

# RATIONAL STOCK VALUATION

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## 1. DEFINITION OF TERMS

- N- Number of years
- MC- Market capitalization or market cost
- P- Stock price
- OE: Operating expenses
- CE: Capital expenses
- S- Number of shares
- $E_i$ - Company total net earnings in  $i$ th year. Net earnings from trailing twelve months is  $E_0$
- $E_{iQj}$ - Company net earnings in the  $j$ th quarter of the  $i$ th year.
- $Es_i$  or  $EPS_i$ - Company net earnings per share for  $i$ th year
- $Es_0$  or  $EPS_0$ - Company net earnings per the baseline year for projecting future earnings
- $V_p$ - Present value
- PE- price / earnings ratio or PE ratio
- PEA- PE value adjusted to account for B & D so can be compared to PES
- Re- Company future earnings growth rate
- $R_f$ - Risk free interest rate such as government bonds
- M- Profit margin
- N - Number of years of earnings stock value is based on
- T- total revenue
- D- Debt- Sum of companies liabilities and long term debt
- B- Book value which is the common shareholder's equity
- $B_s$ - Book value per share
- DE- Debt to equity ratio
- Market share- % companies "T" is of all the "T" in that business
- PPI- Producer price index, reported monthly
- CPI- Consumer price index, reported monthly
- ECI- Employment cost index, reported quarterly
- GDP- Gross domestic product, reported quarterly
- EMP- Unemployment rate, reported monthly
- HWG- Hourly wage rate, reported monthly
- s- Small "s" at end of variable denotes variable is per share value
- m- Small "m" at end of variable denotes actual value market value
- r- Small "r" at end of variable denotes rational stock value

## 2. INTRODUCTION

My education and profession are in scientific fields. However, as a human I am certainly aware of the emotions and personal preferences involved with being human. Watching the stock market I have certainly noticed emotions and personal preferences play a major role in it's response. I, a normally rational person, had a bad experience in

investing in the stock market and also got caught up emotionally in the market. Emotions especially that of fear on missing out on the upward price movement or fear of riding down a downward price movement have a significant effect on the stock market. However, the stock market does to some extent pay attention to rational valuation. So I have written this article to describe rational valuation to differentiate it from all the other stuff that goes on in the stock market. I think it can help so that an investor's emotions do not get them stuck in the valleys of the crazy roller coaster ride that the stock market often goes through.

Actually, I think in all areas of life that it helps to differentiate between emotions, personal preferences and what can be determined true rationally. In case one is interested in Ref 1, I explain some of the logic involved with the scientific approach and how rational thinking can be used in a practical way to see if something can be objectively determined true. In some areas of personal interest I have written articles on my application of rational thinking to morals and values (Ref. 2) and also religion (Ref. 3).

### 3. DESCRIPTION OF COMPANY FINANCIALS

The total of all the sales a company makes is called its revenue (T). The continuous cost to make and sell the products is the operating expenses (OE). Often one time charges involved with making the products are made which are referred to as capital expenses (CE). The revenue minus the operating expenses is the operating earnings. The annual revenue minus the annual operating and capital expenses is the annual net earnings (E). The net earnings is the one most commonly reported in the financial industry and is the one used in the calculation in this article. The percentage the profit is of the revenue is called the profit margin (M).

$$\text{Thus, } M = E / T \quad \text{where } E = T - CE - OE$$

The total market cost or market capitalization (MC) of a company is its total number of shares (S) times the price per share (P). Small cap stocks have a MC of typically 1-2 billion or less.

$$\text{Thus, } MC = P * S$$

The annual earnings per share (EPS or Es) is the annual earnings divided by the number of shares. Often companies have future commitments to provide new shares in the future; for example, special stock perks to company officers. If these not yet issued shares are included then the Es is called diluted. If these not yet issued shares are not included then the Es is called basic.

$$Es = E_0 / S$$

The PE ratio is a parameter that measures the price of the stock relative to one year of earnings. The present PE ratio (i=0 for present) is the market cost divided by how much the company earned in the past twelve months.

$$PE_0 = MC / E_0 = P / Es_0$$

The value of all the company's property or assets plus its cash is called the company's book value. The value of all the companies liabilities is called its debt.

The company's debt (D) is the sum of all its liabilities and long term debt. The company's book value (B) is defined in this article as the common shareholder's equity which I believe is the sum of the companies cash and the cash value of their assets.

### 4. RATIONAL VALUATION

The rational present value (Vp) of a company is the sum of the total money it will earn over a certain number (N) of future years, its present debt, and book value. If investors have the option to invest in a risk free fund which guarantees a certain interest (Rf); then they would purchase a stock only if it would at least earn the amount that the risk free fund would. Thus, consideration of a risk free interest rate requires reducing the present value for the future earnings by the increase in money that would be achieved if the money was invested in the risk free fund. This is accounted for by the  $(1+Rf)^i$  term included in the denominator of the future earnings sum listed below for the present value. This formulation does not consider dividends some companies pay.

$$Vp = E_1/(1+Rf) + E_2/(1+Rf)^2 + E_3/(1+Rf)^3 + \dots + E_i/(1+Rf)^i + \dots + E_N/(1+Rf)^N + B - D = \sum_{i=1}^N \frac{E_i}{(1+Rf)^i} + B - D$$

Thus, the important question is what will be the future earnings of the company. Assuming a certain constant annual earning growth rate (Re) the future earnings are determined by the equation below.

$$E_i = (1+Re) E_{i-1}$$

If the stock price is rational, then its present value would be equal to its market cost. This relationship shown below is the fundamental mathematical equation that defines rational valuation. Any other valuation technique that is

not appropriately related to this mathematical relationship, disconnects the stocks price with what the company is worth financially; thus, would be irrational.

$$MC = Vp$$

Based upon these formulas; the PE ratio for the stock, if it were rationally priced is calculated below.

$$PE_{r_0} * E_0 = MC = Vp = \sum_{i=1}^N \frac{E_i}{(1+Rf)^i} + B - D; \quad D = DE * B$$

$$\text{thus } PE_{r_0} = \sum_{i=1}^N \frac{E_i}{(1+Rf)^i} / E_0 + (B-B*DE) / E_0 = \sum_{i=1}^N \frac{(1+Re)^i}{(1+Rf)^i} + Bs(1-DE) / Es_0$$

