

Eads & Heald Investment Counsel

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Equity Investing

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Chapter 10: Inflation and Interest Rates vs. PE

We need to define the term price/earnings (PE) ratio. This factor is key to understanding the workings of stocks. To simplify, a company has net earnings. Divided by the number of shares of stock outstanding we have earnings per share. A price/earnings ratio is the multiplier times current earnings per share to arrive at the current stock price per share. It is a valuation placed on current earnings. A PE ratio is not simply a fallout of whatever happens to be the current price per share divided by the current earnings per share. The PE is deliberately determined by the mass of all investors. It should be noted that some investors cast their vote on a fair PE for a stock better informed than other investors when they purchase a stock. The fallout factor is the stock price. The price results from multiplying the PE times earnings per share. Later, I will go into some detail as to how I believe investors determine a fair PE for a stock. First, we need to consider some other ideas.

Conventional wisdom on Wall Street is that price/earnings ratios (PE's) are dramatically impacted by interest rates. To that belief I put forth Chart 1. Everything shown in this chart is for running 10 year time periods so as to smooth out year-to-year noise and allow us to focus on trends. The top chart panel shows both long-term interest rates (high grade 20 year corporate bonds) and short-term interest rates (90 day Treasury Bills). The middle panel shows consumer price inflation and the bottom panel shows the PE for the Standard & Poor's 500 index.

First, let us examine the belief that PE's are largely determined by interest rates. A relationship is difficult to discern. Focus on the 30 year period 1950-1980. Both long and short interest rates steadily trended upward while PE's made a complete roundtrip from low to high and back to low. Some years ago on viewing these charts, the world renowned partners/strategists at a top Wall Street investment firm said to me that no one cares about these long-term trends. They stated that they have a difficult time looking out 6-12 months in their forecasting and that their clients were only looking out 1-2 years. Certainly, maintaining a shorter focus and avoiding longer trends is an advantage to a securities trading desk.

Regardless of your time range of interest you are riding on the PE trend curve. Over any given single year you may be trending up, trending down, topping or bottoming. Given the running 10 year trend picture of PE that spans over 120 years of data, only a very silly, ignorant or dishonest person would not have some interest in the determinants of this PE picture.

Throughout all of my work, two beliefs are very important. First, investors are always fighting the last battle. That is, they have a difficult time believing that a trend has altered direction. It seems to take 5-7 years for them to accept that a trend direction has changed. Second, it is the "perception" of something that rules and not necessarily what is actually happening at the time. An example of these two concepts would be the fact that inflation in the U.S. actually began relentlessly rising in the mid-1960's boosted by the spending on the Great Society, the Vietnam War and the Man on the Moon project. However, it took seven years and the oil embargo before investors accepted that inflation was truly a problem and they began adjusting stock PE's to this fact.

Now, look at the relationship between inflation and PE. A dramatic visual relationship exists. Of course, this is not scientific assurance that the trend in inflation helps to determine the trend in PE. However, the fact is that peaks in trend inflation are followed a few years later by a bottom in PE and, conversely, a bottom in inflation is followed a few years later by a peak in PE. The relationship is dramatic enough to attempt to construct a cause/effect model.

The belief that PE's are inversely related to interest rates is essentially based on the idea that higher interest rates pull money out of stocks and into fixed income investments. In the sense that a current stock price is the present value of future earnings, the discount rate (the rate used to bring future earnings back to present value) is directly tied to current interest rates. Thus, when interest rates go up, the present value of future earnings goes down. Conversely, when interest rates go down, the present value of future earnings goes up. In other words, PE is up when interest rates are low and PE is down when interest rates are high. Unfortunately, long-term history offers no support to this thesis.

How could it be that regardless of interest rates the trend in stock PE's seem to key off of inflation? Inflation makes a dollar in the future worth less than it would be worth with no inflation. When investors view a current stock price as the present value of a future stream of earnings, possibly they view inflation as the key factor in bringing future dollars back to a present value regardless of interest rates.

Granted, intuition might cause one to believe that when the lure of higher interest rates pulls money out of stocks, PE's should fall. However, it just may be that investors take their initial cue from inflation. That is, higher inflation leads investors to "expect" higher interest rates and lower inflation leads investors to "expect" lower interest rates. Whether or not interest rates actually follow inflation up and down may be academic if the "expectation" of a relationship exists and investors act on that belief. Or, it may just be that the discount rate used to discount a future stream of earnings and/or dividends back to present value is the rate of inflation as opposed to a key interest rate figure.

