

CHAPTER 7

U.S. STEEL, IBM AND MICROSOFT: THE GROWTH STORY!

Imelda's growing portfolio

Imelda it was a conservative investor whose investment in the Vanguard 500 Index fund grew steadily from year to year, but she was jealous of Martha, her neighbor. Martha's portfolio doubled last year and Martha lorded it over Imelda. "Your portfolio is so boring", she would say, "How do you expect to get rich with it?" Finally, Imelda asked Martha for some advice and Martha told her the secret of her success. She suggested that Imelda buy growth stocks. When Imelda protested that these stocks seemed highly priced, Martha told her not to worry. Earnings would grow next year and the high price earnings ratio would help, not hurt. Finally convinced, Imelda invested her money in the biggest growth companies she could find.

Unfortunately for Imelda, the next year was an awful year for the market, with the market dropping 20%. Imelda's portfolio did much worse. Some of her companies did report higher earnings, but not enough to keep markets happy, and their stock prices tumbled. Other companies went from making money to losing money, as the economy slowed. Imelda lost more than half her portfolio and her only consolation was that Martha did even worse. Chastened, Imelda sold her growth stocks and put her money back into the index fund.

Moral: Growth often comes with a hefty price tag.

Growth stocks are exciting and investors who seek to make extraordinary returns are drawn to them for that reason. If you succeed at picking the right growth companies to buy, your payoffs can be huge. An investor who bought Microsoft and Cisco when they were small growth companies would have seen her investment grow fifty-fold over a decade. Does it follow then that a strategy of investing in stocks with high growth rates will deliver high returns? As you will see in this chapter, succeeding at growth investing is very difficult to do for several reasons. The first is that growth can often be a mirage, since very few growth companies consistently deliver growth. The second is that not all growth is created equal; while some growth is value creating, some growth is value destroying. Finally, even the most attractive growth in the world may not be worth it if you pay too much for it.

The Core of the Story

The sales pitch for growth stocks is easiest to make in buoyant markets when investors believe that growth is not only likely but also inevitable. In such optimistic times,

investors are willing to listen to growth stories and there are at least two themes they will hear:

- *If you want big payoffs, buy growth stocks:* If you want cash flows today, buy bonds. The allure of equity is that companies can grow over time, doubling or tripling revenues and earnings. While you may not receive an immediate payoff in the form of dividends from such growth, you will share in the success as the value of your stockholding increases. For the high returns that can make your small portfolio into a large one and you from a poor to a wealthy individual, you should be buying growth companies.
- *If you buy the right growth companies, there is no additional risk:* Anticipating your concerns that growth companies are riskier than mature companies, proponents of growth stocks will argue that there is no additional risk if you pick the right growth companies to put your money in. After all, there are companies like Coca Cola, Microsoft and WalMart that seem to have found the key to delivering consistent growth. If you can find common patterns or themes across these companies, you can look for them in the younger growth companies of today.
- *Buying growth stocks is more tax efficient:* Historically, price appreciation has been taxed at much lower rates than dividends. Since the bulk of the returns on high growth stocks take the form of price appreciation, not only can you delay paying until you sell your stock taxes but when you do, you will pay less.

If you are not risk averse and seek high returns, you will be drawn to growth stocks as investments, in the hope of hitting the equivalent of a jackpot in your portfolio. A more moderate version of this story works for those who worry about paying too much up front for growth stocks. If you buy growth stocks at a reasonable price, what you receive as value from the higher growth will more than cover what you paid for the stock. This strategy, often titled GARP (Growth at a reasonable price) underlies the strategies of many growth investing icons like Peter Lynch.

The Theory: Growth and Value

A company that is expected to have high growth in earnings in the future should generally be worth more than a firm without this growth. Holding everything else constant, increasing growth increases value. But everything else cannot be held constant. To grow faster, you generally have to reinvest more back into your business and it is this requirement that creates a distinction between what can be termed “value creating growth” and “value destroying growth”. Distinguishing between the two is central to a good growth investing strategy.

Growth in a Discounted Cashflow Valuation

While no one will contest the proposition that growth is valuable, it is possible to pay too much for growth. In this section, you will first look at the fundamental determinants of growth and then extend this discussion to look at the value of growth in both a discounted cashflow model and in relative valuation.

Determinants of Growth

When you are attempting to estimate the expected growth in earnings for a firm, you tend to look at the firm's past history (historical growth in earnings) and what analysts following the firm estimate for expected growth in earnings in the future. With both historical and analyst estimates, growth is a variable that affects value but is divorced from the operating details of the firm. The soundest way of incorporating growth into value is to make it a function of how much a firm reinvests for future growth and the quality of its reinvestment. As noted in the last chapter, the expected growth in operating earnings for a firm is the product of the reinvestment rate (the proportion of after-tax operating income that is reinvested back into new assets, long term as well as short term) and the return on capital the firm makes on its investments.

Expected Growth Rate in operating income = Reinvestment Rate * Return on Capital
This formulation can be extended fairly simply to growth in earnings per share or net income by using equity measures of how much firms reinvest and how well they do it. For instance, you could look at the proportion of net income, rather than operating income, that is invested back into the business, and the return made on just the equity investment in the project. The former is called the retention rate, whereas the latter is the return on equity.

Expected Growth Rate in Equity income = Retention Ratio * Return on Equity
Why link growth to these fundamentals? It is useful at two levels. The first is in bringing home the point that growth is never costless. To grow faster, you have to reinvest more, which leaves less available to return as dividends or stock buybacks. The second is that it allows you to draw the line between the type of growth that creates value and the type of growth that can destroy value.

The Value of Growth in a Discounted Cashflow Model

To keep the analysis simple, start with the simple perpetual growth model that was used in the earlier chapters. Assume that you have a firm that is expected to have \$ 100 million in net income next year, a return on equity of 10% and a cost of equity of 10%. Assume further that you expect earnings to grow 3% a year forever. To value the value of equity, you first need to estimate how much this company will have to reinvest to be able to maintain its 3% growth rate:

$$\begin{aligned}\text{Retention Ratio} &= \text{Expected growth rate in equity earnings} / \text{Return on equity} \\ &= 3\% / 10\% = 30\%\end{aligned}$$

In other words, this company will be able to pay out 70% of its earnings each year. The value of the equity can then be written as:

$$\begin{aligned}\text{Value of Equity} &= \text{Net Income} * \text{Payout ratio} / (\text{Cost of equity} - \text{Expected Growth rate}) \\ &= 100 * 0.70 / (.10 - .03) = \$ 1,000 \text{ million}\end{aligned}$$

A useful follow-up question to ask is what would happen to the value of the equity of this company if the earnings were not expected to grow at all in perpetuity (i.e., earnings were expected to be \$ 100 million each year forever). First, consider the retention ratio that you would need to maintain a 0% growth rate:

$$\text{Retention Ratio} = 0\% / 10\% = 0\%$$

Since this firm can afford to pay out 100% of its earnings as dividends, you can value the equity in the firm as follows:

$$\begin{aligned}\text{Value of Equity} &= \text{Net Income} * \text{Payout ratio} / (\text{Cost of equity} - \text{Expected Growth rate}) \\ &= 100 * 1.00 / .10 = \$ 1,000 \text{ million}\end{aligned}$$

In other words, the growth in this firm does not add to the value of the equity in the firm.

If growth increases earnings, why is not affecting value? The mystery is easily solved if you consider the relationship between the return on equity and the cost of equity. If, as in this case, a firm's return on equity is equal to its cost of equity, what it gains from growth (in terms of higher earnings in the future) will be exactly offset by what it pays to get that growth (in terms of reinvestment needed to sustain that growth).

When will growth create value? Assume, in the prior example, that the firm had a return on equity of 15% instead of 10% (while maintaining a cost of equity of 10%), and that it was able to grow its earnings 3% a year in perpetuity. The retention ratio and equity value are computed below:

$$\begin{aligned}\text{Retention Ratio} &= 3\% / 15\% = 20\% \\ \text{Value of Equity} &= 100 * .80 / (.10 - .03) = \$1,143 \text{ million}\end{aligned}$$

Here, growth increases the value of equity by \$143 million but only because the firm earns more than its cost of equity.

In the final example, assume that the firm earns a return on equity of 6% on its investments and earnings grows 3% a year in perpetuity:

$$\begin{aligned}\text{Retention Ratio} &= 3\% / 6\% = 50\% \\ \text{Value of Equity} &= 100 * .50 / (.10 - .03) = \$714 \text{ million}\end{aligned}$$

Here growth reduces the value of equity by \$286 million because the firm earns less than its cost of equity on its investments.

The key ingredient in analyzing whether growth increases or decreases value is the quality of a firm's investments, where quality is measured by the return made on those investments relative to the cost of funding them. In general, firms that earn a return on equity (capital) that is greater than their cost of equity (capital) will generate value for their investors. In contrast, firms that earn a return on equity (capital) that is less than their cost of equity (capital) will destroy value, and at an increasing rate as growth accelerates. All too often, investors miss this link because they focus on the growth in proverbial bottom line, which is accounting earnings and pay little attention to how efficiently the growth is being generated. Not surprisingly, companies that report high earnings growth see their stock prices rise over time. At some point in time, though, there will be a reckoning and when it occurs, it will leave disappointed investors in its wake.

