	3.3%	1.7%
30-35	3.8%	2.9%	1.9%	0.6%
35-40	2.5%	2.3%	1.1%	0.5%
40-45	2.3%	1.6%	0.9%	0.3%
>45	15.0%	5.8%	2.7%	0.3%
Mean	137.3%	10.5%	7.7%	5.6%
Median	9.5%	7.2%	6.4%	5.3%
StDev	7,627.5%	38.7%	18.9%	10.2%

Sales: $1,250-2,000 Mn	Base Rates			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	9.9%	5.3%	3.1%	0.5%
(25)-(20)	2.4%	2.0%	1.2%	0.5%
(20)-(15)	3.6%	2.9%	2.7%	1.3%
(15)-(10)	4.1%	4.4%	3.5%	2.5%
(10)-(5)	5.1%	6.1%	7.0%	5.9%
(5)-0	7.1%	10.0%	10.2%	12.6%
0-5	9.9%	13.7%	18.7%	25.7%
5-10	10.0%	14.6%	18.1%	25.5%
10-15	9.1%	12.0%	12.5%	14.2%
15-20	7.1%	7.8%	8.2%	5.6%
20-25	4.8%	5.2%	5.3%	3.3%
25-30	3.9%	4.0%	3.3%	1.1%
30-35	3.4%	2.4%	2.1%	0.6%
35-40	2.9%	2.1%	1.1%	0.4%
40-45	2.0%	1.3%	0.8%	0.1%
>45	14.7%	6.4%	2.3%	0.1%
Mean	27.6%	9.1%	6.9%	5.3%
Median	9.0%	6.8%	6.0%	5.2%
StDev	433.6%	26.1%	23.5%	9.4%

Sales: $2,000-3,000 Mn	Base Rates			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	9.6%	5.8%	3.0%	0.7%
(25)-(20)	2.3%	1.7%	2.1%	0.7%
(20)-(15)	3.1%	2.7%	2.3%	1.6%
(15)-(10)	4.2%	3.9%	4.1%	3.1%
(10)-(5)	5.0%	6.4%	6.6%	6.0%
(5)-0	7.5%	10.4%	11.3%	14.2%
0-5	10.0%	14.1%	19.0%	28.0%
5-10	9.8%	14.7%	17.9%	23.1%
10-15	8.6%	10.8%	12.6%	11.8%
15-20	7.4%	8.4%	6.5%	6.2%
20-25	5.2%	4.8%	5.2%	2.5%
25-30	4.4%	3.9%	3.5%	1.1%
30-35	2.8%	3.0%	2.2%	0.5%
35-40	2.9%	2.3%	0.9%	0.2%
40-45	2.0%	1.0%	0.9%	0.2%
>45	15.2%	6.0%	2.0%	0.2%
Mean	33.6%	9.4%	6.3%	4.5%
Median	9.1%	6.5%	5.4%	4.4%
StDev	301.1%	29.1%	17.5%	9.8%

Sales: $3,000-4,500 Mn	Base Rates			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	11.6%	5.7%	3.1%	0.6%
(25)-(20)	2.3%	2.1%	1.6%	0.8%
(20)-(15)	2.9%	3.0%	2.8%	1.3%
(15)-(10)	4.4%	4.3%	4.2%	3.2%
(10)-(5)	4.9%	7.4%	7.1%	6.3%
(5)-0	7.0%	10.7%	12.8%	14.1%
0-5	9.3%	13.1%	18.0%	26.4%
5-10	9.5%	13.7%	16.8%	23.8%
10-15	8.2%	10.0%	12.4%	13.4%
15-20	6.7%	7.6%	7.2%	5.3%
20-25	5.2%	5.8%	5.3%	2.5%
25-30	4.3%	3.7%	3.0%	0.9%
30-35	2.9%	3.2%	2.0%	0.4%
35-40	2.6%	2.4%	1.0%	0.3%
40-45	2.2%	1.6%	0.7%	0.2%
>45	15.9%	5.8%	2.1%	0.3%
Mean	42.2%	9.4%	6.0%	4.6%
Median	8.8%	6.5%	5.2%	4.5%
StDev	994.6%	37.3%	18.0%	9.8%

Sales: $4,500-7,000 Mn	Base Rates			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	12.1%	6.2%	3.6%	1.0%
(25)-(20)	2.8%	2.2%	1.6%	0.9%
(20)-(15)	3.9%	3.1%	3.2%	1.4%
(15)-(10)	3.9%	4.6%	4.1%	3.3%
(10)-(5)	4.9%	6.9%	7.7%	7.4%
(5)-0	6.5%	10.1%	12.5%	15.8%
0-5	8.5%	13.3%	17.6%	23.6%
5-10	9.5%	14.0%	16.9%	22.9%
10-15	8.6%	10.9%	11.7%	12.7%
15-20	6.2%	7.6%	7.4%	5.5%
20-25	5.4%	5.3%	4.3%	2.6%
25-30	4.0%	3.7%	2.9%	1.1%
30-35	2.9%	2.4%	1.9%	0.8%
35-40	2.4%	2.1%	1.2%	0.4%
40-45	1.9%	1.6%	0.8%	0.2%
>45	16.6%	6.0%	2.6%	0.4%
Mean	74.6%	9.2%	5.8%	4.3%
Median	9.0%	6.2%	4.9%	4.3%
StDev	2,176.8%	36.6%	18.8%	10.6%