Let us pursue the belief that it is the perception of future inflation that serves as the discount rate in bringing future earnings back to present value in search of a fair PE. The question arises as to how far out into the future investors are willing to discount future earnings back to present value to determine a PE. Common sense would dictate that when investors are feeling generally optimistic they will be willing to look out further. Conversely, when they are troubled, they will look out a shorter time period. Of course, many factors can go into determining optimism or pessimism. My simple model here assumes that only the perception of future trend inflation determines how far out one discounts future earnings back to present value. That is, when inflation is assumed to be high (say, 10% like in the late 1970's) investors only discount out approximately 8 years. When inflation is assumed to be low (say, 1% like in the 1960's) investors discount out approximately 16 years.

Charts 2, 3 and 4 display some simplistic determinations of PE in three different inflation environments. Chart 2 follows \$1.00 in current earnings per share growing at 15% per year and having each future year's earnings brought back to present value using the assumed rate of inflation of 1% per year. Summing up 16 years of such earnings gives a present value of future earnings of \$57.34. If this is a fair current stock price then having started with \$1.00 of current earnings per share the fair PE is $\$57.34/\1.00 or a PE of 57.34. Divided by the 15% growth rate, it is considered that a fair PE is 3.82 times the earnings growth rate. In fact, this is where quality growth stocks (i.e., Nifty Fifty) went to by the early 1970's. Chart 4 shows the other extreme. Inflation is assumed at 10% per year and future earnings are only considered out through 8 years. The current fair PE is calculated to be 9.82 or .65 times the 15% growth rate. This is where quality growth stock PE's trended to by the late 1970's.

Chart 3 better represents where we may typically be in the process of determining a fair PE. With 3% inflation, 12 years are used and the fair PE is 1.76 times the growth rate. I would use a range of 1.5 to 2.0 times the growth rate.

Of course, the above model is very simplistic. No mention is made of the consistency of the earnings growth. That is, two companies could both have a 15% trend earnings growth rate. However, one could have a straight line trend growth while the other company could see its earnings bounce up and down year-to-year while still maintaining a 15% trend. Obviously, the more consistent grower should be accorded a higher PE all other things being equal.

Even with their simplicity, the views expressed above regarding the relationship of inflation and PE are quite profound and should prompt much more research in this direction if not immediately changing the focus from believing that interest rates determine PE's to one believing that the perception of future trend inflation is the key factor in the long-term trend of PE's.

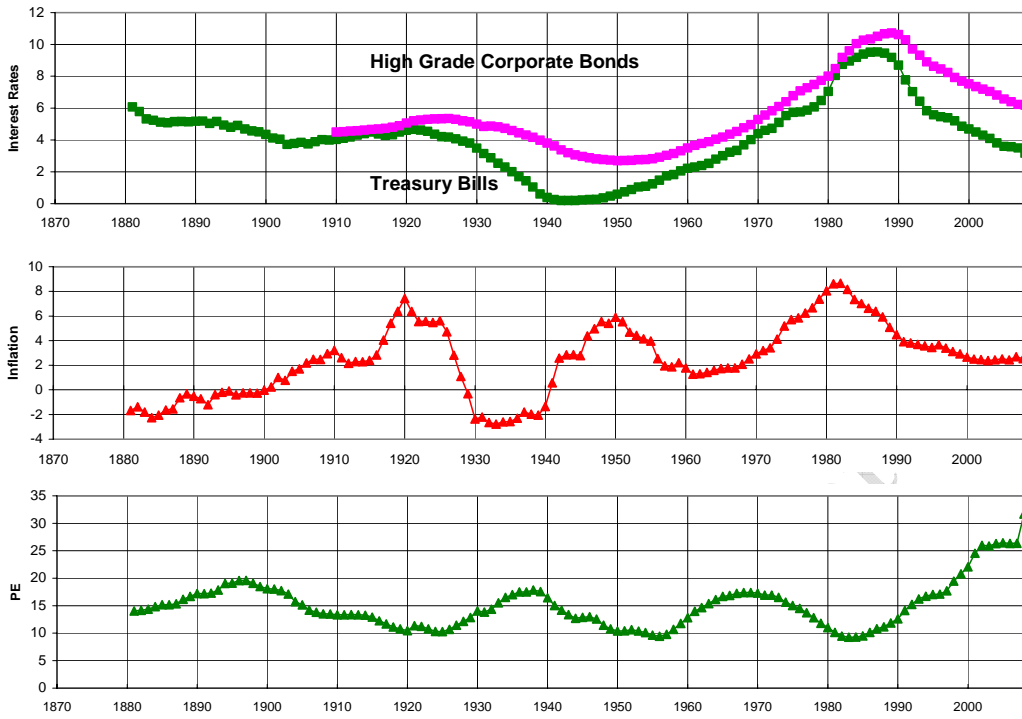
Chart 5 plots PE vs. inflation for four different growth rates. Note that for higher growth rates, the fair PE falls faster as inflation increases than is the case for lower growth rates. Conversely, as inflation falls, PE's increase more rapidly for faster growing companies. This chart helps to conceptually visualize what happened to the PE's of the Nifty Fifty growth stocks in the early 1970's as the perception of inflation went from nonexistent inflation to 3%, 4%, 5% and upward. However, the results in this chart have been altered