The Value of Growth in a Relative Valuation

Many investors prefer to use multiples such as the price earnings or price to book ratio to assess firms, rather than discounted cash flow models. The price-earnings ratio for a high growth firm can also be related to fundamentals and the conclusions parallel those you reached in the last section. If you hold all else constant, a company with a higher expected growth rate in earnings should trade at a higher PE ratio than a company with a lower growth rate in earnings. But if you do not hold all else constant, the relationship between PE and growth becomes more complicated:

- If you compare two companies with similar growth rates and risk profiles but with different returns on equity, you should expect the company with the higher return on equity to trade at a much higher multiple of earnings. This follows directly from the discussion in the last section of the relationship between the efficiency with which firms generate growth and its effect on value. Firms with higher returns on equity are generating growth far more efficiently (by reinvesting less for the same growth) than firms with lower returns on equity.
- If you compare two companies with similar growth and returns on equity, but with different exposures to risk, you should expect the company with the greater exposure to risk to trade at a lower multiple of earnings. This is because the higher risk leads to higher discount rates, which in turn reduce the value of future growth.

The interrelationship between growth, return on equity and risk suggests that investors should be cautious about using rules of thumb for value. For instance, a widely used rule of thumb is that a stock that trades at a PE ratio less than its expected growth rate is undervalued. While this may be true for an average risk stock, it will not hold for a high risk stock (which should trade at a much lower PE ratio).

Looking at the Evidence

Are growth companies better or worse investments than mature companies? This question has been answered in a variety of ways. For instance, there are researchers who looked at whether investing in stocks with high PE ratios generates high returns; these stocks often tend to be high growth companies. Others have adopted a more nuanced approach, where they examine whether stocks with high earnings growth that are reasonably priced do better than the market.

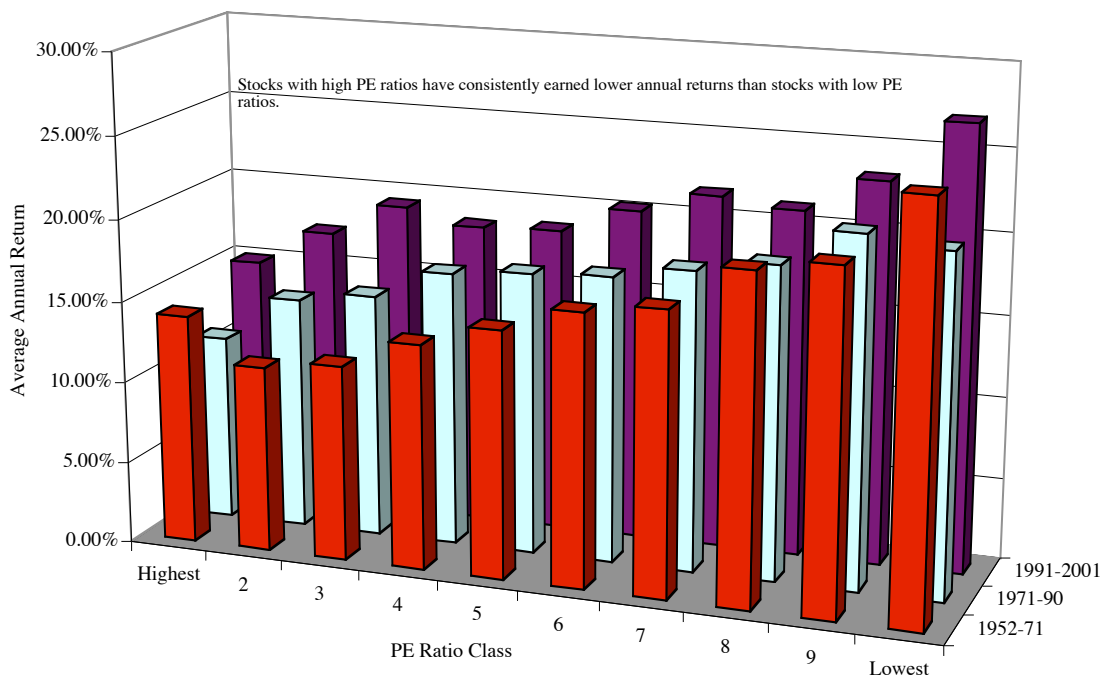
High PE Strategy

The easiest growth strategy, albeit the riskiest, is to buy the stocks with the highest PE ratios on the market, on the assumption that these are growth companies where the growth will deliver the excess returns in the future.

The Overall Evidence

The overall evidence on buying stocks with high PE ratios is grim. As noted in Chapter 3, when looking at stocks, a strategy of buying low PE ratio stocks seems to outperform one of buying high PE ratio stocks by significant margins. Figure 7.1 presents the difference in annual returns from buying low PE stock and high PE stock portfolios from 1952 to 2001. Note that these stocks were picked based upon their PE ratios at the beginning of each year and the returns represent the returns over the following year.

Figure 7.1: Returns on PE Ratio Classes - 1952 - 2001



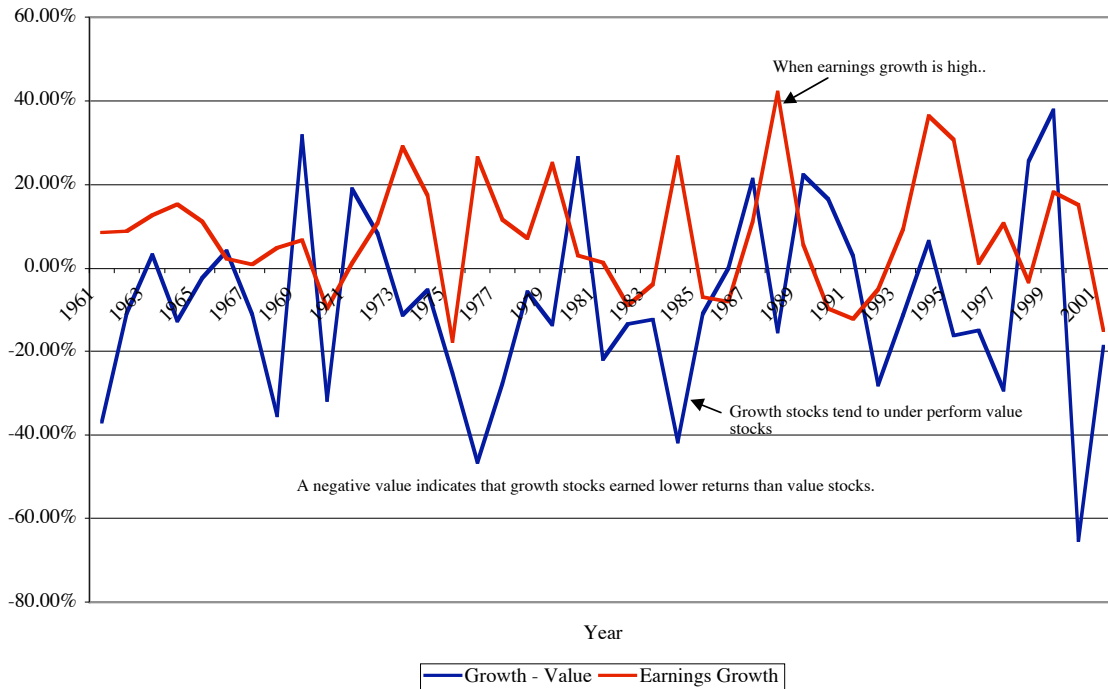
Data from Fama/French. The stocks were categorized into classes based upon their PE ratios at the beginning of each year and the returns were measured over the year.

The returns are computed using two different assumptions. In the equally weighted approach, an equal amount was invested in each stock in each portfolio whereas in the value weighted approach, the investments were proportional to the market values of the firms. On both an equally-weighted and a value-weighted basis, high PE stocks have under performed low PE ratio stocks. In fact, it is this consistent under performance of high PE stocks that has led to the value investing bias that you often see in both academic and practitioner research.