Sales: $7,000-12,000 Mn	Base Rates			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	13.3%	7.3%	4.1%	0.7%
(25)-(20)	2.6%	2.4%	1.9%	0.8%
(20)-(15)	3.0%	3.6%	2.8%	1.4%
(15)-(10)	4.0%	4.2%	4.5%	3.6%
(10)-(5)	5.4%	7.2%	6.8%	6.2%
(5)-0	6.9%	9.4%	11.8%	14.9%
0-5	7.9%	12.6%	17.9%	24.9%
5-10	8.6%	13.3%	16.1%	22.1%
10-15	7.8%	9.8%	11.2%	12.8%
15-20	6.6%	6.9%	7.4%	5.9%
20-25	4.9%	5.5%	4.9%	3.1%
25-30	3.9%	4.1%	3.1%	1.5%
30-35	3.5%	2.8%	2.0%	0.9%
35-40	2.5%	2.4%	1.7%	0.4%
40-45	2.0%	1.6%	1.0%	0.3%
>45	17.0%	6.7%	2.8%	0.6%
Mean	47.0%	9.4%	6.3%	5.0%
Median	8.9%	6.0%	5.1%	4.5%
StDev	751.8%	35.4%	19.9%	11.1%

Sales: $12,000-25,000 Mn	Base Rates			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	14.8%	7.6%	4.4%	1.0%
(25)-(20)	2.8%	2.4%	2.0%	0.9%
(20)-(15)	3.2%	3.5%	3.3%	2.2%
(15)-(10)	3.5%	4.6%	4.3%	3.3%
(10)-(5)	5.3%	6.9%	7.8%	6.7%
(5)-0	6.8%	9.7%	11.7%	14.2%
0-5	7.3%	12.8%	16.5%	23.1%
5-10	8.8%	11.8%	14.3%	20.2%
10-15	7.8%	9.9%	11.3%	14.5%
15-20	5.1%	7.8%	7.9%	6.1%
20-25	4.8%	4.9%	5.3%	3.7%
25-30	3.9%	3.7%	3.4%	1.4%
30-35	2.5%	2.9%	2.0%	1.1%
35-40	2.8%	2.1%	1.3%	0.7%
40-45	1.8%	1.6%	1.0%	0.4%
>45	18.7%	7.5%	3.4%	0.6%
Mean	66.3%	9.7%	6.6%	5.2%
Median	8.6%	6.0%	5.0%	4.8%
StDev	821.4%	37.2%	21.5%	11.7%

Sales: >$25,000 Mn	Base Rates			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	16.2%	9.4%	5.3%	0.7%
(25)-(20)	2.9%	3.1%	2.4%	1.0%
(20)-(15)	3.0%	3.8%	3.3%	2.3%
(15)-(10)	4.1%	5.1%	5.4%	3.6%
(10)-(5)	4.8%	7.2%	8.0%	7.6%
(5)-0	6.0%	8.7%	11.7%	14.2%
0-5	6.6%	10.8%	14.3%	21.0%
5-10	7.6%	10.7%	14.4%	21.7%
10-15	7.5%	9.9%	11.0%	13.0%
15-20	6.4%	7.2%	7.3%	7.2%
20-25	4.7%	5.7%	5.4%	3.6%
25-30	3.5%	3.8%	3.6%	2.0%
30-35	3.3%	3.1%	2.0%	1.2%
35-40	2.6%	2.2%	1.2%	0.5%
40-45	2.0%	1.6%	1.0%	0.1%
>45	18.6%	7.5%	3.6%	0.2%
Mean	47.6%	8.4%	5.8%	5.0%
Median	9.0%	5.9%	4.9%	4.9%
StDev	507.7%	36.0%	21.0%	11.1%

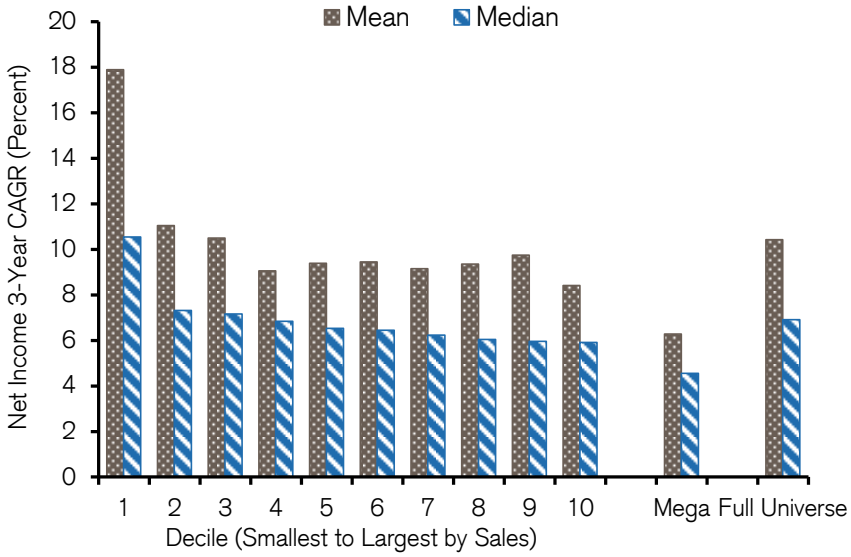
Sales: >$50,000 Mn	Base Rates			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	17.6%	11.1%	5.5%	0.6%
(25)-(20)	3.2%	3.0%	2.7%	1.3%
(20)-(15)	3.4%	4.2%	3.5%	1.8%
(15)-(10)	4.1%	5.4%	5.8%	3.9%
(10)-(5)	4.2%	7.3%	8.7%	9.3%
(5)-0	6.1%	9.6%	12.5%	15.3%
0-5	6.5%	10.9%	16.3%	22.0%
5-10	8.3%	10.3%	14.2%	21.1%
10-15	7.3%	9.2%	9.3%	9.5%
15-20	6.1%	6.7%	6.7%	6.3%
20-25	4.5%	5.2%	3.7%	4.0%
25-30	3.2%	3.0%	3.2%	2.7%
30-35	3.2%	2.4%	1.9%	1.6%
35-40	2.1%	2.0%	1.2%	0.4%
40-45	1.9%	1.7%	1.0%	0.1%
>45	18.2%	7.8%	3.9%	0.2%
Mean	37.1%	6.3%	4.6%	4.6%
Median	7.9%	4.6%	3.8%	4.1%
StDev	334.5%	30.9%	19.8%	11.2%