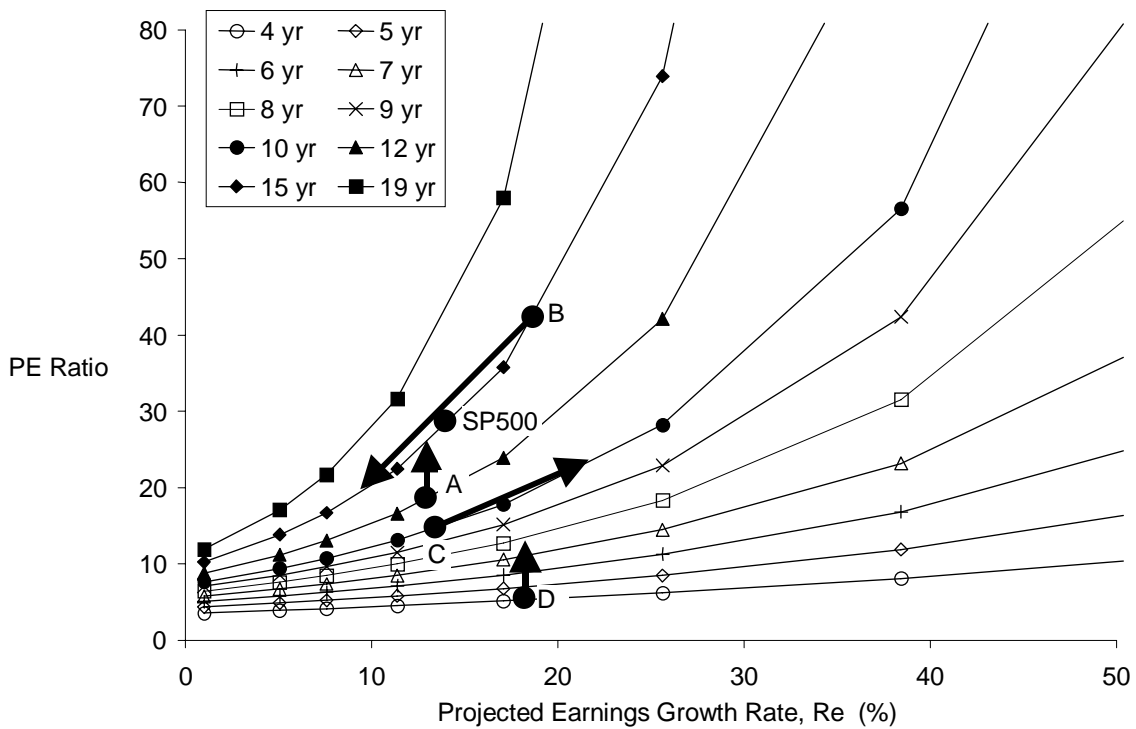
Since  $P = PE * Es$ , the rational stock price can determined by the following equation.

$$Pr = PE_{r_0} Es_0 = PES * Es_0 + Bs(1-DE) \quad \text{where } PES \equiv \sum_{i=1}^N \frac{(1+Re)^i}{(1+Rf)^i}$$

If stocks were rationally priced ( $PE_m=PE_r$ ) then their PEA value should be equal to PES as shown below.

$$PEA_0 \equiv PE_0 - (Bs_0 / Es_0) (1 - DE) = PES$$

The plot in Figure 1 shows what the PE ratio for a stock should be if it were rationally priced. These PE ratio curves produced by the formula above depend upon the number of years considered (N), the Re and Rf values and the assumption that  $E_i=(1+Re)E_{i-1}$  and  $B-D=0$ .



**Figure 1. PE ratio for Rf=0.062.**

The curves in Figure 1 give insight into on how a stock is rationally valued. The greater the Re, the greater the PE. Presently, as shown in Figure 1, the SP500 has an average PE ratio of about 28 and a projected growth rate of about 13% as shown in Figure 1. This means it is valued at what the index is expected to earn in about 15 years. So especially big "MC" stocks such as those in the SP500 are valued based upon their earnings over the long term. This means that news that affects the long term earnings of a company should have more of an affect than news that affects the earnings for just the short term. This is part of the reason why large stable companies are given higher PE ratios than smaller companies. Large stable companies are expected to survive longer and make earnings over a much longer period of time than small companies.

All new information about a company should be evaluated on how it would affect the earnings over the long term. For example, if a company just came out with greatly improved earnings it may appear a good time to buy; however, if the new news did not provide any evidence for improved earnings in the future then the present improvement in earnings does not rationally mean the stock price should increase more. For example, in the middle of 1999 housing companies reported fantastic earnings growth, but their stock prices went down even though they had low PE ratios less than 8.0. This supposedly occurred because investors thought that the great earnings improvement was due to a lot of home buyers buying homes prior to interest rates going up as they were expected to. Thus, future earnings were expected to really drop down. Investors really did not know for sure if new housing was going to decrease, they just know the standard wall street routine is to dump housing companies when interest rates appear to be going up.

Figure 1 indicates that stocks with a  $Re$  at or near  $Rf$  should have low PEs, but those with  $Re$  much greater than  $Rf$  have much higher PE's. The stock market loves very high  $Re$  stocks and often gives them very high PE ratios.

The Figure 1 chart can be used to estimate how the stock price should change. Consider the case where stocks "A" and "B" should be valued based upon the 15 year line. If stock "A" has a present PE ratio of 18 as shown in Figure 1, then it would be undervalued because it should have a PE ratio of 24. Therefore, it has the present potential to raise in price by 33%. If stock "B" had a present PE ratio of 42, but new news came out that it's projected earnings growth rate should be 9% rather than 19%, then it should drop its PE ratio to 18 which would mean it would drop in price 57%. Consider the case where stock "C" should be valued based upon the 10 year line. If stock "C" had a present PE ratio of 13, but new news came out that its projected earnings growth rate should be 22% rather than 13%, then it should increase its PE ratio to 22 which would mean it would raise in price 69%. Consider the case where stock "C" should be valued based upon the 10 year line. If stock "C" had a present PE ratio of 13, but new news came out that its projected earnings growth rate should be 22% rather than 13%, then it should increase its PE ratio to 22 which would mean it would raise in price 69%. Consider the case where stock "D" is expected to grow at 18% for 4 years, but all its contracts would end in four years. Then the contracts were renegotiated to 8 years and the company was still expected to grow earnings at 18%, then its PE ratio should change from 4 to 11, resulting in a stock price increase of 275%.

If stock prices followed the rational criterion than the method presented in this section could be used to theoretically determine what the change in stock price should be depending upon the new news about the projected earnings.