The Growth Investors' Case

Given this sorry performance, what you might wonder attracts investors to this strategy? The answer lies in cycles. There have been extended time periods where high PE stocks seem to outperform low PE stocks. For instance, growth investing seems to do much better when the earnings growth in the market is low and value investing tends to do much better when earnings growth is high. In Figure 7.2, you can see the difference between a low PE and a high PE portfolio and the growth in earnings in each period:

Figure 7.2: Relative Performance of Growth and Value versus Earnings Growth

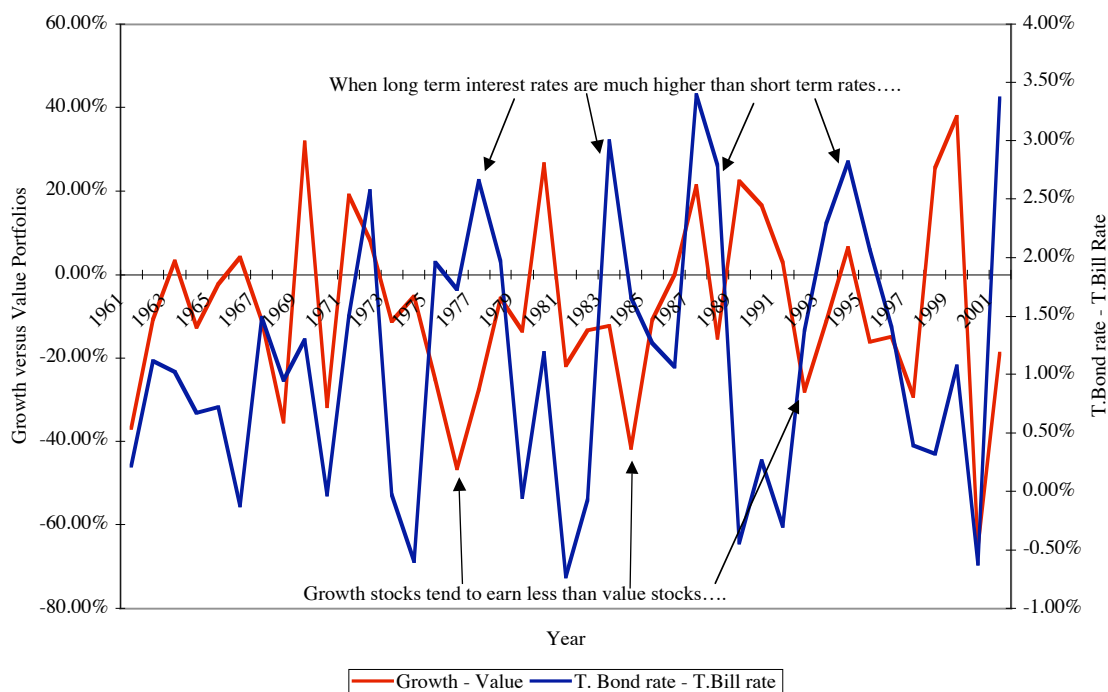


Data from Fama/French. The difference in annual returns between stocks with the highest PE ratios (growth stocks) and stocks with lowest PE ratios (value stocks) is reported in the figure.

The performance of growth stocks versus value stocks is measured by looking at the difference between the returns earned on a portfolio of stocks in the top ten percent in terms of PE (growth stocks) and a portfolio of stocks in the lowest ten percent (value stocks). Thus, a positive value indicates that high PE stocks outperformed low PE stocks in that year. Growth investing does best in years when earnings growth is low. This may be due to the fact that growth stocks are more desirable in these periods, because they are scarcer; if earnings growth is low for the market, there will be fewer companies with high expected earnings growth. By the same token, when all companies are reporting high earnings growth, investors seem to be unwilling to pay a premium for growth.

Growth investing also seems to do much better when long-term interest rates are close to or lower than short term interest rates (downward sloping yield curve) and value investing does much better when long term interest rates are higher than short term rates (upward sloping yield curve). Figure 7.3 presents the relationship between the slope of the yield curve and the performance of growth investing.

Figure 7.3: Relative Performance of Growth Stocks versus Yield Curve



Data from Fama/French. The difference in annual returns between stocks with the highest PE ratios (growth stocks) and stocks with the lowest PE ratios (value stocks) is plotted against the difference between long term and short term rates.

The most interesting evidence on growth investing, however, lies in the percent of active money managers who beat their respective indices. When measured against their respective indices, active growth investors seem to beat growth indices more often than active value investors beat value indices. In a paper on mutual funds in 1995, Burt Malkiel provides additional evidence¹ on this phenomenon. He notes that between 1981 and 1995, the average actively managed value fund outperformed the average actively managed growth fund by only 16 basis points a year, while the value index outperformed a growth index by 47 basis points a year. He attributes the 32 basis point difference to the contribution of active growth managers, relative to value managers.

Growth at a Reasonable Price (GARP) Strategies

There are many growth investors who would blanch at the strategy of buying high PE stocks. Their mission, they would argue, is to buy high growth stocks where growth is undervalued. To find these stocks, they have developed a number of strategies where you

¹ Malkiel, B.G., 1995, *Returns from Investing in Equity Mutual Funds 1971 to 1991*, Journal of Finance, v50, 549-572.

consider both expected growth and the current pricing of the stock. You will consider two of these strategies in this section – buying stocks with a PE less than the expected growth rate or buying stocks with a low ratio of PE to growth (called a PEG ratio).

PE less than Growth Rate

The simplest GARP strategy is to buy stocks that trade at a PE ratio less than the expected growth rate. Thus, a stock that has a PE ratio of 12 and an expected growth rate of 8% would be viewed as overvalued, whereas a stock with a PE of 40 and an expected growth rate of 50% would be viewed as undervalued. While this strategy clearly has the benefit of simplicity, it can be dangerous for several reasons.

- *Interest rate effect:* Since growth creates earnings in the future, the value of growth is a present value. In other words, the expected future earnings will be discounted back to the present by investors who want to assess its value. The value created by any given growth rate will be greater when interest rates are low (which makes the present values higher) than when interest rates are high. Thus, the stock with a PE of 40 and an expected growth rate of 50% when interest rates are 7% may find itself with a PE of 60 if interest rates drop to 5% but growth remains unchanged. It is not surprising, therefore, that portfolio managers who use this strategy not only find far more attractive stocks when interest rates are high but also find many emerging market stocks (where interest rates tend to be higher) to be bargains. The effect on interest rates on the relationship between PE and growth can be best illustrated by looking at the percent of firms that trade at less than their expected growth rate as a function of the treasury bond rate. In 1981, when treasury bond rates hit 12%, more than 65% of firms traded at PE ratios less than their expected growth rates. In 1991, when rates had dropped to about 8%, the percent of stocks trading at less than the expected growth rate also dropped to about 45%. By the end of the nineties, with the treasury bond rate dropping to 5%, the percent of stocks that traded at less than the expected growth rate had dropped to about 25%.
- *Growth Rate Estimates:* When this strategy is used for a large number of stocks, you have no choice but to use the growth rate estimates of others. In some cases, the consensus growth rates estimated by all analysts following a firm are obtained from a data service and used. When you do this, you have to wonder both about the differences in the quality of the growth estimates across different analysts and the comparability. Given that these estimated growth rates are at most for five years, you may penalize companies that have expected growth for much longer periods by focusing just on the 5-year rate.

It is also possible that in low interest rate scenarios, very few stocks pass this screen and that you will end up with little to invest in.

PEG Ratios

An alternative approach that seems to offer more flexibility than just comparing the PE ratio to expected growth rates is to look at the ratio of the PE ratio to expected growth. This ratio is called the PEG ratio and is widely used by analysts and portfolio managers following growth companies.

Defining the PEG Ratio

The PEG ratio is defined to be the price earnings ratio divided by the expected growth rate in earnings per share:

$$\text{PEG ratio} = \frac{\text{PE ratio}}{\text{Expected Growth Rate}}$$

For instance, a firm with a PE ratio of 40 and a growth rate of 50% is estimated to have a PEG ratio of 0.80. There are some who argue that only stocks with PEG ratios less than one are desirable, but this strategy is equivalent to the strategy of comparing the PE to the expected growth rate.

Consistency requires the growth rate used in this estimate be the growth rate in earnings per share. Given the many definitions of the PE ratio, which one should you use to estimate the PEG ratio? The answer depends upon the base on which the expected growth rate is computed. If the expected growth rate in earnings per share is based upon earnings in the most recent year (current earnings), the PE ratio that should be used is the current PE ratio. If it based upon trailing earnings, the PE ratio used should be the trailing PE ratio. The forward PE ratio should generally not be used in this computation, since it may result in a double counting of growth.² Building upon the theme of uniformity, the PEG ratio should be estimated using the same growth estimates for all firms in the sample. You should not, for instance, use 5-year growth rates for some firms and 1-year growth rates for others. One way of ensuring uniformity is to use the same source for earnings growth estimates for all the firms in the group. For instance, both I/B/E/S and Zacks are information services that provide consensus estimates from analysts of earnings per share growth over the next five years for most U.S. firms.