Full Universe	Base Rates			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	11.5%	5.9%	3.2%	0.7%
(25)-(20)	2.5%	2.1%	1.6%	0.6%
(20)-(15)	3.1%	2.9%	2.5%	1.4%
(15)-(10)	3.8%	4.2%	3.9%	2.8%
(10)-(5)	4.9%	6.4%	6.5%	5.7%
(5)-0	7.0%	9.8%	11.3%	12.7%
0-5	9.0%	13.2%	17.5%	24.5%
5-10	9.5%	13.7%	16.8%	23.3%
10-15	8.5%	10.7%	12.3%	13.9%
15-20	6.6%	7.9%	8.0%	6.8%
20-25	5.0%	5.6%	5.4%	3.4%
25-30	4.0%	4.0%	3.5%	1.7%
30-35	3.2%	2.9%	2.2%	0.9%
35-40	2.7%	2.3%	1.3%	0.6%
40-45	2.1%	1.5%	0.9%	0.4%
>45	16.5%	7.0%	3.2%	0.6%
Mean	56.8%	10.4%	7.5%	5.9%
Median	9.3%	6.9%	6.0%	5.3%
StDev	2,540.8%	34.6%	20.2%	10.9%

Source: Credit Suisse HOLT®.

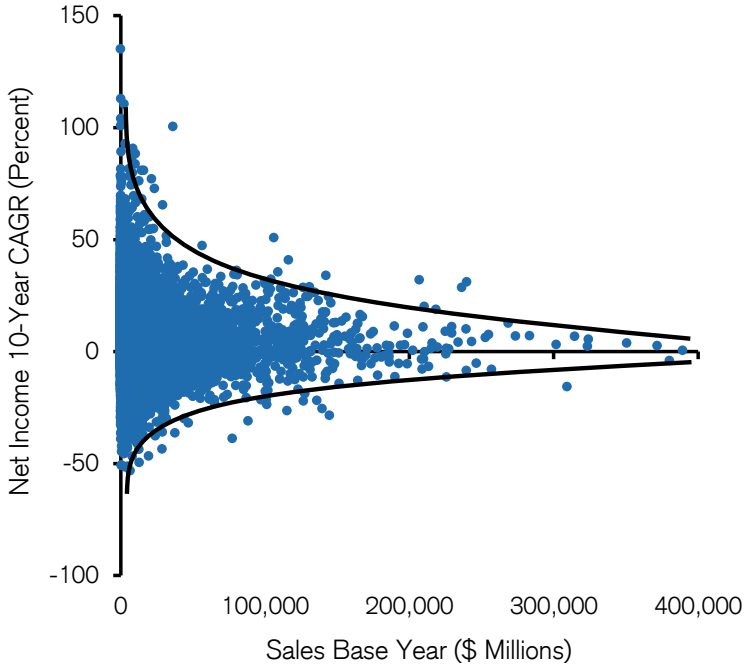
While the value of these data is in the details, there are some useful observations about the whole that are worth keeping in mind. The first is that the median growth rates tend to decline as firm size increases, as does the standard deviation of the growth rates. This point has been well established empirically.[22] Exhibit 5 shows this pattern for annualized net income growth rates over three years. Exhibit 6 reveals that the variance in net income growth rates for ten years declines with size, underscoring that it is sensible to temper expectations about net income growth for large companies.

Exhibit 5: Three-Year Median Net Income Growth Rates Decline with Size



Source: Credit Suisse HOLT®.
Note: Growth rates are annualized over three years; mega companies have sales in excess of $50 billion (2014 USD) in the base year.

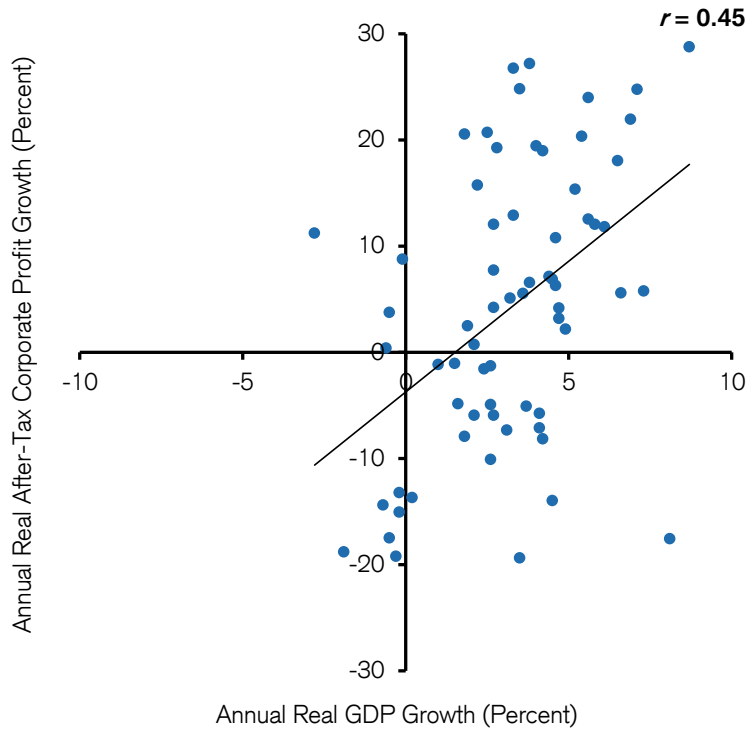
Exhibit 6: Variances in Ten-Year Net Income Growth Rates Decline with Size



Source: Credit Suisse HOLT®.
Note: Base year sales are in 2014 U.S. Dollars.

Next, net income growth follows gross domestic product (GDP) growth reasonably closely in the U.S. (see Exhibit 7). The correlation coefficient is 0.45 between annual GDP growth and after-tax corporate profit from the national income and product accounts (NIPA). Over the 67-year period from 1948 to 2014, U.S. GDP grew 3.2 percent per year, adjusted for inflation, with a standard deviation of 2.4 percent. Net income, also adjusted for inflation, grew at 3.4 percent with a standard deviation of 13.2 percent.