Many stocks last twelve months earning ( $E_0$ ) are not well representative of a base earnings for projected future earning from as is done in the equation  $E_i = (1 + Re)E_{i-1}$ . For example, new news could come out that the company earnings in the future will dramatically increase or decrease than it had done so previously. Thus, the present earnings and PE ratio would not be representative of some base to make future projection directly from. In these cases if one has the projected earnings for the future year then one could just do the future earnings sum themselves to figure the proper stock price. If one is not in a position to sum the earnings than there are several ways they could try to determine some representative PE ratio so that Figure 1 could be used to determine the stock valuation. One could use the projected PE ratio for the future years. Analyst often report  $PE_1$  or  $PE_2$ . This technique is good to use if the analyst have accounted for the new news in their  $PE_1$  or  $PE_2$  predictions. If not then one would have to figure it themselves. If a company just had a recent problem where it is expected to soon get back to normal earnings at a reasonable profit margin, then present earnings ( $E_0$ ) could be determined by multiplying the expected profit margin by the present revenues. This will give a value for  $E_0$  which can then be used to determine a  $PE_0$  by the formula  $PE_0 = P / E_{s_0}$ . As long as there is no significant seasonal affects, if the recent quarterly ( $E_{0Q0}$ ) earning is representative of a base to project future earnings; then, one could assume  $E_0 = 4 * E_{0Q0}$ .

The author's preferred approach for determining a stock's valuation is to use as a base PE ratio  $PE_1$  and use the 5 year projected earnings growth rate ( $Re_5$ ) for  $Re$ .  $PE_2$  should be used if the short term growth rate is expected to be much higher than the long term growth rate.  $PE_0$  is not preferred because it is more likely to be affected by short term effects in a way that would make it less representative of a PE base ratio from which to extrapolate long term earnings from.

Actually, no person knows exactly what will happen to future company earnings. Thus, practically earnings prediction should be a range with differently probabilities associated with different portions of the range. The further out the earning the more unknowns; thus, the larger the range should be. The earnings sum which would be a sum of these probability distributions would then produce a probability distribution for the PE ratio. The stock PE ratio should then stay within the reasonable probability limits of this range. As new information about a companies future earnings comes up this probability distribution would change.

If the stock market behaved rationally then the best strategy would be to as best possible keep one's money in the most undervalued stocks according to Figure 1.

#### 4.1 Valuation analysis of SP500 population

The stocks in the SP500 index are well covered by analyst; thus, have the most reliable projected  $Re$  values; therefore, are the best population for checking the valuation of the group as a whole. Table 1 shows the results of the average of the  $PE_1$  ratio and the  $Re_5$  value for the SP500 index for certain  $PE_1$  ranges. The standard deviation for the averages is also listed. There are several stocks in the database that have very high  $PE_1$  ratios which makes the removal of just the 19 stocks with the highest  $PE_1$  ratios reduce the average  $PE$  ratio by a very large 32%! Some of these 19 stocks have been given very high stock prices and others of them just so happen to have a  $E_1$  just above 0.00 which makes their  $PE_1$  abnormally high. This clearly shows how the SP500 average  $PE$  ratio can be and presently is so meaningless and arbitrary. For example, consider if one stock in the SP500 recently had bad news so it's  $E_1$  went to 0.00001, then it's  $PE$  ratio would all of a sudden become very high increasing the average  $PE$  ratio for the SP500 index by a significant amount. Thus, some bad news in one company can all of a sudden cause the average  $PE$  ratio for the whole SP500 index to increase. This example shows that the SP500 average  $PE$  ratio can be quite arbitrary; thus, is not a reliable parameter for which to generally determine valuation as it is often used.

**Table 1. SP500 index averages.**

<b><math>PE_1</math> Range</b>	<b>n</b>	<b><math>PE_1</math> value</b>	<b><math>Re_5</math> value</b>
<b>All</b>	500	29.5 $\pm$ 100.7	14.3 $\pm$ 7.1
<b>0&lt;9999</b>	490	33.6 $\pm$ 85.4	14.0 $\pm$ 6.5
<b>0-100</b>	471	23.0 $\pm$ 15.9	13.6 $\pm$ 5.6
<b>0-90</b>	466	22.2 $\pm$ 14.2	13.5 $\pm$ 5.4
<b>0-80</b>	464	21.9 $\pm$ 13.7	13.4 $\pm$ 5.4
<b>0-70</b>	459	21.4 $\pm$ 12.6	13.3 $\pm$ 5.3
<b>0-60</b>	450	20.5 $\pm$ 11.2	13.2 $\pm$ 5.1
<b>0-50</b>	438	19.6 $\pm$ 9.9	12.9 $\pm$ 4.9
<b>0-40</b>	414	18.2 $\pm$ 8.2	12.7 $\pm$ 4.8
<b>0-30</b>	366	16.2 $\pm$ 6.2	12.1 $\pm$ 4.1
<b>0-20</b>	263	13.0 $\pm$ 3.7	11.4 $\pm$ 3.5

The main portion of the SP500 population as of 1/8/2000 is plotted in Figure 2. The curves in Figure 2 are based upon a  $R_f$  of 6.55% which was the value for the 30 yr bond as of 1/8/2000. An appropriate way to check the valuation of the group as a whole is to determine which curve shown in Figure 1 best fits the population. This can be objectively evaluated by statistics.