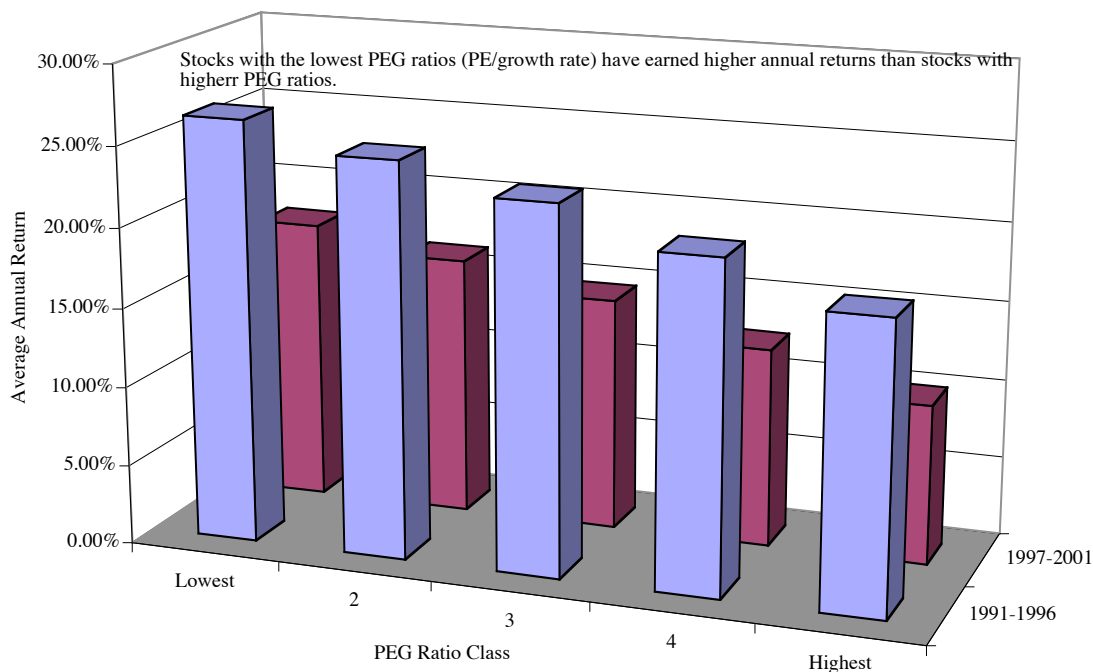
² If the forward earnings are high because of high growth in the next year, and this high growth results in a high growth rate for the next 5 years, you will understate your PEG ratio.

Using the PEG Ratio

How do analysts use PEG ratios? A stock with a low PEG ratio is considered cheap, because you are paying less for the growth. It is viewed as a growth neutral measure that can be used to compare stocks with different expected growth rates. In a study concluded in 1998, Morgan Stanley found that a strategy of buying stocks with low PEG ratios yielded returns that were significantly higher than what you would have made on the S&P 500. They came to this conclusion by looking at the 1000 largest stocks on the U.S. and Canadian exchanges each year from January 1986 through March 1998, and categorizing them into deciles based upon the PEG ratio. They found that the 100 stocks with the lowest PEG ratios earned an annual return of 18.7% during the period, much higher than the market return of about 16.8% over the period. While no mention was made of risk adjustment, Morgan Stanley argued that the return difference was larger than could be justified by any risk adjustment.

This study was updated to examine how this strategy would have done from 1991 to 2001, creating five portfolios at the end of each year based upon the PEG ratio and examining the returns in the following year. Figure 7.4 summarizes the average annual returns on PEG ratios classes in the 1991-1996 and 1997-2001 time periods.

Figure 7.4: PEG Ratios and Annual Returns



Data from Value Line. Stocks were categorized based upon the PEG ratios at the start of each year (PE divided by expected growth rate in earnings over the next five years).

A strategy of investing in low PEG ratio stocks would have generated an average return about 3% higher than the average returns on a high PEG ratio portfolio, before adjusting for risk, during both time periods. Before you decide to adopt this strategy, though, this analysis found that low PEG ratio stocks are, on average, about 20% riskier than high PEG ratio stocks. In fact, adjusting the average returns on these portfolios for risk eliminates all of the excess returns.

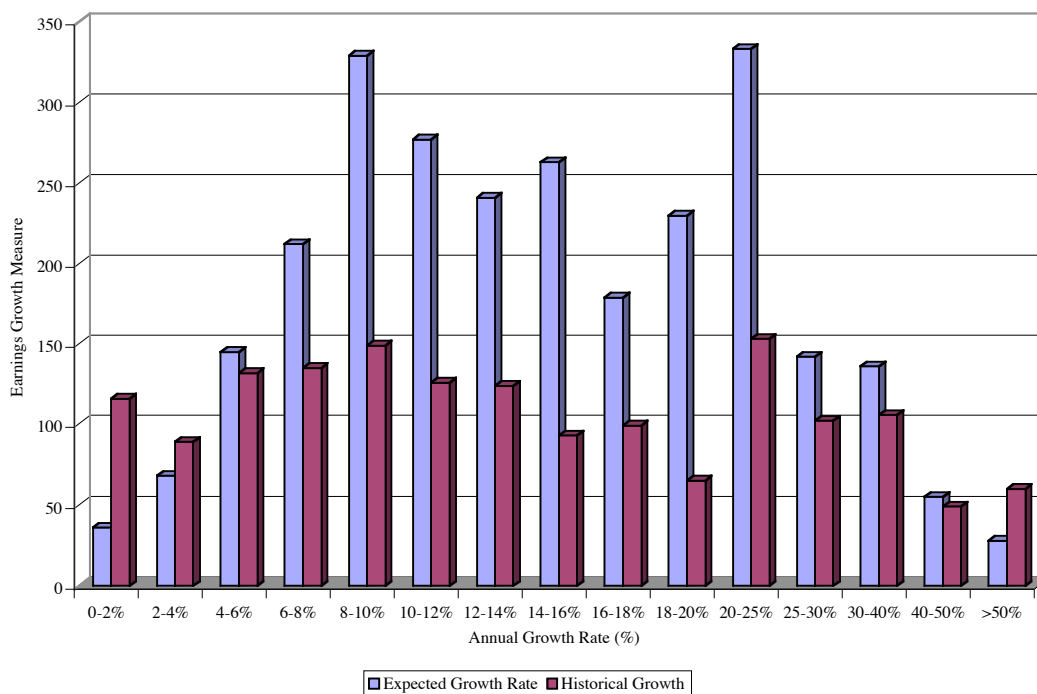
Crunching the Numbers

How different are growth rates across the market and what is a high growth rate? To answer these questions, you will need to look at the entire market and look at both past growth in earnings and expected future earnings growth rates. A legitimate follow up question to this would be to wonder how the market prices growth; this question is answered by comparing the PE ratios for companies with different expected growth rates.

Across the Market

In a market as large and diverse as the United States, it should come as no surprise that there are large differences in earnings growth across companies. This is true whether you look at past growth in earnings (historical growth) or at expected future growth. In Figure 7.5, you can see the distribution of earnings growth across U.S. companies for both past and future growth in earnings per share in early 2002.

Figure 7.5: Earnings Growth: Past and Future



Data from Value Line. Past earnings growth is growth in earning per share over previous five years. Expected earnings growth is from analyst estimates.

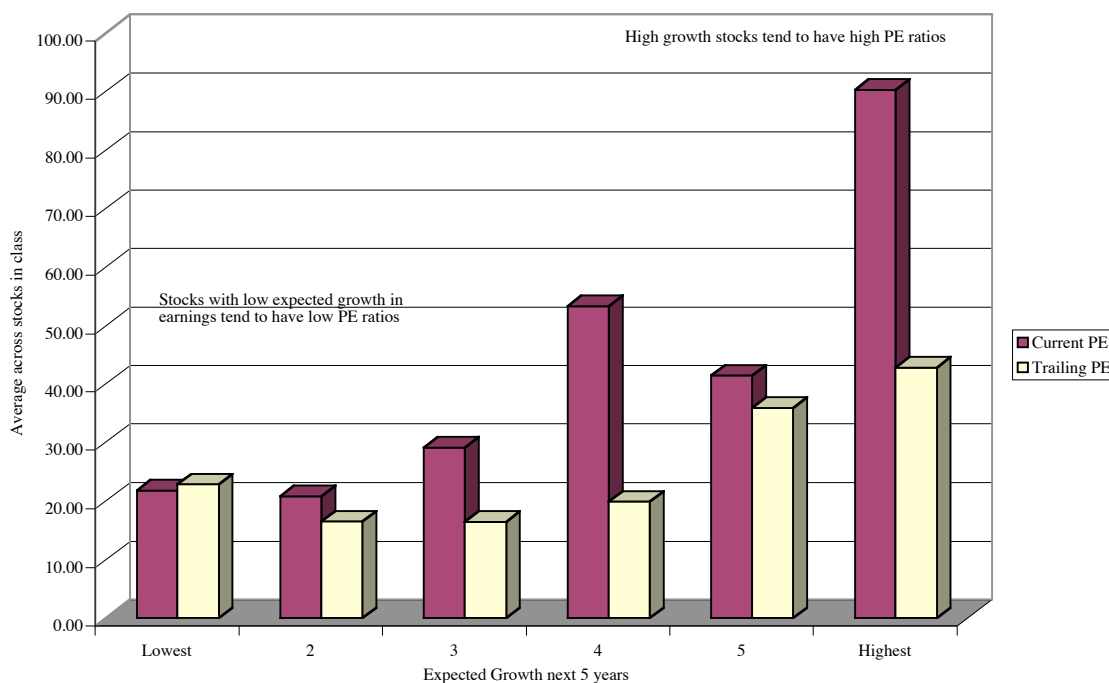
The expected earnings growth rates are obtained from I/B/E/S, a data service that reports on analyst forecasts, and represents the projected annual growth rate in earnings per share over the next five years. The median projected earnings growth rate is about 15% but there are firms with projected growth rates in excess of 50%. The past growth rate is the growth in earnings per share from 1997 to 2001 and the median for this growth rate is about 12%. There are a large number of firms where you cannot compute one or more of these growth rates. For instance, you cannot obtain projected growth rates for firms that are not tracked by analysts – smaller, less liquid firms are particularly susceptible to this problem. Similarly, you cannot estimate historical growth rates for firms with negative earnings per share or for firms that have not been listed for five years.