Exhibit 7: Net Income Growth Rate Is Correlated with GDP Growth



Source: Bureau of Economic Analysis.

Warren Buffett, the chairman and CEO of Berkshire Hathaway, admonishes companies to avoid predicting rapid growth. Here's what he wrote in his letter to shareholders in 2000:[23]

> Charlie [Munger] and I think it is both deceptive and dangerous for CEOs to predict growth rates for their companies. They are, of course, frequently egged on to do so by both analysts and their own investor relations departments. They should resist, however, because too often these predictions lead to trouble.
>
> It's fine for a CEO to have his own internal goals and, in our view, it's even appropriate for the CEO to publicly express some hopes about the future, if these expectations are accompanied by sensible caveats. But for a major corporation to predict that its per-share earnings will grow over the long term at, say, 15% annually is to court trouble.
>
> That's true because a growth rate of that magnitude can only be maintained by a very small percentage of large businesses. Here's a test: Examine the record of, say, the 200 highest earning companies from 1970 or 1980 and tabulate how many have increased per-share earnings by 15% annually since those dates. You will find that only a handful have. I would wager you a very significant sum that fewer than 10 of the 200 most profitable companies in 2000 will attain 15% annual growth in earnings-per-share over the next 20 years.

We ran a version of Buffett's test. We started by identifying the 200 companies with the highest net income in 1990. By 2000, only 162 of those companies were still around (mergers and acquisitions claimed most of the others). Of those, less than 9 percent (14 of 162) grew net income at a rate of 15 percent or more from 1990-1999. None of those 14 companies grew at higher than a 15 percent rate for the decade ended in 2009. Buffett's sense of the base rate is accurate.

The reason that unrealistic expectations are worrisome is that executives may start to change their behavior for the worse. His letter continues:

> The problem arising from lofty predictions is not just that they spread unwarranted optimism. Even more troublesome is the fact that they corrode CEO behavior. Over the years, Charlie and I have observed many instances in which CEOs engaged in uneconomic operating maneuvers so that they could meet earnings targets they had announced. Worse still, after exhausting all that operating acrobatics would do, they sometimes played a wide variety of accounting games to "make the numbers." These accounting shenanigans have a way of snowballing: Once a company moves earnings from one period to another, operating shortfalls that occur thereafter require it to engage in further accounting maneuvers that must be even more "heroic." These can turn fudging into fraud. (More money, it has been noted, has been stolen with the point of a pen than at the point of a gun.)
>
> Charlie and I tend to be leery of companies run by CEOs who woo investors with fancy predictions. A few of these managers will prove prophetic — but others will turn out to be congenital optimists, or even charlatans. Unfortunately, it's not easy for investors to know in advance which species they are dealing with.

Finally, notwithstanding our natural tendency to anticipate growth, 33 percent of the companies in the sample had a negative growth rate in net income year over year, after an adjustment for inflation. Further, 31 percent of the firms realized lower net income for 3 years, 29 percent for 5 years, and 24 percent for 10 years.

Using Base Rates to Model Growth

Two common ways of making a forecast are to do bottom-up research (known as the "inside view"), which is the most natural approach, or to turn to a base rate ("outside view") to see what the results have been for an appropriate reference class. The research in decision making shows that the bottom-up approach is subject to biases and that incorporating the base rate generally improves the accuracy of the forecast.[24] Yet we don't want to lean too much on either our own analysis or the base rate. We want to combine the two intelligently.

There is a technique to blend the two approaches, which we will apply to our sales growth data.[25] Correlation is the key to the method. Correlation measures the degree of the linear relationship between variables in a pair of distributions. The value of a correlation coefficient can fall between -1.0 (the rise in one variable perfectly correlates with the fall of the other) to 1.0 (both variables move in tandem). A zero correlation indicates randomness. We will examine net income growth over time. All of the correlations are negative.

If the correlation between two distributions is high, then what happened before gives you a really good sense of what will follow. For example, the correlation for cash flow return on investment (CFROI®) for companies in the consumer staples sector is about 0.90 from one year to the next. That means if you know Nestlé's CFROI® from last year, you can forecast it this year with a great deal of accuracy. The bottom-up work is highly relevant.

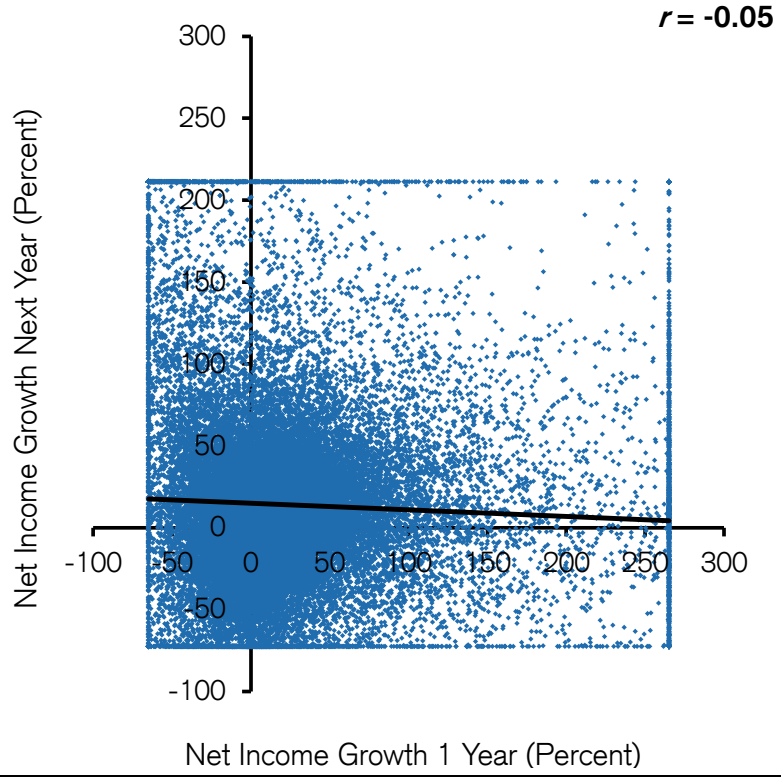
If the correlation is low, what happened before provides little inkling of what will happen next. Take the annual total shareholder returns for the S&P 500 as a case. The correlation from year to year, from 1928 to 2014, is essentially zero. Telling you last year's return provides no help in forecasting the return for this year. Your best forecast is the average of the reference class.