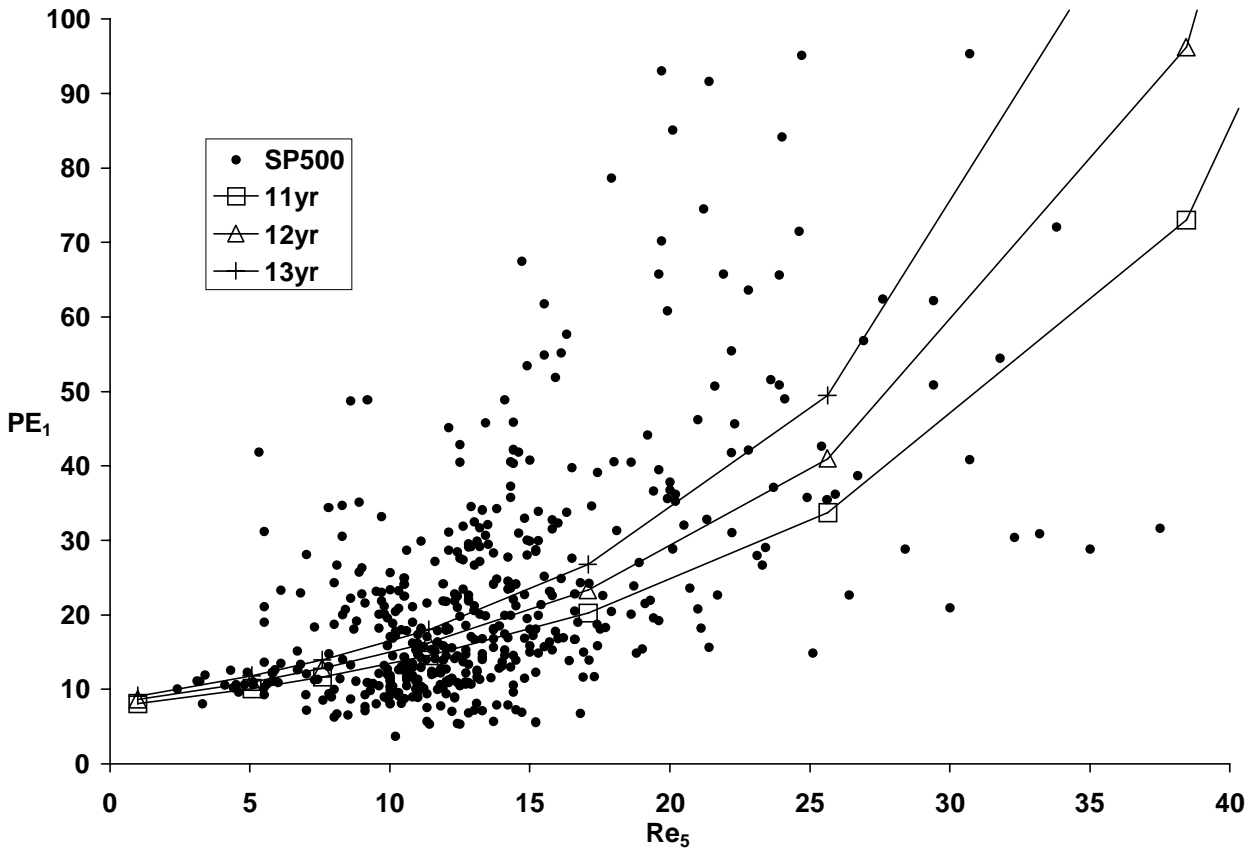
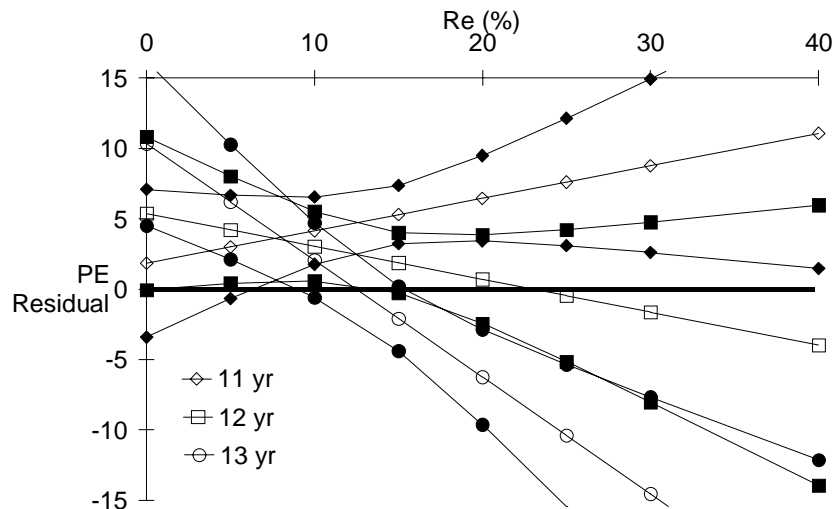


Figure 2. Plot of  $PE_1$  vs.  $Re_5$  for SP500 database.

The residual is the distance the actual data is off from the prediction. A linear regression of the residuals is a convenient way to use statistics to check the fit of the data to any curve. This sort of regression analysis is called "detrending". It removes the predicted trend from the data. If the theory matched perfectly, the slope of the residuals would be zero and would have a Y-axis intercept of 0.0. This means the data is just randomly distributed about the prediction, implying no bias inconsistent with the theory. The best fit line for the mean of the residuals (open symbol) and the 99% probability interval for the mean of the residuals (filled symbol) are plotted in the residual plot in Figure 3. Stock with a  $PE_1$  less than 0.0 and greater than 100 were excluded from the analysis. The probability interval for the mean of the residuals shows the estimated upper and lower variation for the mean of the population. The lower or upper bound curves crossing the Residual = 0.0 line, is an indication that the prediction method as rejected by the statistical analysis at a probability level of 99%. In other words, there would be a 99% probability that the theory is false.



### Figure 3. Results for mean from regression analysis of residuals.

The 12 yr curve appears to have the best fit because its interval covers almost the complete range of Re values while the 11 yr line just covers Re values up to about 7 and the 13 yr interval covers just Re values in the range of about 9-15. Thus, it is appropriate to conclude that the valuation curve that best fits the SP500 population is the 12 yr valuation curve. However, as shown in Figure 2, there is considerable variation about the 12 year curve. Thus, objective relative valuation of SP500 type stocks should on average be based upon what the stock is realistically estimated to earn over approximately the next 12 years, not some exaggeration from some pundit's irrational exuberance. Thus, the relative rational stock price (Pr) is determined according to the formula below where N=12 for PER.

$$Pr = PES * Es_1 + Bs(1-DE)$$

Most stocks not in the SP500 are determined undervalued by this formula so just because a stock is determined undervalued by this formula, it is not necessarily a good deal, because it is difficult to verify for stocks not in the SP500 the business case for the assumed Re from the analyst. Often for these smaller companies it is not difficult for other companies to penetrate their business and take away a significant amount of market share. The more undervalued a stock and the more one can verify the assumption which determine it undervalued the more one has a reason for investing in the stock.

#### 5. VERIFYING GROWTH RATE (Re)

The key to determining the stock value is in accurately determining the future earnings growth rate. This means determining the future profit margin and the future revenue. Revenue tends to be more consistent and predictable than profit margin because the profit margin is a small fraction of the much bigger revenue number. Also, the cost for producing the product which affects the profit margin can vary significantly depending upon internal company changes or change in cost from external suppliers to the company.

The sales for the company depends upon the market condition for its product. The balance of supply and demand for its products, the competition and the economic conditions. These factors affect the price of the products and the quantity of items sold. The cost for producing the product depends upon how well or efficiently the company is run. These factors all vary depending the business the company is in. To be able to make a judgement on these issues one has to be quite familiar with the industry the business is in. For example, one should be familiar with the typical growth rates in the industry and what are the industry's typical potential problems. Fields like computers have had a tremendous growth as more and more of the world uses computers.