These growth rates do change over time, as both the economy and the market changes. During the economic boom period of the late 1990s, earnings growth rates rose across the spectrum, but the rise was greatest for technology stocks. A stock with expected earnings growth of 25% a year for the next 5 years may not have made the cut as a high growth stock during this period. In early 2003, after 3 years of economic stagnation and in much more subdued financial markets, a stock with earnings growth of 15% a year for the next five years would have qualified as a high growth stock.

The Value of Growth

Given the differences in earnings growth across U.S. companies chronicled in the last section, how does the market value these differences? Even if you accept the conventional wisdom that higher growth companies have higher prices for any given level of current earnings, you are still faced with the question of how much higher. To answer this question, companies were categorized into six classes based upon projected earnings growth over the next five years and then the average price earnings ratios – current and trailing – were estimated for firms in each class in early 2002. The results are reported in Figure 7.6. The market clearly values expected earnings growth, since high growth companies have substantially higher PE ratios than low growth companies.

Figure 7.6: PE Ratios and Projected Growth -US Stocks in October 2002



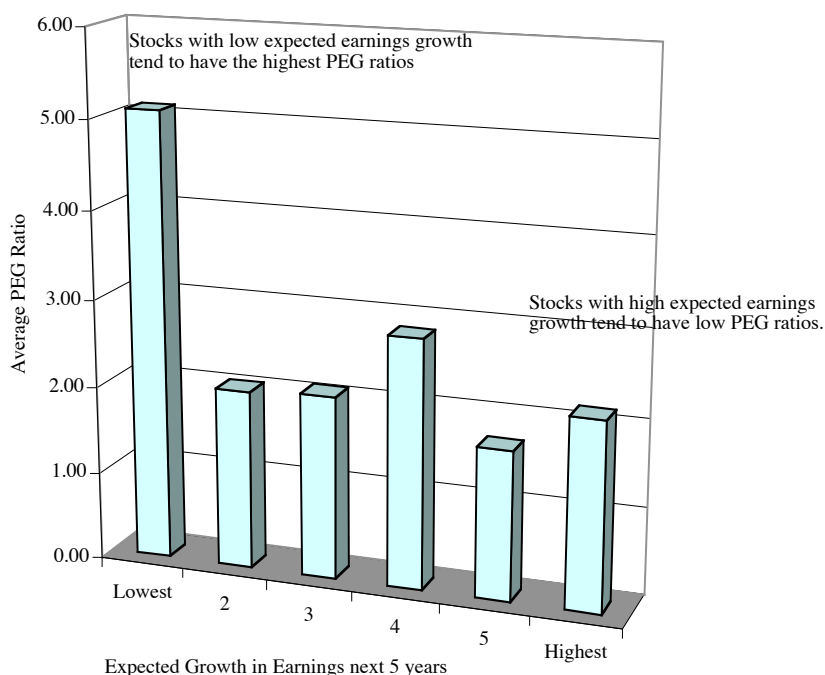
Data from Value Line. The expected growth rate in earnings per share is for the next five years and is from analyst estimates. The PE ratio is a current PE.

Why do these pricing differences matter? If you adopt a strategy of buying high earnings growth companies, you are likely to be paying very high multiples of earnings when you buy them. Even if the earnings growth comes to fruition, it is not clear that you will come out ahead as an investor because of the rich pricing.

As noted in the last section, you can look for companies that trade at low PE ratios, relative to their expected growth rate. This low PEG ratio can be viewed as “growth at a reasonable price.” In Figure 7.7, the average PEG ratios are reported for the six growth

classes used to analyze PE ratios in Figure 7.6. Unlike PE ratios, higher growth companies do not have higher PEG ratios. In fact, there is a tendency for PEG ratios to become lower as expected growth increases and not higher. This is because the price does not increase proportionately as growth increases; as the growth rate doubles from 10% to 20%, the PE increases but it does not double. However, it is the lowest growth stocks where this bias in PEG ratios is most visible; note that PEG ratios are more than twice as high as they are for the highest growth companies.

Figure 7.7: PEG Ratios by Growth Class



Data from Value Line. Stocks were categorized based upon expected earnings growth over next 5 years into five classes. The average PEG ratios of firms in each class is reported.

A High Growth Portfolio

As Figure 7.6 makes clear, investing in a portfolio of companies with high earnings growth can expose you to the serious danger of overpaying. To avoid this problem, a portfolio of high growth companies was created using two cutoff criteria:

- ❑ Expected growth in earnings per share over next five years > 15%: This will eliminate any firms with negative earnings and also firms that are not tracked by analysts.
- ❑ PEG ratios < 0.5: By restricting the PEG ratio, you reduce the likelihood of overpaying for stocks.

The resulting portfolio of 98 companies is listed in Table 7.3. The portfolio is surprisingly diverse and includes companies from 31 different businesses. The key question, though, is whether there are hidden problems that you might be confronted with in this portfolio.

Table 7.3: High Growth Firms with Low PEG Ratios- US in October 2002

Company Name	Ticker Symbol	Industry	Company Name	Ticker Symbol	Industry
Optical Communication Prods	OCPI	TELEQUIP	AmeriCredit Corp.	ACF	FINANCL
Petroleum Geo ADR	PGO	OILFIELD	ClearOne Communications Inc	CLRO	TELEQUIP
Mail-Well Inc.	MWL	OFFICE	TTM Technologies Inc	TTMI	ELECTRNX
Carrizo Oil & Gas	CRZO	OILPROD	First Cash Inc.	FCFS	FINANCL
SRI/Surgical Express Inc	STRC	MEDSUPPL	Wet Seal `A'	WTSLA	RETAILSP
Houston Expl Co	THX	OILPROD	Flowserve Corp.	FLS	MACHINE
Comtech Telecomm.	CMTL	TELEQUIP	Charlotte Russe Holding Inc	CHIC	RETAILSP
United Rentals	URI	MACHINE	Newpark Resources	NR	OILFIELD
Ryland Group	RYL	HOMEBUILD	QLT Inc.	QLT.TO	DRUG
HEALTHSOUTH Corp.	HRC	MEDSERV	Sunrise Asst. Living	SRZ	MEDSERV
Brigham Exploration Co	BEXP	OILPROD	Smart & Final	SMF	GROCERY
Skechers U.S.A.	SKX	SHOE	CryoLife Inc.	CRY	MEDSUPPL
Rockford Corporation	ROFO	ELECTRNX	Ectel Limited	ECTX	TELESERV
Metro One Telecom	MTON	INDUSRV	Gulfmark Offshore	GMRK	MARITIME
Centex Corp.	CTX	HOMEBUILD	Ace Cash Express Inc.	AACE	FINANCL
Acclaim Entertainment	AKLM	ENT TECH	Hanover Compressor	HC	OILFIELD
Nash Finch Co.	NAFC	FOODWHOL	Steelcloud Co	SCLD	COMPUTER
Tweeter Home	TWTR	RETAILSP	Grey Wolf Inc.	GW	OILFIELD
Quaker Fabric	QFAB	TEXTILE	MEDAMICUS INC	MEDM	MEDSUPPL
Radiologix Inc	RGX	MEDSERV	AsiaInfo Holdings Inc	ASIA	INTERNET
Gadzooks Inc	GADZ	RETAILSP	Amedisys Inc	AMED	MEDSERV
D & K Healthcare Resources	DKWD	DRUGSTOR	Sanchez Computer Assoc	SCAI	SOFTWARE
MSC.Software	MNS	SOFTWARE	TRC Cos.	TRR	ENVIRONM
Lennar Corp.	LEN	HOMEBUILD	Administaff Inc	ASF	HUMAN
Entegris Inc	ENTG	SEMICON	Nautilus Group Inc.	NLS	RETAILSP
Varian Semiconductor Equip	VSEA	SEMICON	Performance Tech Inc	PTIX	TELESERV
TTI Team Telecom Intl	TTIL	TELEFGN	Advent Software Inc	ADVS	SOFTWARE
Seitel Inc.	SEI	INFOSER	Rubio's Restaurants Inc	RUBO	RESTRNT
XETA Corp.	XETA	TELEQUIP	U.S. Energy Sys Inc	USEY	UTILEAST
Global Power Equipment Group	GEG	MACHINE	NVIDIA Corp.	NVDA	SEMICON
Norstan Inc.	NRRD	TELESERV	Superior Energy Svcs	SPN	OILFIELD
Innotrac Corp	INOC	INDUSRV	Famous Dave's of America	DAVE	RESTRNT
Orthodontic Centers	OCA	MEDSERV	First Horizon Pharmaceutical	FHRX	DRUG
Shaw Group	SGR	METALFAB	Integra LifeSciences Corp	IART	MEDSUPPL
Sportsmans Guide Inc	SGDE	RETAILSP	Culp Inc.	CFI	TEXTILE
Green Mountain Pwr.	GMP	UTILEAST	Fischer Imaging Corp.	FIMGE	MEDSUPPL
NVR Inc.	NVR	HOMEBUILD	Sierra Pacific Res.	SRP	UTILWEST
Microsemi Corporation	MSCC	ELECTRNX	Edge Petroleum	EPEX	OILPROD
Universal Electronics	UEIC	ELECTRNX	Tripos Inc	TRPS	SOFTWARE
Micromuse Inc	MUSE	SOFTWARE	National-Oilwell Inc	NOI	OILFIELD
Sonic Automotive	SAH	RETAILSP	University of Phoenix Online	UOPX	EDUC
Somera Communications Inc	SMRA	TELEQUIP	PAREXEL Int'l	PRXL	DRUG
Ohio Casualty	OCAS	INSRPTY	Century Casinos Inc	CNTY	HOTELGAM
Meridian Resource Corp	TMR	OILINTEG	Cholestech Corp.	CTEC	MEDSUPPL
LTX Corp.	LTX	INSTRMNT	Lam Research	LRCX	SEMI-EQP
Fleming Cos.	FLM	FOODWHOL	Warrantech Corp.	WTEC	INDUSRV
EXFO Electro-Optical Engr	EXFO	TELESERV	McDermott Int'l	MDR	DIVERSIF
Atlantic Coast Airlines	ACAI	AIRTRANS	DaVita Inc.	DVA	MEDSERV
Mobile Mini Inc	MINI	METALFAB	Labor Ready Inc	LRW	HUMAN