The basic idea is that the correlation determines how you should weight the bottom-up analysis and the base rate. For Nestlé, a sensible forecast is nine parts last year's CFROI® and one part last year's average CFROI® for the sector, the base rate. For your S&P 500 forecast, you should place minimal weight on what happened last year, or your own view, and rely largely on the base rate.

Studying base rates for net income growth is logical for three reasons. First, net income growth, despite its flaws, is the most popular measure of corporate results. Second, net income growth does have a decent correlation with total shareholder return. Net income growth is not persistent, but it is predictive of changes in stock price. Finally, earnings are a significant component of many incentive compensation programs.

Exhibit 8 shows that the correlation coefficient is -0.05 for the year-to-year net income growth rate. This includes the top 1,000 global companies by market capitalization from 1950 to 2014. More than 48,000 company years are in the data, and all of the figures are adjusted for inflation. You can interpret this result as follows: for a population of companies with net income growth that is far from average in a particular year, the expected value of the next year's net income growth is close to the average. For companies with high growth, the expected value is actually slightly below the average growth rate, and for companies with low growth the expected value is slightly above the average growth rate. You can refine this analysis by examining sectors and industries, which shrinks the sample size but increases its relevance.

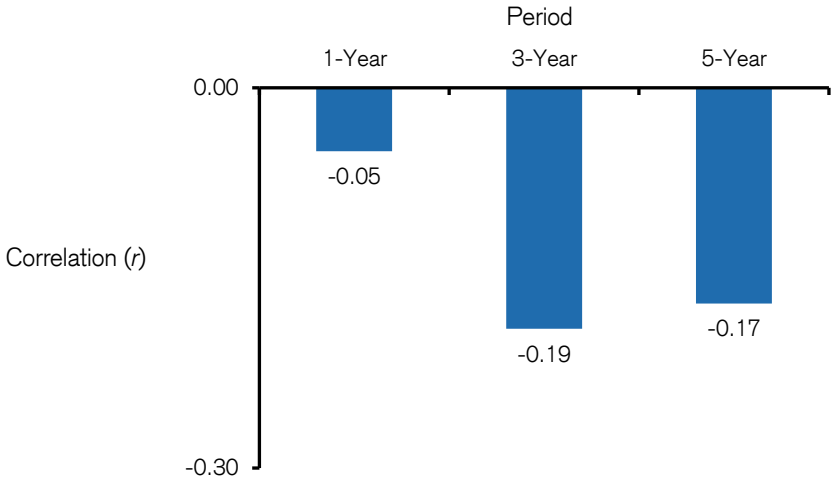
Exhibit 8: Correlation of One-Year Net Income Growth Rates



Source: Credit Suisse HOLT®.
Note: Data winsorized at 2nd and 98th percentiles.

The correlations decline as we consider longer time periods, which is not surprising. Exhibit 9 shows the correlation coefficients for 1-, 3-, and 5-year horizons for the full population of companies. The lesson is that the base rate for the reference classes, the median net income growth rate, should receive the majority of the weight for forecasts of three years or longer. In fact, you might start with the base rate and seek reasons to move away from it. In addition, companies with net income growth above the average have a slight tendency to swing to growth below the average, and vice versa.

Exhibit 9: Correlation of Net Income Growth Rates for 1-, 3-, and 5-Year Horizons

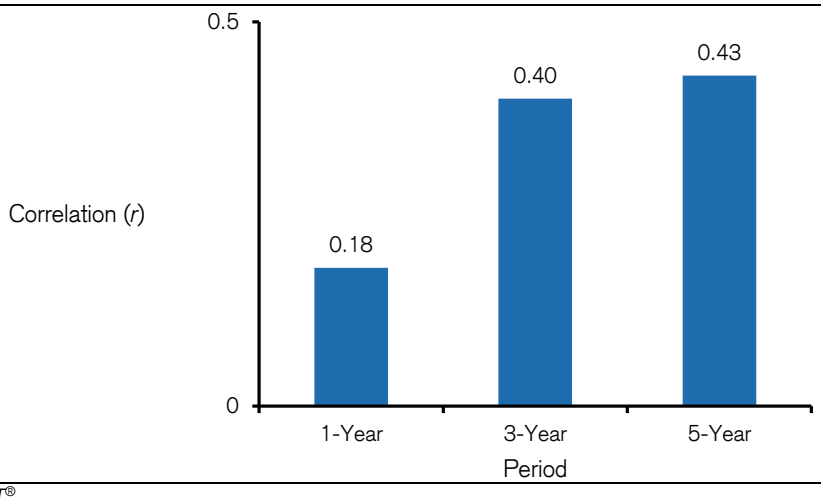


Source: Credit Suisse HOLT®.
Note: Data winsorized at 2nd and 98th percentiles.

Earnings and Total Shareholder Returns

Net income is hard to forecast but there is a solid positive correlation between net income growth and total shareholder return. Exhibit 10 shows that the correlation coefficient is 0.18 for 1 year, 0.40 for 3 years, and 0.43 for 5 years. So there is a potential payoff from successfully predicting net income growth, but the ability to do so is challenging.