Wall-street analyst publicly publish projected earnings growth rates and PE ratios for companies. These numbers are available from internet sources such as Yahoo or other electronic trading companies such as ETRADE. However, often these companies publish incorrect results for even the PE ratio. Make sure these values are correct by checking them with reports from the actual company. The most reliable readily available public reports that I am aware of are the baseline profiles which used to be available through ETRADE but are still available through Fidelity. Caution should be taken when using these numbers. The projected growth rates are sometimes unreliable and not believed by the investing community for several reasons. There may be some recent bad news which has not yet been accounted for in the projected earnings. The analyst may intentionally report unrealistically high projected growth rates. The reported numbers may be out-of-date. Thus, it is important to be able to verify the projected growth rates.

Companies do make public statements such as in Reuters reports or in their quarterly conference calls. These public statements from the company officers are typically reliable because they are controlled by the SEC to ensure their statements based upon their present knowledge are accurate unlike unconstrained spin-doctors which are all over wall street. However, it should be pointed out that company officers are often motivated to just state positive information and just will not mentioned the negative information until after the stock price has dropped. Sometimes they make statements about their expected future earnings. Statements from Company officers are typically the most valuable in verifying projected growth rates. However, often it is more important what they do not say then what they actually say. For example, if they made a general statement about a possibly negative issue for the company and they had specific information on this issue, but avoided saying anything quantitatively specific in determining how negative the issue is, then most likely they are hiding something significantly negative. Typically in these kinds of cases, the stock will probably go down just based on the fear of the unknown from the investment community that has seen so many times company officials avoid presenting negative news.

New news about a company often significantly changes the stock price. The problem for most people is that usually most of the stock price change occurs prior to them finding out about the bad or good news, so they are typically late in selling or buying the stock.

There are certain general characteristics that are good to look for in assessing the future outlook for a stock. It is important that the management is interested in improving the stock price by increasing earnings. It is better for the company to be in a business that is projected to grow such as computers. It is important to verify the companies ability to at least maintain market share if not grow market share. This could be due to them being more competitive than others by having a technological advantage, advantageous contracts or perhaps a patent that guarantees them being the sole producer of a preferred product.

The stock market loves leaders in a field because they are expected to survive a long time. A leader is in a position to stomp out competition while any company below the leader is vulnerable to being stomped by the leader. The market's favorites are leaders in high growth fields such as; CSCO, AOL, YHOO, MSFT, EBAY, INTC, AMZN. The market typically gives stocks of this type very high PE ratio that makes them appear over-valued, but there prices keep going up. If one can find a stock of a company that is a leader in it's field and is undervalued according to Figure 1, then one has found a stock with the best guarantee for future price increase.

I recommend avoiding stocks with debt/equity ratios greater than 0.50-1.0 except for special circumstances.

## 6. ACTUAL STOCK MARKET RESPONSE

Stocks are actually priced by the results of investors buying and selling shares. The important question is what are the criterion if any are the investors using to buy and sell shares. If all investors were following the rational criterion and they all believed the analyst projections then all stocks would fall neatly along the appropriate curve in Figure 1. However, stocks do not fall neatly along any of the curves in Figure 1.

I plotted the 6000 stock data base from Zacks that has the projected growth rates and the PE ratio in the Figure 1 format. The data was spread out all over the chart making it looked like it was shot at several times by a blind man with a shot gun. I tried several different combinations of  $PE_0$ ,  $PE_1$  and  $PE_2$  plotted versus 1-year and 5-year growth rates. No combination showed a statistically significant correlation. Then I tried comparing the change in price of the stock over the period of time from 3/98 to 4/98 to see if stock prices were changing according to the rational valuation. If they did then stocks in the bottom right portion of the chart should do better than the stocks in the top left portion of the chart. Again, absolutely no statistically significant correlation. Granted this was a short period of time, only one month. During that month the SP500 did increase so it was a bull market period and there was much adu over the internet stocks, apparently, rational valuation was not in the wall-street focus during that short period of time.

With the advent of small spreads (difference between bid and ask on the stock market), easily accessible electronic trading and cheap trading fees it appears that most of the volume comes from "traders" rather than "investors". "Traders" closely watch the stock historical chart of price and volume. They have their theories that are based upon the shape of the stock price historical chart which is called "technical analysis". The shape of such charts is independent of the variables involved with rational valuation so all these theories on the shapes of the historical price chart are fundamentally not based upon rational valuation. Rational valuation is called "fundamental analysis". There is a lot of advertisements from those that try to promote "technical analysis". They often publish charts with pretty and color graphics giving fancy sounding names to spots on the graph like "ellipsoid supports", "cup and handle shape" etc... Of the advertisements I have seen they do not present any objective information for measuring success of the technique like a statistical analysis that determines how successful the technique worked for a certain unbiasedly selected group of stocks. Success or validity of a technique is not measured on how pretty the graphics are rather on the rational basis of the technique. These chart theories really are essentially theories about the behavior of the people buying and selling in the stock market. If investors were essentially rational and all significant information about PE, Re, D and B were known then there would be no advantage to doing the additional technical analysis beyond the fundamental analysis. However, the more irrational investors are and the more hidden news about PE, Re, D and B the more advantageous it would be to do the "technical analysis".

"Traders" also consider if the stock is a "momentum" play such an internet stocks. They also follow the news stories that the rest of this herd is watching. These "Traders" appear to be more than just the "day-traders" whose eyes are always fixed on their stock trading screen when the stock market is open, but also individuals with electronic accounts and even institutional investors such as money market managers. This keeps the "momentum" market running on emotions that can be manipulated by the spin-doctors of the day. The rational "investor" follows the criterion mention in Section 4 and tends to buy undervalued stocks and would typically holds onto them for a much longer time then a "trader" would. Thus, rational "investor" does not create nearly as much volume as "traders" do, so their affect in today's stock market has become less significant. It is the time of the bear market when all owners of stocks including the "traders" look at the fundamentals and the bubble bursts for these "momentum" stocks which come back down to earth while the undervalued stock do not reduce in price as much. So the "Bull" which in some ways is fueled by BS is much more irrational than the "Bear" market which is why I say the brain is actually in the "Bear" not the "Bull".

One interesting phenomenon that momentum traders look for is "breakouts". "Breakouts" is when a stock makes a new high then all of a sudden goes higher and higher. The theory behind this is that the stock is now in a position

where no people have a loss on the stock so few people want to sell it so there is little downward pressure. Such a theory has no relationship to rational valuations, but often little that momentum traders follow does. It sure makes it more difficult for a patient rational investor to buy these stocks.