The Rest of the Story

There are three potential dangers in growth investing strategies. The first is that finding companies where growth in earnings will be high in future periods may be difficult to do. Neither past growth nor analyst estimates of growth seem to be reliable forecasters of expected growth in earnings. The second problem relates back to a point made at the beginning of the chapter; growth can destroy value if it is generated by investing in projects with low returns. Third, you often find that high growth companies are also exposed to high risk; the benefits of growth may very well be wiped out by the presence of high risk.

Identifying growth companies

You generally look at past growth in earnings or analyst estimates of growth in earnings in the future when you are trying to identify companies that will have high growth in earnings in the future. Unfortunately, both measures have their limitations when it comes to this task.

Past and Future Growth in Earnings

Is the growth rate in the past a good indicator of growth in the future? Not necessarily. Past growth rates are useful in forecasting future growth, but there are two problems.

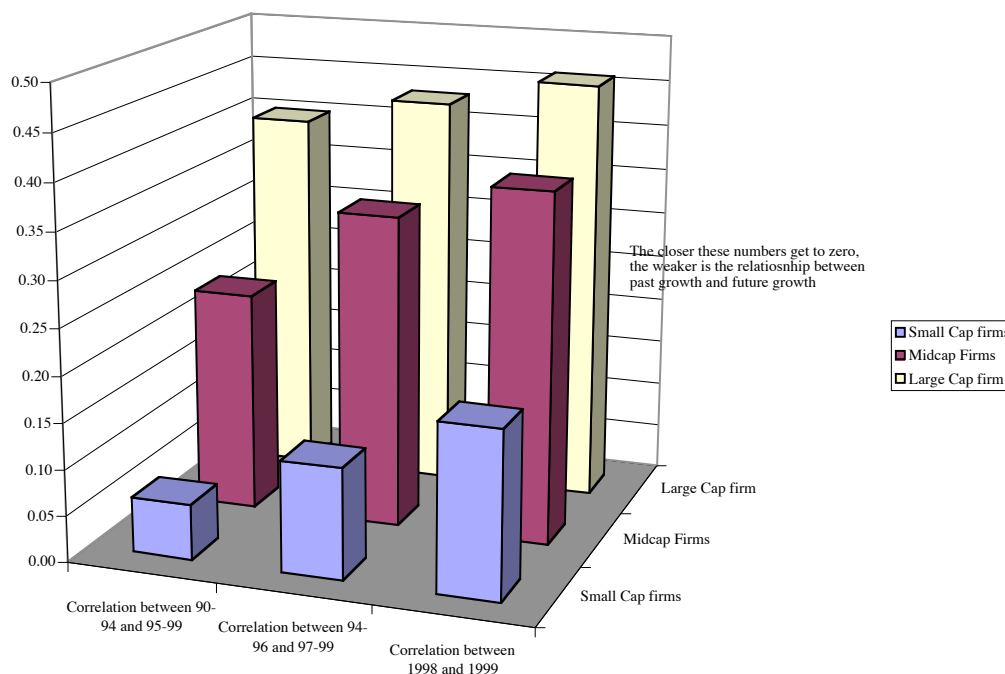
- Past growth rates are extremely volatile and are not very good predictors of future growth. In an examination of earnings growth at U.S. companies in the prior decade in 1960, Little coined the term "Higgledy Piggledy Growth" because he found little evidence that firms that grew fast in one period continued to grow fast in the next period.³ In the process of examining the relationship between growth rates in earnings in consecutive periods of different length, he frequently found negative correlations between growth rates in the two periods and the average correlation across the two periods was close to zero (0.02).⁴ If past growth in earnings is not a reliable indicator of future growth at many firms, it becomes even less so at smaller firms. The growth rates at smaller firms tend to be even more volatile than growth rates at other firms in the market. The correlation between growth rates in earnings

³ Little, I.M.D., 1962, *Higgledy Piggledy Growth*, Institute of Statistics, Oxford.

⁴ A correlation of 1 would indicate that companies with high earnings growth in the last period can be guaranteed to have earnings growth in the next period. A zero correlation indicates no relationship whereas a negative correlation suggests that high earnings growth are more likely to be followed by low earnings growth.

in consecutive time periods (five-year, three-year and one-year) for firms in the United States, categorized by market value, is reported in Figure 7.8.

Figure 7.8: Correlations in Earnings Growth by Market Capitalization



Data from Compustat. The correlation is computed between earnings in consecutive time periods.

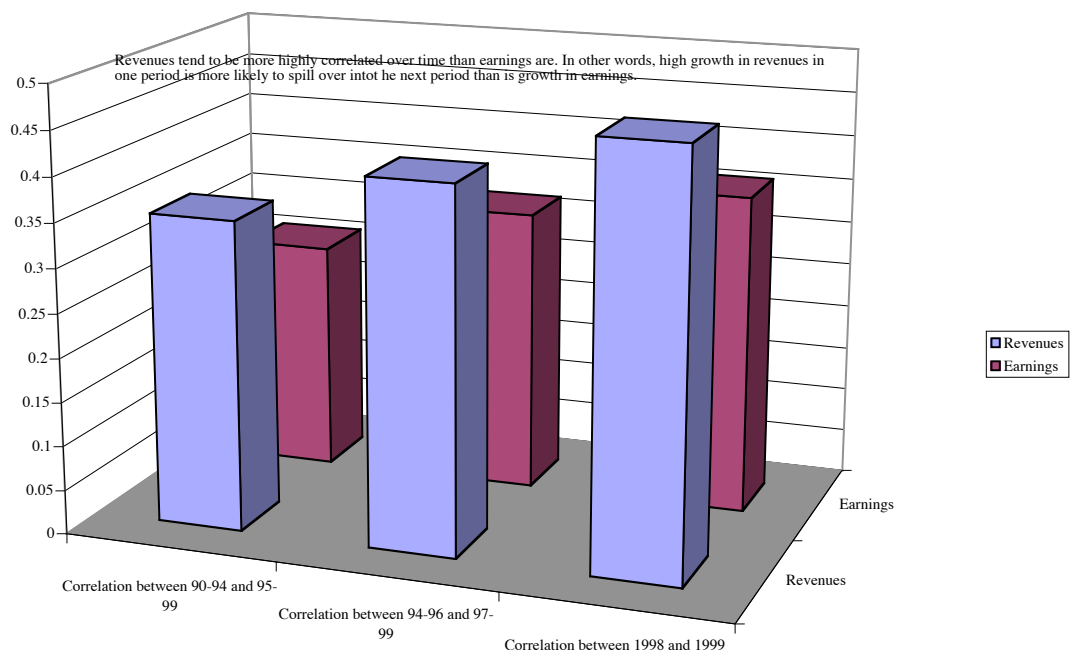
While the correlations tend to be higher across the board for one-year growth rates than for 3-year or 5-year growth rates in earnings, they are also consistently lower for smaller firms than they are for the rest of the market. This would suggest that you should be more cautious about using past growth in earnings as a forecast of future growth at these firms.

- The second problem is that there is earnings growth rates at firms tends to revert back the average for the market. In other words, companies that are growing fast will see their growth rates decline towards the market average whereas below average growth companies will see their growth rates increase. This tendency is chronicled by Dreman and Lufkin who track companies in the highest and lowest earnings growth classes for five years after the portfolios are formed. While the highest earnings growth companies have an average growth rate which is 20% higher than the average growth rate for the lowest earnings growth companies in the year the portfolio is formed, the difference is close to zero five years later.

If past earnings growth is not a reliable indicator of future earnings growth, what are the alternatives? One is to use analyst forecasts of growth that will be considered in the next

section, but this is an option only available for firms that are tracked by analysts. The other is to use past revenue growth as your measure of growth rather than earnings growth. In general, revenue growth tends to be more persistent and predictable than earnings growth. This is because accounting choices have a far smaller effect on revenues than they do on earnings. Figure 7.9 compares the correlations in revenue and earnings growth over one-year, three-year and five-year periods at U.S. firms.