somewhat from what the equations in Charts 2, 3 and 4 would indicate. This was done to combine the equations theoretical results with empirical historical results. One could argue that the Nifty Fifty stocks were not overpriced in selling at PE's of 3-4 times their growth rates so long as inflation was perceived as nonexistent. However, as the perception of inflation markedly increased, PE's began a long slide.

Since one is not likely to be successful in predicting year-to-year PE ratios, it would seem that the more useful exercise would be to determine if one is in a long-term trend PE expansion or a long-term trend PE contraction. In long periods of PE expansion, growth stock PE's have great upside leverage while in long periods of PE contraction, they have great downside leverage. Although outside the scope of this chapter, this leverage effect can be easily demonstrated by discounting a stream of high growth rate earnings back to present value using a high discount rate versus a low discount rate. Start with unitized earnings of \$1 per share so that the resulting sum of all future earnings brought back to present value (i.e., price) divided by the current \$1 per share earnings is the PE ratio. The next time you run across a guru level strategist that says that PE's are controlled by interest rates, ask him to explain why history does not bear this out. Tell him that you are not so much interested in his theory of "what should be," but are much more interested in a thesis that jives with a long period of real life history. Don't let him off the hook until you get a satisfactory answer. Wall Street has an amazing blind spot on this matter. It is as if it would be heresy to not believe that PE's are controlled by interest rates. Believing that the long-term trend in interest rates controls the long-term trend in PE's is very much akin to believing that the world is flat and you will fall over the edge if you attempt to sail around the world. If everyone believes something, you appear a fool if you express a contrary view. In this instance, we have high resolution satellite photo reconnaissance of the world and we know that there is not a good correlation between interest rates and PE's.

As discussed elsewhere, a successful Wall Street strategist is one who garners big commissions for his firm. Weight is given to many factors in addition to being a seemingly adequate forecaster. Viewers are not attracted to certain TV weathermen because of accurate forecasts but because they are colorful, entertaining and are adept in engaging in mindless verbal prattle with the anchorperson. After all, a Wall Street strategist is in "show business." Image, not substance, is the key. Some will disparage long-term trend analysis by saying that investors are concerned about what will happen over the next year or two, not over the next decade. This is akin to being a rowboat on the middle of the ocean and saying that you do not care which way the tidal current is taking you. That is, you only care about the waves slapping against the sides of your boat. True, large waves can sink you and you must be mindful of them. But, to ignore the tidal drift, you have absolutely no control over your destiny. In other words, if a strong trend direction for PE's is in process and it may span 10-15 years in one direction, how can you ignore the trend and still be a knowledgeable investor? If the trend is 10-15 years in duration you would do well to clue in to what is happening.