Money certainly arouses emotions in people, so it is not surprising that emotions play such a significant factor in the stock market. American society is so full of entertainment and tantalizing material possessions. Thus, especially many of those that are wealthy are used to spending money to make themselves feel good. Thus, it is not surprising that a significantly driving factor in the stock market comes from people with a whole lot of extra money who are looking to do something each day in the stock market that makes them feel good like at the right time, buy or sell out of a "momentum stock".

One of the main ways that people invest is by buying mutual funds. This way people who are not confident in their stock selecting skills put their trust in some mutual fund manager. One of the key ways people evaluate funds is how well they have done in the past. Many people assume that a greater increase in the past is a sign of a greater increase for the future. The mutual fund analysis company, Morningstar, uses past performance to rank funds and give them their star rating which people use to select mutual funds. This situation can create a blind pyramid scheme where people put money into funds just because they are going higher which then causes more people to put money into the same fund which make it go even higher attracting even more of these types of investors. I believe this has created the situation with the aggressive growth funds which invest in internet stocks. People keep dumping money into this sector through aggressive growth funds creating the internet stock bubble.

These results and other observations appear to me to indicate that during bull market periods fundamental analysis or rational investing plays a secondary role and the primary factor is technical analysis and spin-doctoring from the wall street community that makes all these projection and set their manipulative stock price targets for the stocks the wall-street herd is chasing after, such as AOL, YHOO, EBAY, AMZN, etc ....

## 6.1 Wall-Street Public Pundits

There is a large number of Wall-Street pundits that make public news stories that the stock market reacts to. Analyst make public statements about future earnings and announce new stock price targets. Experts make comments about which way the economy will go. There is plenty of evidence that there are many pundits that put out spinned stories to manipulate stock prices to their advantage. Some pundits will just always claim it is time to buy whatever they own. Regardless of rational criterion, stock price targets are always adjusted higher when the actual price gets close to them so they can keep the bait out in front of the "traders".

Specifically, in 1997 when disk drive prices were falling the stock price dropped of the leading disk drive company, Seagate. Before Seagate reported earnings problems the analyst kept their Seagate earnings projection high so the stock look attractive to the naive. Obviously these analysts who were very familiar with Seagate business knew that there were future earnings problems for Seagate, but still kept their projection high so they and their friends could get a better chance to sell out. This sort of deceptive reporting is quite common, in addition there are times when analyst just are not aware of new significantly negative factors. This why it is difficult for a common person to select a genuinely undervalued stock. There are many cases where there is a legitimate reason for a stock appearing undervalued. The key is to be able to differentiate between a genuine undervalued stock and one that just appears undervalued, but has hidden bad news.

I do not mean to say all wall-street pundits are manipulative, but evidence certainly indicates one should not just assume the public information pundits present is credible. It is often advantageous for pundits to be deceitful so there is a lot of motivation to report manipulative news related to the stock market. If these pundits really are credible and are really interested in intelligently educating the investing public in a non-manipulative way, then they should have a rational based criterion that they are willing to present and provide a means for verification. Wall-street pundits report all kinds of target prices for stocks. They do report short term and long term projected earnings growth, but I have never seen them explain the relationship of their price target to the rational valuation formulas. This leaves them free to claim whatever price target they personally prefer and they do not have to worry about being checked for consistency to some rational standard that cannot be manipulated.

The stock market biggest gainers are usually in new fields where there is a lot of growth potential such as the internet. As with any new business field there will be a stage of high growth as the new potential is realized; however, there is always some finite limit on potential. As the market in that field gets saturated the earnings growth rate decreases to more of a typical range for mature businesses. During this initial stage stocks are often priced as if this high growth will go on forever, but that is not realistic This is a good reason why 15 year projections should be done rather than just 1 or 5 year projections.

In the short term the wall-street community pays close attention to the comparison of the just reported quarterly earnings to the estimates. Often regardless if the stock earnings were good or not if they are low relative to the projection the stock market will typically send the price down at least in the short term. If they are high relative to the

projection then the market will typically send the price up at least in the short term. Thus, analysts are very cautious about ensuring their projected earnings are below the next earnings to be reported. Fundamentally, it rationally does not matter how the earnings are in comparison to the projections. What matters is how the new news changes the future earnings sum.

Wall street pundits often refer to how the stock is presently priced compared to its recent high or lows. If they want people to buy it they will talk about how much it is below the highest peak, if they want people to sell then they will talk about how much it is above the lowest valley. These comparisons have nothing to do with rational valuation; therefore, can be just manipulative comments. However, for all those people who watch stock price charts closely such as “traders” these comparisons mean a lot because they are often indicators of when a momentum trader will move in or out.

Often to appear to support their stock selection strategy, pundits will show one stock example in time that followed their predicted pattern. For example, in my just recently received monthly letter from Fidelity they showed a chart where Intel's (INTC) stock price dropped quite a bit when it crossed its 50 day moving average line. This was supposed to be an indication of how momentum stocks follow a trend according to their moving average line. With all the fluctuations in stocks, a stock historical price curve will take on many different patterns so there is bound to be some time when some stock will follow a certain relationship which the pundits want to promote. Fidelity just selected one time INTEL followed a certain pattern that they wanted to present. Any scientist knows that selection of data that follows one's theory out of a larger data set is a biased and an invalid way to check a theory. This is just another irrational technique that spin-doctors use, in fact, Fidelity knew that at that time in October, Intel went down because of the Taiwanese earthquake. A sufficiently large, unbiased random sample of data from the larger data set should be used to objectively check a theory. Section 4.1 presents a good example of appropriate consideration of all the relevant data. So these presentation of one or just a few stocks matching a theory should be not considered reliable unless justification for it is given by an appropriate analysis of all the relevant stocks in the database.

Another biased selection that these pundits will do is they will compare their stock's PE ratio to another stock which has a very high PE as a way to claim that the selected stock price should go higher. Basically they do an arbitrary biased search for the highest PE ratio in another stock to try to give the appearance that price of the stock they are promoting should go higher.

It appears to me stocks can typically swing about their rational valuation by as much as 50% due to speculation, spin-doctoring from the pundits, fear of unknowns, etc .. The more speculative stocks such as internet stock vary more while the more stable stocks such as utilities vary less. However, since it appears the general variation is as much as 50% it appears to me that in the short term rational valuation is secondary to the primary irrational forces in the stock market. Eventually given a long enough term for the speculation to finally be dismissed by reality rational valuation becomes primary.