Figure 7.9: Correlation in Revenues and Earnings



Data from Compustat. The correlations are computed only for those firms that have enough historical data on earnings and revenues.

Revenue growth is consistently more correlated over time than earnings growth. The implication is that historical growth in revenues is a far more useful number when it comes to forecasting future growth than historical growth in earnings.

Consider the portfolio of high growth companies that was constructed at the last section. While this portfolio was constructed using analyst forecasts of growth in earnings, you could consider an additional test. If you accept the notion that companies with high revenue growth in the past are more likely to sustain growth in earnings in the future, you could screen the portfolio to eliminate firms that have had low revenue growth in the past. Using a cut off of 10% for revenue growth over in the last five years, you would eliminate 24 firms out of the portfolio of 98 firms.

Analyst Estimates of Growth

Value is ultimately driven by future growth and not by past growth. It seems reasonable to argue, therefore, that you would be better served investing in stocks where expected growth in earnings is high. Here, you do run into a practical problem. In a market as large as the United States, you cannot estimate expected growth rates for each firm in the market. Instead, you have to rely on analyst estimates of expected growth. That information, though, is freely accessible now to most investors and you could buy stocks with high expected growth rates in earnings. But will such a strategy generate excess returns?

Consider what you would need for this strategy to be successful. First, analysts have to be fairly proficient at forecasting long-term earnings growth. Second, the market price should not already reflect or overprice this growth. If it does, your portfolio of high growth companies will not generate excess returns. On both conditions, the evidence works against the strategy. When it comes to forecasting growth, analysts have a tendency to overestimate growth and the mistakes they make are highest for long-term forecasts. In fact, some studies find that using historical earnings growth can match or even outperform analyst estimates when it comes to long term growth. As for pricing growth, markets historically have been more likely to over price growth than under price it, especially during periods of high earnings growth for the market.

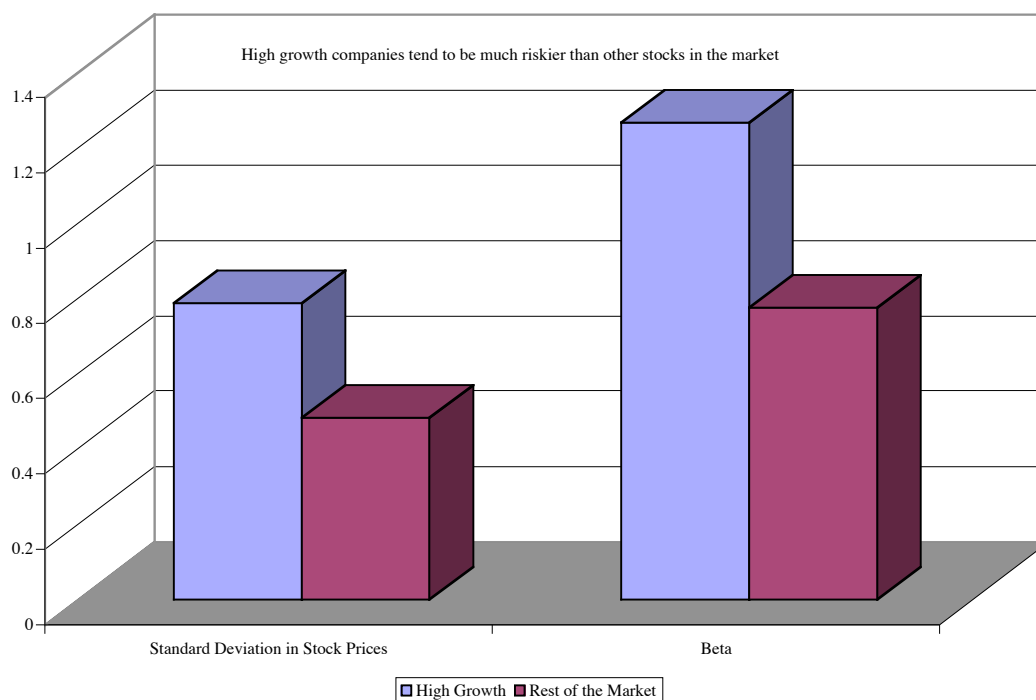
There is one potential screen that you could use to capture the uncertainty analysts feel about expected growth. The data services that track analyst forecasts report not only the average of analyst estimates of forecasted growth for a given company but also the degree of disagreement among analysts. It should stand to reason that the average growth rate will be much less reliable for firms where analysts disagree more about future growth than for firms where there is a high degree of consensus.

Risk

Not all growth stocks are risky, but growth stocks do tend to be more volatile and risky than stock in mature companies. This should not be surprising since you are investing on expectations of the future with growth companies whereas you are basing your analysis of mature companies on investments already made. The practical consequence for investors is that a portfolio of high growth companies can expose them to significant risk.

You can see the contrast between high growth and stable companies when you contrast how the portfolio of high growth companies constructed in the last section measures up against the rest of the market. Figure 7.10 presents the difference on two measures of risk – standard deviation in stock prices and beta over the previous three years – between the two groups of companies.

Figure 7.10: Risk Differences - High Growth vs Rest of the Market



Data from Value Line. The beta and standard deviation using three years of returns is computed for the firm in the portfolio and for the rest of the market.

High Growth companies are much more risky on both measures of risk. Their stock prices tend to be much more volatile and they have significantly higher betas.

You could screen the high growth portfolio to eliminate companies that have unduly high exposures to risk. If you eliminate firms that have standard deviations in stock prices that exceed 80% or betas that are greater than 1.25, you would reduce the portfolio from 74 firms (after the screen of past revenue growth > 10%) to 23 firms. The 23 firms are listed in Table 7.4 below:

Table 7.4; Firms that pass revenue growth and risk screens

Company Name	Ticker Symbol	Industry	Beta	Standard deviation	Revenue Growth
Sierra Pacific Res.	SRP	UTILWEST	0.61	47.99	13.00%
Ryland Group	RYL	HOMEBUILD	0.93	45.4	13.50%
TRC Cos.	TRR	ENVIRONM	1.15	61.85	14.00%
Centex Corp.	CTX	HOMEBUILD	1.01	42.05	14.00%
Newpark Resources	NR	OILFIELD	0.73	54.37	14.50%
Gulfmark Offshore	GMRK	MARITIME	0.95	65.34	15.50%

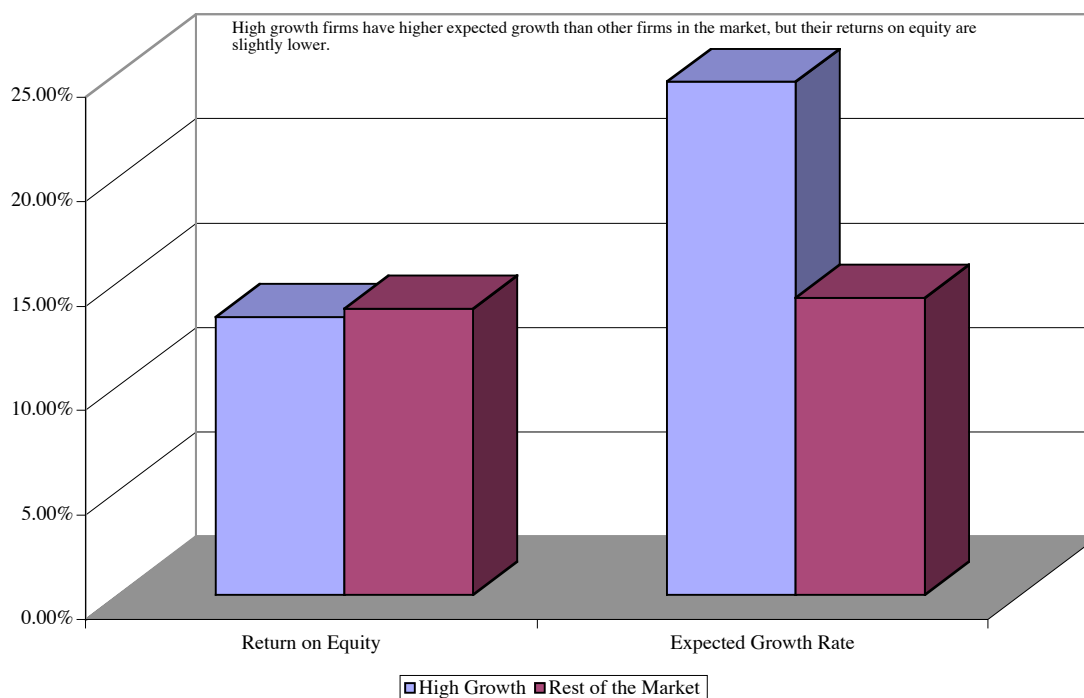
Mail-Well Inc.	MWL	OFFICE	1.44	70.75	16.50%
SRI/Surgical Express Inc	STRC	MEDSUPPL	-0.15	57.92	17.50%
Comtech Telecomm.	CMTL	TELEQUIP	0.96	72.59	18.50%
D & K Healthcare Resources	DKWD	DRUGSTOR	1.16	79.37	19.00%
Wet Seal `A'	WTSLA	RETAILSP	1.03	78.87	19.50%
Gadzooks Inc	GADZ	RETAILSP	0.81	65.15	19.50%
Ace Cash Express Inc.	AACE	FINANCL	0.32	35.22	21.00%
Lennar Corp.	LEN	HOMEBUILD	0.71	38.1	24.50%
Shaw Group	SGR	METALFAB	1.44	69.2	25.00%
Meridian Resource Corp	TMR	OILINTEG	0.94	70.82	25.50%
Houston Expl Co	THX	OILPROD	0.62	48.53	27.00%
Cholestech Corp.	CTEC	MEDSUPPL	1	75.77	29.00%
NVR Inc.	NVR	HOMEBUILD	0.59	49.11	34.00%
DaVita Inc.	DVA	MEDSERV	0.78	70.12	34.00%
Labor Ready Inc	LRW	HUMAN	-1.65	62.62	41.50%
QLT Inc.	QLT.TO	DRUG	1.21	72.38	52.50%
Famous Dave's of America	DAVE	RESTRNT	1.14	61.3	54.00%