Exhibit 10: Correlation between Net Income Growth Rates and Total Shareholder Returns over 1-, 3-, and 5-Year Horizons



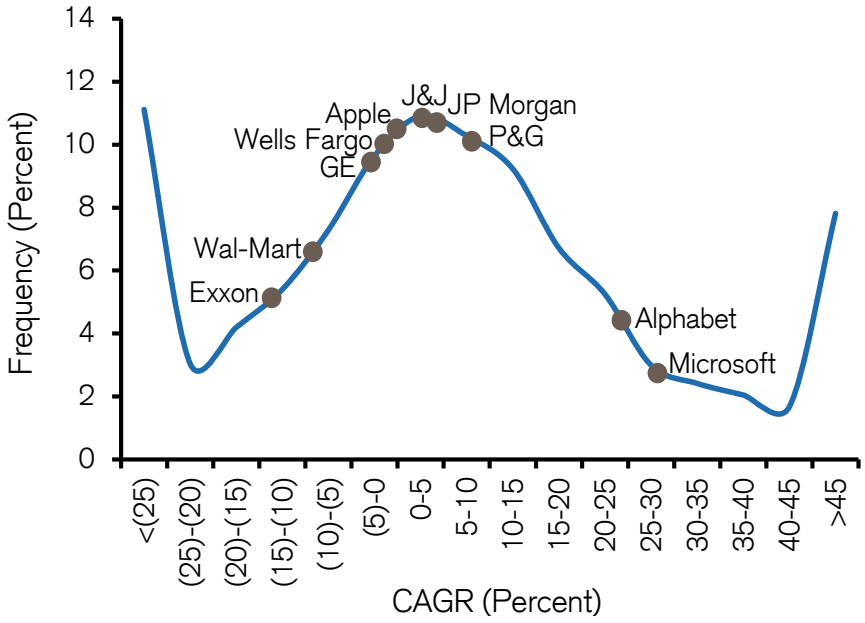
Source: Credit Suisse HOLT®.
Note: Data winsorized at 2nd and 98th percentiles.

Current Expectations

Exhibit 1 showed the current expectations for net income growth over three years for more than a thousand public companies in the U.S. The median expected growth rate is eight percent, which is roughly consistent with GDP growth of two to three percent.

Exhibit 11 shows the three-year net income growth rates, adjusted for inflation, which analysts expect for ten companies with sales in excess of $50 billion. We superimposed the expected growth rates on the distribution of historical sales growth rates for mega companies.

Exhibit 11: Three-Year Expected Net Income Growth Rates for Ten Mega Companies



Source: Credit Suisse HOLT®, FactSet Estimates.
Note: FactSet consensus estimates as of December 4, 2015; Growth rates are annualized; J&J = Johnson & Johnson, GE = General Electric, Exxon = ExxonMobil, and P&G = Procter & Gamble.

Summary

Despite substantial limitations, earnings are the most common measure of corporate performance. Research shows that earnings announcements do contain information and that "Street" earnings forecasts correlate more highly with stock prices than GAAP earnings do. Further, anticipating earnings growth substantially above or below the prevailing consensus yields substantial excess returns in the stock market.

The good news is that earnings growth has a reasonably good correlation with total shareholder return over periods of three to five years. The bad news is that net income growth is hard to predict. The challenge in forecasting earnings prompted leading researchers to suggest that there "is no persistence in long-term earnings growth beyond chance."[26]

Optimism and overconfidence commonly creep into our forecasts, creating distortions. Research shows that incorporating a base rate can improve the quality of our forecasts. In this piece we provide the base rates for net income growth for 1,000 global companies from 1950-2014.

Appendix: Observations for Each Base Rate by Decile (1950-2014)

Sales: $0-325 Mn	Observations			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	415	164	79	16
(25)-(20)	91	53	49	15
(20)-(15)	121	92	53	40
(15)-(10)	160	155	120	76
(10)-(5)	204	225	176	142
(5)-0	315	409	441	382
0-5	488	566	728	903
5-10	504	673	734	1,031
10-15	441	512	633	708
15-20	302	385	465	473
20-25	252	310	321	300
25-30	206	249	242	161
30-35	195	176	159	95
35-40	166	152	97	78
40-45	136	99	80	59
>45	931	588	363	91
Total	4,927	4,808	4,740	4,570

Sales: $325-700 Mn	Observations			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	459	194	94	21
(25)-(20)	98	75	46	15
(20)-(15)	144	111	71	43
(15)-(10)	189	190	149	88
(10)-(5)	263	279	239	202
(5)-0	411	520	568	451
0-5	583	787	945	1,221
5-10	568	767	932	1,153
10-15	501	592	681	734
15-20	404	455	465	368
20-25	278	311	301	140
25-30	215	202	169	86
30-35	180	143	97	37
35-40	139	96	57	18
40-45	111	66	29	11
>45	698	314	129	25
Total	5,241	5,102	4,972	4,613

Sales: $700-1,250 Mn	Observations			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	438	205	113	34
(25)-(20)	121	99	59	17
(20)-(15)	135	116	87	59
(15)-(10)	167	198	161	93
(10)-(5)	218	271	270	223
(5)-0	376	464	474	476
0-5	529	673	848	1,038
5-10	531	706	853	1,025
10-15	453	528	587	549
15-20	346	398	393	274
20-25	241	277	225	112
25-30	191	177	149	69
30-35	186	137	85	25
35-40	123	108	49	21
40-45	114	77	41	14
>45	738	274	123	12
Total	4,907	4,708	4,517	4,041

Sales: $1,250-2,000 Mn	Observations			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	444	226	128	19
(25)-(20)	109	85	48	19
(20)-(15)	162	124	111	48
(15)-(10)	185	190	141	89
(10)-(5)	230	260	285	212
(5)-0	322	427	415	456
0-5	445	586	762	929
5-10	450	623	738	922
10-15	408	515	509	515
15-20	322	333	333	203
20-25	218	222	217	118
25-30	177	170	135	41
30-35	151	103	84	22
35-40	129	90	46	13
40-45	89	55	33	5
>45	663	272	95	5
Total	4,504	4,281	4,080	3,616