Chart 1



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Chart 2

| | |
|-----------|------|
| INFLATION | 1 % |
| GROWTH | 15 % |

| Year | EPS Growth | | PE | PE/g |
|---------|------------|-------|-----------|-------------|
| | 15% | PV | | |
| 0 | 1.00 | 1.00 | | |
| 1 | 1.15 | 1.14 | | |
| 2 | 1.32 | 1.30 | | |
| 3 | 1.52 | 1.48 | | |
| 4 | 1.75 | 1.68 | | |
| 5 | 2.01 | 1.91 | | |
| 6 | 2.31 | 2.18 | | |
| 7 | 2.66 | 2.48 | | |
| 8 | 3.06 | 2.82 | | |
| 9 | 3.52 | 3.22 | | |
| 10 | 4.05 | 3.66 | | |
| 11 | 4.65 | 4.17 | | |
| 12 | 5.35 | 4.75 | | |
| 13 | 6.15 | 5.41 | | |
| 14 | 7.08 | 6.16 | | |
| 15 | 8.14 | 7.01 | | |
| 16 | 9.36 | 7.98 | | |
| 17 | 10.76 | 9.09 | | |
| 18 | 12.38 | 10.35 | | |
| 19 | 14.23 | 11.78 | | |
| 20 | 16.37 | 13.41 | | |
| | | | <u>PE</u> | <u>PE/g</u> |
| 5 Yrs. | | | 7.51 | 0.50 |
| 6 Yrs. | | | 9.68 | 0.65 |
| 7 Yrs. | | | 12.17 | 0.81 |
| 8 Yrs. | | | 14.99 | 1.00 |
| 9 Yrs. | | | 18.21 | 1.21 |
| 10 Yrs. | | | 21.87 | 1.46 |
| 11 Yrs. | | | 26.04 | 1.74 |
| 12 Yrs. | | | 30.79 | 2.05 |
| 13 Yrs. | | | 36.19 | 2.41 |
| 14 Yrs. | | | 42.35 | 2.82 |
| 15 Yrs. | | | 49.36 | 3.29 |
| 16 Yrs. | | | 57.34 | 3.82 |
| 17 Yrs. | | | 66.43 | 4.43 |
| 18 Yrs. | | | 76.77 | 5.12 |
| 19 Yrs. | | | 88.55 | 5.90 |
| 20 Yrs. | | | 101.96 | 6.80 |

Chart 3

| | |
|-----------|------|
| INFLATION | 3 % |
| GROWTH | 15 % |

| Year | EPS | | |
|---------|---------------|-----------|-------------|
| | Growth 15% | PV | |
| 0 | 1.00 | 1.00 | |
| 1 | 1.15 | 1.12 | |
| 2 | 1.32 | 1.25 | |
| 3 | 1.52 | 1.39 | |
| 4 | 1.75 | 1.55 | |
| 5 | 2.01 | 1.74 | |
| 6 | 2.31 | 1.94 | |
| 7 | 2.66 | 2.16 | |
| 8 | 3.06 | 2.41 | |
| 9 | 3.52 | 2.70 | |
| 10 | 4.05 | 3.01 | |
| 11 | 4.65 | 3.36 | |
| 12 | 5.35 | 3.75 | |
| 13 | 6.15 | 4.19 | |
| 14 | 7.08 | 4.68 | |
| 15 | 8.14 | 5.22 | |
| 16 | 9.36 | 5.83 | |
| 17 | 10.76 | 6.51 | |
| 18 | 12.38 | 7.27 | |
| 19 | 14.23 | 8.12 | |
| 20 | 16.37 | 9.06 | |
| | | <u>PE</u> | <u>PE/g</u> |
| 5 Yrs. | | 7.04 | 0.47 |
| 6 Yrs. | | 8.98 | 0.60 |
| 7 Yrs. | | 11.14 | 0.74 |
| 8 Yrs. | | 13.56 | 0.90 |
| 9 Yrs. | | 16.25 | 1.08 |
| 10 Yrs. | | 19.27 | 1.28 |
| 11 Yrs. | | 22.63 | 1.51 |
| 12 Yrs. | | 26.38 | 1.76 |
| 13 Yrs. | | 30.57 | 2.04 |
| 14 Yrs. | | 35.25 | 2.35 |
| 15 Yrs. | | 40.47 | 2.70 |
| 16 Yrs. | | 46.30 | 3.09 |
| 17 Yrs. | | 52.81 | 3.52 |
| 18 Yrs. | | 60.08 | 4.01 |
| 19 Yrs. | | 68.20 | 4.55 |
| 20 Yrs. | | 77.26 | 5.15 |