Poor Quality Growth

In the section that related value and growth, it was noted that higher growth can sometimes destroy rather than create value, if the growth is generated by investing in assets that earn returns less than the costs of equity. A prudent investor should therefore consider not just the level of expected growth but also the quality of this growth.

The simplest measure of the quality of growth is the difference between the return on equity and the cost of equity. Other things remaining equal, you can argue that firms that earn higher returns on equity have higher quality growth than companies with lower returns on equity. In Figure 7.11, the average return on equity earned by firms in the high growth portfolio in the most recent year is contrasted with the average return on equity earned by the rest of the market.

Figure 7.11: Quality of Growth: High Growth vs Rest of Market



Data from Compustat. The expected growth rate in earnings per share for the next five years is from analyst forecasts and the return on equity is the net income divided by the book value of equity.

On average, the high growth firms have a slightly lower return on equity than the rest of the market, which is surprising given the large advantage they have on expected growth rates. This suggests that there are firms in the high growth portfolio with low or negative returns on equity. If you added a condition that firms in the high growth portfolio would need to earn at least a 10% return on equity to be good investments, the portfolio of 23 firms listed in table 7.4 shrinks to 12 companies and they are listed in Table 7.5:

Table 7.5: Firms that pass revenue growth, risk and quality growth screens

Company Name	Ticker Symbol	ROE	Projected Growth Rate	Current PE	Sales Growth 5-Year	Beta Year	3-Std Dev 3-Year
Ryland Group	RYL	27.93%	15.50%	7.21	13.5	0.93	45.4
Centex Corp.	CTX	18.65%	17.00%	7.02	14	1.01	42.05
TRC Cos.	TRR	14.03%	25.00%	12.37	14	1.15	61.85
Gulfmark Offshore	GMRK	20.39%	25.00%	7.09	15.5	0.95	65.34
D & K Healthcare Resources	DKWD	10.81%	18.43%	5.86	19	1.16	79.37

Ace Cash Express Inc.	AACE	15.28%	25.00%	8.31	21	0.32	35.22
Lennar Corp.	LEN	26.96%	18.50%	8.54	24.5	0.71	38.1
Shaw Group	SGR	14.42%	20.00%	8.90	25	1.44	69.2
Houston Expl Co	THX	12.33%	15.00%	7.49	27	0.62	48.53
Cholestech Corp.	CTEC	15.53%	40.00%	14.52	29	1	75.77
DaVita Inc.	DVA	21.74%	52.00%	15.90	34	0.78	70.12

Lessons for Investors

A strategy of investing in high growth companies, based solely upon past earnings growth or analyst projections of growth can be dangerous for several reasons. You will need to screen this portfolio to make sure that you are not overpaying for the growth, that the growth can be sustained, that the risk exposure is not excessive and that it is high quality growth. To accomplish these objectives, the universe of U.S. companies was screened using the following criteria:

- *Growth Screens:* Only companies with projected earnings growth greater than 15% over the next 5 years were considered for the portfolio. This does eliminate smaller firms that are not followed by analysts but expected future growth is too critical an input for this strategy to be based solely on past earnings growth.
- *Pricing Screens:* Only companies with PE ratios less than the expected earnings growth (PEG <1) were considered for this portfolio. While this is not as strict a screen as the one used earlier in this chapter, it conforms to a widely used standard for pricing (i.e., that stocks that trade at PE ratios that are less than expected growth rates are underpriced)
- *Sustainability of Growth:* While there is no simple test for sustainability, the evidence seems to indicate that companies with high revenue growth in the past are more likely to sustain this growth in the future. Consequently, only firms with revenue growth of more than 10% a year over the last five years were considered.
- *Risk Exposure:* To keep the risk in the portfolio under reasonable bounds, only firms with betas less than 1.25 and standard deviations in stock prices less than 80% were considered for the analysis.
- *High Quality Growth:* Only firms with returns on equity that exceeded 15% in the most recent financial year were considered for the final portfolio. This is stricter than the standard used in the last section but high quality growth is an important factor in the ultimate success of this strategy.

The portfolio of 27 stocks that made it through these screens in January 2003 is listed in the appendix.

Conclusion

Every investor dreams about buying a young growth company and riding the growth to huge returns. There is no denying that growth can add value to a company but it is not always true that higher growth translates into higher value. The value of a company will increase as expected growth increases, but only if that growth is generated by investing in assets that earn high returns on equity.

Even if a company's growth is expected to be value generating, its stock may not be a good investment if the market has over priced growth. In other words, even the best growth company can be a bad investment if you pay too high a price and if the actual growth does not measure up to your high expectations. The essence of successful growth investing is to buy high growth companies at reasonable prices. In fact, a prudent growth investor will consider not only the magnitude of expected growth but also the sustainability of this growth rate – there is a tendency for high growth rates to converge towards normal levels over time – and the quality of this growth. Since growth companies tend to be risky, you will also need to control for risk in designing your portfolio.

Appendix: High Growth Companies with sustainable, high quality growth, low risk and low pricing

<i>Company Name</i>	<i>Ticker Symbol</i>	<i>Stock Price</i>	<i>Current P/E Ratio</i>	<i>Beta</i>	<i>Std Dev 3-Year</i>	<i>Proj EPS Growth Rate</i>	<i>Return on Common Equity</i>	<i>Sales Growth 5-Year</i>
AutoZone Inc.	AZO	70.65	15.1	0.95	39.43	18	62.12	24.5
Barr Labs.	BRL	65.09	16.6	0.95	46.9	19	31.55	20.5
Bio-Rad Labs. 'A'	BIO	38.7	13.58	0.85	52.12	25.5	15.56	12
Biovail Corp.	BVF	26.41	13.34	1.35	54.86	23.5	17.13	46.5
Block (H&R)	HRB	40.2	13.01	1.1	33.48	15.5	31.72	24
Cardinal Health	CAH	59.19	18.5	0.9	28.13	19	18.98	12
Catalina Marketing	POS	18.5	15.68	1.05	39.32	16	24.27	25
CEC Entertainment	CEC	30.7	11.9	0.85	40.47	16	18.96	13
Centex Corp.	CTX	50.2	6.04	1.2	41.03	17	18.05	14
Darden Restaurants	DRI	20.45	13.91	0.8	40.93	16	20.92	11
DaVita Inc.	DVA	24.67	12.21	0.95	69.9	59.5	19.47	34
Enzon Inc.	ENZN	16.72	13.38	1.75	62.27	41	19.28	15
Express Scripts 'A'	ESRX	48.04	16.57	1.05	58.35	26.5	15.03	57
GTECH Holdings	GTK	27.86	11.1	0.85	39.63	18	41.81	11
Harrah's Entertain.	HET	39.6	12.65	1.05	32.54	19	17.13	15
Health Mgmt. Assoc.	HMA	17.9	16.27	0.95	44.11	17.5	15.55	22
Lennar Corp.	LEN	51.6	6.44	1.3	38.39	18.5	25.18	24.5
Lincare Holdings	LNCR	31.62	16.47	0.75	50.33	21.5	19.6	21.5
Lowe's Cos.	LOW	37.5	19.95	1.25	40.22	22	15.33	17.5
Manitowoc Co.	MTW	25.5	11.18	1.2	44.52	15.5	18.52	22
NVR Inc.	NVR	326.5	8.55	1.2	46.76	21	67.82	34
Oxford Health Plans	OHP	36.45	9.8	1.25	42.81	19	63.38	13
Ryland Group	RYL	33.35	5.21	1.35	45.55	15.5	24.24	13.5
Sonic Corp.	SONC	20.49	16.01	0.8	31.72	18	20.67	19

UnitedHealth Group	UNH	83.5	17.77	0.75	25.52	23.5	23.46	30
Universal Health Sv. `B'	UHS	45.1	15.34	0.75	41.17	19	16.21	19
WellPoint Health Ntwks	WLP	71.16	14.67	0.8	29.66	21.5	19.44	30.5