## **6.2 Recommended Rational Approach for Valuation**

This section describes the author's minimal recommendations for reporting a stock price target in a way that has a relationship to rational valuation so at least some check can be made to see if a stock price is rational rather than just some arbitrary personal preference as is often done by today's pundits. Two different approaches could be used. The “absolute rational” is done by estimating the expected future earnings for the life of the company and then based upon the 30 year bond for  $R_f$  a PE ratio; thus, stock price could be rationally determined according to the rational method in Section 4. The “relative rational” way is done by estimating the expected future earnings for the number of years that presently the most relevant index is generally valued at. According to Section 4.1, on average the SP500 index is presently valued based upon 12 years of earnings. Thus, in this case, based upon the projected earnings for 12 years and the 30 year bond for  $R_f$  a PE ratio; thus, stock price could be rationally determined according to the rational method in Section 4. Analysts do often project future earnings for at least the next one year and often for the next 5 years, but to rationally justify many of today's stock prices future earnings need to be stated for at least the next 12 years and justification given for the predicted future earnings for these years. The problem with the “absolute rational” approach is that it is often very difficult predict company earnings in the distant future such as much more than a decade away. Thus, the “relative rational” approach is more practical. The formula for calculating the relative rational stock price ( $P_R$ ) is listed in Section 4.1.

The common wall-street approach is claiming the stock should have some present or future PE ratio based upon a comparison to the average PE ratio of some index of similar companies or some personally selected PE ratio. Section 4.1 present evidence and reasoning that shows such technique are unreliable. Valuations based on just PE ratio as is often done without any justification relating to an earnings sum, has no specified relationship to rational valuation; therefore, is essentially subjective; thus, identified as “relative arbitrary”. The recommended rational approaches in the previous paragraph are appropriately based upon some total earnings sum which is crucial and necessary part of rational valuation. Thus, the recommended rational approaches in the previous paragraph are

much more objective than the common wall-street approach based on just PE ratio. Preference of arbitrary valuation approaches over the rational valuation approaches are just based upon personal preference.

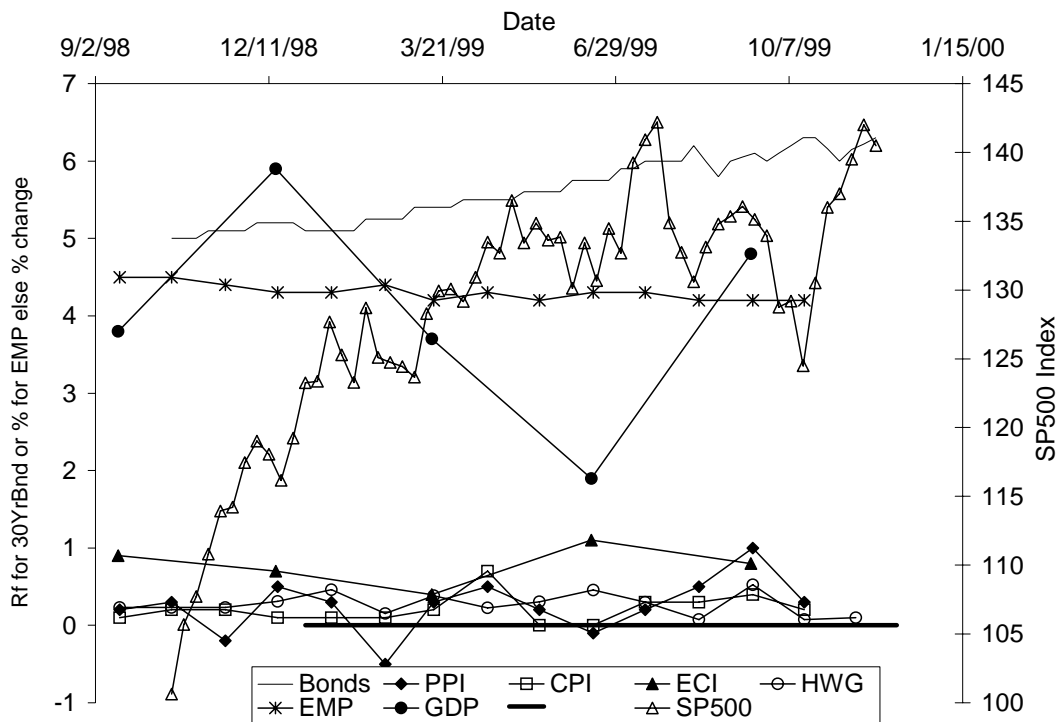
For those that know of the rules of rational valuation which the wall-street pundits do, preference of arbitrary valuation approaches over the rational valuation approaches are most likely for reasons of essentially just personal advantage. It is not surprising that in a capitalistic system that motivations of personal advantage would take precedence over rational criterion. I have read financial publications such as the Wall-Street Journal, Investors Business Daily, Barons, etc... and listened to business shows such as Wall-Street Week in review, Nightly Business news, etc.. Granted they do mention PE ratio, but I have never heard an explanation of rational valuation where relationships to the future earnings sum is explained so the audience can make a judgement for themselves on valuation. The analysis as shown in Section 4 is quite simple and charts or parameters reported that explain rational valuation could easily be described. They probably have mentioned rational valuation sometime, but it sure appears to at least be seldom mentioned. Considering they discuss so much other financial information, it appears to me there is a consistent interest of keeping the general public in the dark about rationale valuation so that they can arbitrarily tailor their presentations to present a perspective suited for their advantage. I am not aware of any other plausible motivation of this pattern for Wall-Street pundits.

## **7. ECONOMIC INDICATORS & BEAR AND BULL MARKETS**

The last six terms defined in Section 1 are economic indicators. Economic indicators are important and can have a very significant affect on the general stock market response as measured by the major indices. The economy strength is measured by the GDP. Thus, if the GDP is increasing at a more rapid rate, then in general so will companies earnings which means Re values will increase. The importance of other indices is mostly in their affect on the bond rate which sets Rf. The federal reserve tries to control inflation through setting the interest rate (discount rate) as a way of controlling growth and inflation. The government bonds are set at what the financial community figures the discount rate will be at in the future. According to the last formula in Section 4 the higher the bond rate, Rf, the lower stock prices should be. Thus, the stock market tends to in the short term respond in the reverse direction of the way the bond rate is going. The CPI is the direct measure of inflation so it is the most important. If it goes up then most likely so will Rf. The other indicators have secondary importance because they are expected to cause the CPI to change. The PPI is the price of material the goes into producing the products that are consumed and monitored in the CPI index. The ECI and HWG are measures of the cost of labor which would affect the price of the products they produce; thus, ultimately affecting the CPI. Greenspan is concerned that the low EMP rate will result in a tight labor market which would drive up the cost of labor because there are few workers available resulting in more competition for labor.