Sales: $2,000-3,000 Mn	Observations			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	436	244	117	22
(25)-(20)	104	70	84	23
(20)-(15)	141	115	91	53
(15)-(10)	189	165	161	103
(10)-(5)	227	273	260	199
(5)-0	343	442	448	472
0-5	455	599	752	932
5-10	444	624	709	769
10-15	393	458	499	394
15-20	335	358	256	205
20-25	238	204	206	83
25-30	202	166	137	38
30-35	127	126	89	15
35-40	131	96	37	7
40-45	89	44	37	6
>45	693	256	81	8
Total	4,547	4,240	3,964	3,329

Sales: $3,000-4,500 Mn	Observations			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	562	254	127	20
(25)-(20)	113	94	66	27
(20)-(15)	140	131	113	45
(15)-(10)	212	192	173	109
(10)-(5)	238	327	289	214
(5)-0	340	472	524	479
0-5	452	578	735	895
5-10	463	605	686	808
10-15	398	443	506	455
15-20	327	335	296	180
20-25	252	257	219	86
25-30	208	164	124	29
30-35	141	140	81	15
35-40	128	108	40	10
40-45	109	69	29	7
>45	771	259	86	10
Total	4,854	4,428	4,094	3,389

Sales: $4,500-7,000 Mn	Observations			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	640	295	155	36
(25)-(20)	148	107	69	31
(20)-(15)	207	149	136	49
(15)-(10)	209	218	177	116
(10)-(5)	260	330	334	256
(5)-0	343	485	541	547
0-5	453	635	760	817
5-10	502	670	728	794
10-15	455	523	503	440
15-20	330	363	319	189
20-25	285	252	185	89
25-30	213	177	123	38
30-35	156	113	84	29
35-40	125	99	50	13
40-45	100	75	33	8
>45	882	288	114	13
Total	5,308	4,779	4,311	3,465

Sales: $7,000-12,000 Mn	Observations			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	806	393	198	24
(25)-(20)	160	132	92	29
(20)-(15)	179	197	134	51
(15)-(10)	241	227	217	133
(10)-(5)	326	389	328	226
(5)-0	416	510	567	545
0-5	481	683	865	910
5-10	519	720	778	810
10-15	472	529	540	468
15-20	402	375	359	215
20-25	297	297	236	112
25-30	238	219	148	56
30-35	212	153	96	33
35-40	151	129	80	16
40-45	124	89	48	10
>45	1,027	360	136	23
Total	6,051	5,402	4,822	3,661

Sales: $12,000-25,000 Mn	Observations			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	912	408	206	33
(25)-(20)	176	129	95	29
(20)-(15)	196	188	156	73
(15)-(10)	218	246	201	111
(10)-(5)	325	371	366	225
(5)-0	420	520	552	475
0-5	453	686	775	775
5-10	544	631	671	676
10-15	480	530	533	488
15-20	318	414	369	205
20-25	298	263	249	123
25-30	243	198	161	48
30-35	155	154	96	37
35-40	176	114	62	25
40-45	114	88	45	12
>45	1,155	401	161	19
Total	6,183	5,341	4,698	3,354

Sales: >$25,000 Mn	Observations			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	873	427	206	17
(25)-(20)	157	141	92	24
(20)-(15)	163	175	129	58
(15)-(10)	223	235	210	90
(10)-(5)	256	327	308	190
(5)-0	326	399	451	354
0-5	358	495	554	524
5-10	409	489	556	542
10-15	404	453	424	324
15-20	346	331	282	179
20-25	255	259	210	90
25-30	189	175	140	51
30-35	177	140	79	30
35-40	142	101	47	13
40-45	109	75	37	3
>45	1,002	344	139	6
Total	5,389	4,566	3,864	2,495

Sales: >$50,000 Mn	Observations			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	404	212	87	6
(25)-(20)	73	58	43	12
(20)-(15)	77	80	55	17
(15)-(10)	95	103	91	37
(10)-(5)	97	139	138	89
(5)-0	139	184	197	146
0-5	149	208	257	210
5-10	191	196	224	202
10-15	167	176	147	91
15-20	140	128	106	60
20-25	104	100	59	38
25-30	73	57	50	26
30-35	74	46	30	15
35-40	49	39	19	4
40-45	44	32	16	1
>45	416	149	62	2
Total	2,292	1,907	1,581	956

Full Universe	Observations			
Net Income CAGR (%)	1-Yr	3-Yr	5-Yr	10-Yr
<(25)	5,985	2,810	1,423	242
(25)-(20)	1,277	985	700	229
(20)-(15)	1,588	1,398	1,081	519
(15)-(10)	1,993	2,016	1,710	1,008
(10)-(5)	2,547	3,052	2,855	2,089
(5)-0	3,612	4,648	4,981	4,637
0-5	4,697	6,288	7,724	8,944
5-10	4,934	6,508	7,385	8,530
10-15	4,405	5,083	5,415	5,075
15-20	3,432	3,747	3,537	2,491
20-25	2,614	2,652	2,369	1,253
25-30	2,082	1,897	1,528	617
30-35	1,680	1,385	950	338
35-40	1,410	1,093	565	214
40-45	1,095	737	412	135
>45	8,560	3,356	1,427	212
Total	51,911	47,655	44,062	36,533

Source: Credit Suisse HOLT®.