Chart 4

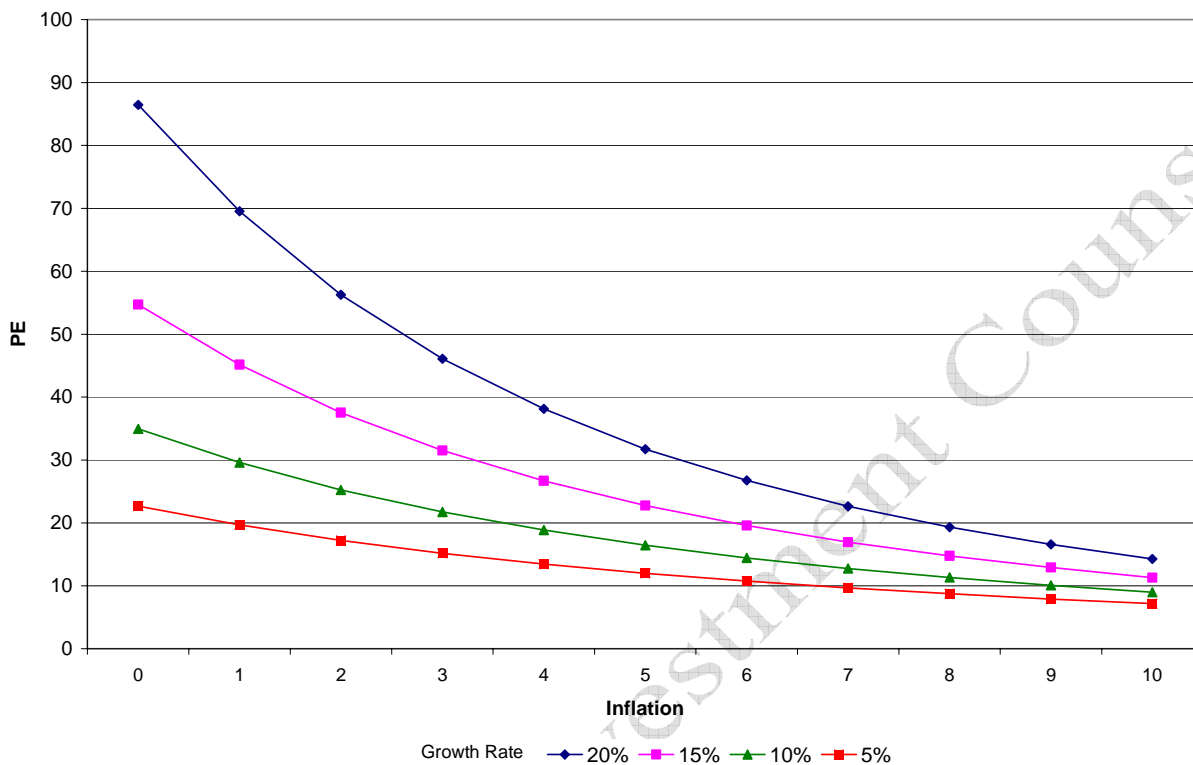
| | |
|-----------|------|
| INFLATION | 10 % |
| GROWTH | 15 % |

| Year | EPS Growth | |
|------|------------|------|
| | 15% | PV |
| 0 | 1.00 | 1.00 |
| 1 | 1.15 | 1.05 |
| 2 | 1.32 | 1.09 |
| 3 | 1.52 | 1.14 |
| 4 | 1.75 | 1.19 |
| 5 | 2.01 | 1.25 |
| 6 | 2.31 | 1.31 |
| 7 | 2.66 | 1.37 |
| 8 | 3.06 | 1.43 |
| 9 | 3.52 | 1.49 |
| 10 | 4.05 | 1.56 |
| 11 | 4.65 | 1.63 |
| 12 | 5.35 | 1.70 |
| 13 | 6.15 | 1.78 |
| 14 | 7.08 | 1.86 |
| 15 | 8.14 | 1.95 |
| 16 | 9.36 | 2.04 |
| 17 | 10.76 | 2.13 |
| 18 | 12.38 | 2.23 |
| 19 | 14.23 | 2.33 |
| 20 | 16.37 | 2.43 |

| | <u>PE</u> | <u>PE/g</u> |
|---------|-----------|-------------|
| 5 Yrs. | 5.72 | 0.38 |
| 6 Yrs. | 7.03 | 0.47 |
| 7 Yrs. | 8.40 | 0.56 |
| 8 Yrs. | 9.82 | 0.65 |
| 9 Yrs. | 11.31 | 0.75 |
| 10 Yrs. | 12.87 | 0.86 |
| 11 Yrs. | 14.50 | 0.97 |
| 12 Yrs. | 16.21 | 1.08 |
| 13 Yrs. | 17.99 | 1.20 |
| 14 Yrs. | 19.85 | 1.32 |
| 15 Yrs. | 21.80 | 1.45 |
| 16 Yrs. | 23.84 | 1.59 |
| 17 Yrs. | 25.97 | 1.73 |
| 18 Yrs. | 28.19 | 1.88 |
| 19 Yrs. | 30.52 | 2.03 |
| 20 Yrs. | 32.95 | 2.20 |

Chart 5

PE vs. Inflation



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