Ref. 4 is a good source of information on economic indicators. The historical record of them is available at Ref. 5.

Figure 4 shows how these indices developed over 9/98-12/99. In late 1998 the stock market pulled out of the Asian crisis but the increased bond rate slowed down the stock market advance because Greenspan was concerned that the tight labor market would increase HWG and ECI. ECI and PPI were reported high in the end of 6/1999 which caused bonds to increase further causing the SP500 index to go down. The stock market was furthered decreased by the Taiwanese earthquake. The low CPI, PPI and HWG high GDP and modest ECI in 10/1999 got the bull started again even with Y2K looming.



**Figure 4. Plot of economic indicators.**

With the cold war over and defense budgets decreasing, government budgets being balanced, the world economy becoming more efficient thanks to technology and still a large pool of low-cost labor pool from 2nd and 3rd world countries, the United States economy has a better future outlook than ever. Considering the present future economic outlook in general stock PE ratio deserve to be higher than the historical norms which they certainly are. A recession would dramatically reduce stock prices, but it appears one may not happen for a long time. I suspect the most likely time for the next significant recession will be when the baby boomers are retired. At that time they will not anymore be a productive part of the economy and will incur a lot of health and social security expenses. The negative affect of their retirement on the economy along with their pulling money out of the stock market will put downward pressure on the stock market. For presidents to appeal to this major voting group they will have to make sure that these retirees get the full social security payments. Also, at this time oil reserves may be used up to the extent where oil supply will be decreased with no inexpensive alternative dramatically driving up the cost of much needed fuel which will negatively affect the world economy.

## 8. INVESTING RECOMMENDATIONS

### 8.1 General

Considering the irrational and manipulative forces in the stock market, my stock market investing suggestion is to put one portion of your money into stocks that look the best on a rational basis and has a business case that can be verified by you and are in a sector that the wall-street herd is in love with at the time. Put the other portion into stocks that look the best on a purely rational basis with a business case that can be verified by you. What percentage these portions are to be of the total depends upon how rational you think the stock market will be over the term you plan on holding the stocks.

Investors should educate themselves so they can wisely select a stock. One cannot always find a great stock, but one should at least be informed so that in case one comes across them from their screening process they could identify it. I recommend ordinary investors get a Fidelity account so that they can get for free the S&P investors monthly newsletter and other S&P publications which are often full of recommendations. By selecting the best of the S&P recommendations according to the techniques in this article I have recently done well without to much effort.

In searching for an undervalued stock, the key is to be able to differentiate between a genuine undervalued stock and one that just appears undervalued, but has hidden bad news. If there is a good deal one should invest quickly because good deals in especially large or medium "MC" stocks do not last for very long, sometimes just a few days. So one should be able to decide quickly. Not on emotion, but on already well-thought out and planned strategies. I hope the information in this article helps one to plan a good strategy to select a truly undervalued stock. If one is not able to then I suggest just buying the SP500 ticker SPY.

Emotions get involved with every bodies investing decisions. Hopefully, this article will cause them to see the rationale so they will hopefully make the best possible decision and not let their emotions make poor decisions. Timing the stock market is difficult and an investing stately should not depend good timing as an absolute requirement. Many people have often identified a good undervalued stock and then watch it go up some and felt they missed the buying opportunity so they put no money in and then watch it go up more and more and more. If the stock looks good rationally then the investors should not pay much attention to the historical price chart. If one wants to buy a certain stock but they do not think it is the right time, then they should at least put some money into it and then save some for later in case the stock drops in price. Not putting any money into the stock market until a certain low price is reached can leave one completely out of a bull market.

Investors should keep alert of news on stocks they own and stocks they considering buying in case something comes up that would allow for a well timed decision. If one makes a good decision and the stock happened to drop down then they should be buying more not selling out to just get rid of the negative emotions associated with a stock dropping below the price at which it was purchased. However, if new negative news indicates that according to rationale valuation and typical stock market response, the stock price will significantly drop some more for a long term, then regardless of the present losses the investor should sell out immediately because typically the stock will start loosing price immediately just after the market open in the morning after the bad news. However, be cautious if the bad news is just short term, because that day or the next few the stock price will start going right back up.

Also, monitor economic indicators to figure out if it is a "Bull" or "Bear" stock market atmosphere.

## 8.2 Specific

The table below present my past and present recommendations. Val. =  $P_R/P$ , in other words, the actual price increase if the actual price went to it's rational price; thus, it is the rational price increase potential. New recommendations will be published at Ref. 6. Also, if you know the author personally, send him a note to be on his stock mailing list then he will email you any changes to his recommendation list. This table should be just considered as advice and not a guarantee of future performance.

**Table 2. Specific stock recommendations.**

Date	Rec.	Syb	Price \$	PE <sub>1</sub>	Val. (%)	Re <sub>5</sub> (%)	% Price Chng.	Comments
6/3/1999	buy	orcl	27.4	30	32	25	198	Leader in electronic business for internet
6/4/1999	buy	thqi	13.3	10	284	24	60	Leader in video games
6/16/1999	buy	aapl	47.9	19	58	20	163	Has PC market niche that is expanding
6/16/1999	buy	hrly	12.3	9	286	22	44	Leader in military electronics
6/16/1999	buy	nvh	24.4	9	235	20	-35	Growing market share in class 5 RV's
6/21/1999	buy	symc	27.1	15	104	21	180	Leader in antivirus for internet
6/22/1999	buy	gtw	32.8	24	63	25	89	Good PC program
7/14/1999	buy	spf	13.3	6	222	15	-27	Low PE and in housing market
7/14/1999	buy	tbcc	7.6	9	51	8	-36	Leader in discount tire distribution
7/14/1999	buy	Xirc	32.1	20	96	25	42	Leader in mobile connectivity for internet
12/28/1999	buy	thqi	23.5	12	195	22	-9	Sony new play station coming
1/25/2000	buy	nvh	15.0	5	332	14	7	Concern over interest rates exaggerated
1/25/2000	buy	xirc	41.0	17	156	26	11	Recent drop
1/26/2000	buy	hrly	15.0	9	153	17	18	Starting to enter wireless
4/3/2000	Sell	xirc						Notebooks now sold with integral connections

## 9. REFERENCES

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