Endnotes

[1] Daniel Kahneman, *Thinking, Fast and Slow* (New York: Farrar, Straus and Giroux, 2011), 249.
[2] John R. Graham, Campbell R. Harvey, and Shiva Rajgopal, "Value Destruction and Financial Reporting Decisions," *Financial Analysts Journal*, Vol. 62, No. 6, November/December 2006, 27-39.
[3] Shreenivas Kunte, CFA, "Earnings Confessions: What Disclosures Do Investors Prefer?" *CFA Institute: Enterprising Investor,* November 19, 2015.
[4] Benjamin Lansford, Baruch Lev, and Jennifer Wu Tucker, "Causes and Consequences of Disaggregating Earnings Guidance," *Journal of Business Finance & Accounting*, Vol. 40, No. 1-2, January/February 2013, 26–54 and Stanley Block, "Methods of Valuation: *Myths vs. Reality*," *The Journal of Investing*, Winter 2010, 7-14.
[5] Alfred Rappaport, *Creating Shareholder Value: A Guide for Managers and Investors* (New York: Free Press, 1998), 13-31.
[6] Patricia M. Dechow, Richard G. Sloan, and Jenny Zha, "Stock Prices and Earnings: A History of Research," *Annual Review of Financial Economics*, Vol. 6, December 2014, 343-363.
[7] William H. Beaver, "The Information Content of Annual Earnings Announcements," *Journal of Accounting Research,* Vol. 6, 1968, 67-92.
[8] Wayne R. Landsman, Edward L. Maydew, and Jacob R. Thornock, "The Information Content of Annual Earnings Announcements and Mandatory Adoption of IFRS," *Journal of Accounting and Economics*, Vol. 53, No. 1-2, February-April 2012, 34-54.
[9] William H. Beaver, Maureen F. McNichols, Zach Z. Wang, "The Information Content of Earnings Announcements: New Insights from Intertemporal and Cross-Sectional Behavior," *Stanford Graduate School of Business Working Paper No. 3338,* March 14, 2015.
[10] Ray Ball and Lakshmanan Shivakumar, "How Much New Information Is There in Earnings?" *Journal of Accounting Research*, Vol. 46, No. 5, December 2008, 975-1016.
[11] Lansford, Lev, and Tucker.
[12] Mark T. Bradshaw and Richard G. Sloan, "GAAP versus The Street: An Empirical Assessment of Two Alternative Definitions of Earnings," *Journal of Accounting Research*, Vol. 40, No. 1, March 2002, 41-66; Theo Francis and Kate Linebaugh, "U.S. Corporations Increasingly Adjust to Mind the GAAP," *Wall Street Journal*, December 14, 2015; and Dechow, Sloan, and Zha.
[13] Robert L. Hagin, *Investment Management: Portfolio Diversification, Risk, and Timing—Fact and Fiction* (Hoboken, NJ: John Wiley & Sons, 2004), 75-78.
[14] Louis K.C. Chan, Jason Karceski, and Josef Lakonishok, "The Level and Persistence of Growth Rates," *Journal of Finance*, Vol. 58, No. 2, April 2003, 643-684.
[15] Scott A. Richardson, Richard G. Sloan, Mark T. Soliman, and Irem Tuna, "Accrual Reliability, Earnings Persistence and Stock Prices," *Journal of Accounting and Economics*, Vol. 39, No. 3, September 2005, 437-485.
[16] The sample throughout the report includes the top 1,000 global companies by market capitalization, including all sectors, since 1950. (The sample is somewhat smaller in the early years but reaches 1,000 by the late 1960s.) When calculating growth rates, we exclude companies with negative net income. "Net Income" is defined as "Income Before Extraordinary Items." The Compustat annual data item number is 18. Here's the description: "This item represents the income of a company after all expenses, including special items, income taxes, and minority interest – but before provisions for common and/or preferred dividends. This item does not reflect discontinued operations or extraordinary items presented after taxes. This item, for banks, includes net profit or loss on securities sold or redeemed after applicable deductions for tax and minority interest."
[17] Michael J. Mauboussin and Dan Callahan, "The Base Rate Book – Sales Growth: Integrating the Past to Better Anticipate the Future," *Credit Suisse Global Financial Strategies,* May 4, 2015.

[18] Paul Hribar and John McInnis, "Investor Sentiment and Analysts' Earnings Forecast Errors," *Management Science,* Vol. 58, No. 2, February 2012, 293-307.
[19] Vijay Kumar Chopra, "Why So Much Error in Analysts' Earnings Forecasts?" *Financial Analysts Journal,* Vol. 54, No. 6, November/December 1998, 35-42 and Andrew Stotz and Wei Lu, "Financial Analysts Were Only Wrong by 25%," *SSRN Working Paper*, November 25, 2015. See: www.ssrn.com/abstract=2695216.
[20] Alfred Rappaport and Michael J. Mauboussin, *Expectations Investing: Reading Stock Prices for Better Returns* (Boston, MA: Harvard Business School Press, 2001).
[21] Michael J. Mauboussin, "The True Measure of Success," *Harvard Business Review,* October 2012, 46-56.
[22] Michael H. R. Stanley, Luís A. N. Amaral, Sergey V. Buldyrev, Shlomo Havlin, Heiko Leschhorn, Philipp Maass, Michael A. Salinger, and H. Eugene Stanley, "Scaling Behaviour in the Growth of Companies," *Nature*, Vol. 379, February 29, 1996, 804-806. Also, Rich Perline, Robert Axtell, and Daniel Teitelbaum, "Volatility and Asymmetry of Small Firm Growth Rates Over Increasing Time Frames," *Small Business Research Summary*, No. 285, December 2006.
[23] Warren E. Buffett, "Letter to Shareholders," *Berkshire Hathaway Annual Report,* 2000. See http://www.berkshirehathaway.com/2000ar/2000letter.html.
[24] Dan Lovallo and Daniel Kahneman, "Delusions of Success: How Optimism Undermines Executives' Decisions," *Harvard Business Review*, July 2003, 56-63.
[25] William M. K. Trochim and James P. Donnelly, *The Research Methods Knowledge Base, Third Edition* (Mason, OH: Atomic Dog, 2008), 166. See http://www.socialresearchmethods.net/kb/regrmean.php.
[26] Chan, Karceski, and Lakonishok.