CHAPTER 12

THE IMPOSSIBLE DREAM? TIMING THE MARKET

It is every investor's dream to time the market and this occurs for obvious reasons. A successful market timer does not have to any skill at picking stocks since market timing alone will deliver extraordinary returns. In fact, we will begin this chapter by looking at the immense payoff that can come from timing the market well. This payoff to timing the market makes all of us easy victims for the next market-timing strategy. In this chapter, we consider a range of market timing strategies ranging from technical indicators to fundamental indicators to societal indicators. We look at the assumptions underlying each indicator and why they sometimes help us predict market movements.

In the final section of this chapter, we examine why market timing is so difficult to succeed at, relative to other investment philosophies. We also consider what allows market timing to succeed sometimes and whether we can replicate their success.

Market Timing: Payoff and Costs

The question of whether market timing has a big payoff and what its costs are arouses strong views from both practitioners and academics. While academics are fairly unified in their belief that market timing is not worth the time and resources that are expended on it, practitioners feel deeply on both sides of the issue. We will begin by looking at the payoffs to market timing and then consider the costs.

The Payoff to Market Timing

In a 1986 article, a group of researchers[1] raised the shackles of many an active portfolio manager by estimating that as much as 93.6% of the variation in quarterly performance at professionally managed portfolios could be explained by the mix of stocks, bonds and cash at these portfolios.[2] In a different study in 1992, Shilling examined the effect on your annual returns of being able to stay out of the market during bad months. He concluded that an investor who would have missed the 50 weakest months of the market between 1946 and 1991 would have seen his annual returns almost double from 11.2% to 19%. Ibbotson examined the relative importance of asset allocation and security selection of 94 balanced mutual funds and 58 pension funds, all of which had to make both asset allocation and security selection decisions. Using ten years of data through 1998, Ibbotson

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[1] See "Determinants of Portfolio Performance" by Brinson, Hood and Beebower.

[2] This is a much quoted and misquoted study. A survey by Nutall and Nutall found that of 50 writers who quoted this study, 37 misread it to indicate that 93% of the total return came from asset allocation.

finds that about 40% of the differences in returns across funds can be explained by their asset allocation decisions and 60% by security selection. When it comes to the level of returns, almost all of the returns can be explained by the asset allocation decision. Collectively, these studies suggest that the asset allocation decision has important consequences for your returns, and its importance increases with your time horizon.

While how much of actual portfolio returns are due to asset allocation is open to debate, there can be no denying its importance to overall portfolio returns. While the researchers looked at the allocation across financial assets – stocks, bonds and bills - alone, we would define the asset allocation decision much more broadly to include real assets, including real estate, and in the most general case, human capital. The asset allocation decision follows logically from the assessment of the risk preferences, cash needs and tax status of the investor. The portfolio manager has to decide on the mix of assets that maximizes the after-tax returns subject to the risk and cash flow constraints of the investor. This is what we would term the passive approach to asset allocation, where the investor's characteristics determine the right mix for the portfolio. In coming up with the mix, we draw on the lessons of diversification; asset classes tend to be influenced differently by macro economic events such a recessions or changes in inflation, and do not move in tandem. This, in turn, implies that diversifying across asset classes will yield better trade offs between risk and return than investing in any one asset class. The same can be said about expanding portfolios to include both domestic and foreign assets.

There is, however, an active component to asset allocation, which leads portfolio managers to deviate from the passive mix defined above, and one component is market timing. To the extent that portfolio managers believe that they can time markets, i.e., determine which markets are likely to go up more than expected and which less than expected, they will alter the asset mixes accordingly. Thus, a portfolio manager who believes that the stock market is over valued and is ripe for a correction, while real estate is under valued, may reduce the proportion of the portfolio that is allocated to equities and increase the proportion allocated to real estate. It should be noted that there are some who differentiate between these actions, that they call tactical asset allocation, and more drastic switches from stock to cash, which they call market timing. We see only a difference in degree and will draw no such distinction.

The Cost of Market Timing

If market timing were costless, you could argue that everyone should try to time markets, given the huge returns to getting it right. There are, however, significant costs associated with trying to time markets (and getting it wrong):

- In the process of switching from stocks to cash and back, you may miss the best years of the market. In an article, titled "The Folly of Stock Market Timing", Jeffrey examined the effects of annually switching from stock to cash and back from 1926 to 1982 and concluded that the potential downside vastly exceeds the potential upside. In his article on market timing in 1975, Bill Sharpe suggested that unless you can tell a good year from a bad year 7 times out of 10, you should not try market timing. This result is confirmed by Chua, Woodward and To, who use Monte Carlo simulations on the Canadian market and confirm you have to be right 70-80% of the time to break even from market timing.
- These studies do not consider the additional transactions costs that inevitably flow from market timing strategies, since you will trade far more extensively with these strategies. At the limit, a stock/cash switching strategy will mean that you will have to liquidate your entire equity portfolio if you decide to switch into cash and start from scratch again the next time you want to be in stocks.
- A market timing strategy will also increase your potential tax liabilities. To see why, assume that you have a strategy of selling your stocks after two good years in the market, based upon the empirical findings that a bad year is more likely to follow. You will have to pay capital gains taxes when you sell your stocks, and over your lifetime as an investor, you will pay far more in taxes.

In Summary

The perceived payoff from market timing is large and apparent, whereas the costs are often less visible. This must explain why so many portfolio managers and investors, their protestations to the contrary, engage in some market timing. In addition, the high profile of market strategists at all of the major investment firms suggests that the asset allocation decision is perceived to be an important one.

Its appeal to investors, notwithstanding, market timing remains an elusive dream for most. Looking back at market history, there have been far fewer successful market timers than successful stock selectors, and it is not clear whether even the few successes that can be attributed to market timing are more attributable to luck. Why is it so difficult to succeed at market timing? One very important reason is that there are fewer potential differential advantages that investors can build on when it comes to timing markets. For instance, it is unlikely that one can acquire an informational advantage over other investors at timing markets, but it is still possible, with sufficient research and private information, to get an informational advantage at picking stocks. Market timers contend that they can take existing information and use it more creatively or in better models to arrive at predictions for

markets, but such approaches can be easily imitated, and imitation is the kiss of death for successful investment strategies.

Market Timing Approaches

There as probably as many market timing approaches as there are investors. Some of these approaches are based upon non-financial indicators, some on macroeconomic variables such as interest rates and business cycles and some draw on the valuation tools that we used to analyze individual stocks – discounted cashflow and relative valuation models.

Market Timing based upon Non-financial Indicators

Through the decades, there are some investors who have claimed to foretell the market's future by looking at non-financial indicators. Some of these indicators, such as whether the NFC or AFC team wins the Super Bowl are clearly of dubious origin and would fall into a category that we title spurious indicators. Other indicators such as the hemline index, which relates stock prices to the length of hemlines on skirts, fall into the grouping of "feel good indicators" that measure the overall mood of people in the economy, who after all are both the consumers who act as the engine for the economy and as investors determining prices. Finally, there are the "hype indicators" that measure whether market prices are becoming disconnected from reality.

Spurious Indicators

Millions of investors track what happens to their stocks and to the market every day and it is not surprising that they find other occurrences that seem to predict what the market will do in the next period. Consider one very widely talked-about indicator – who wins the Super Bowl.[3] In the 35 years that the Super Bowl has been played from 1966 to 2001, the winner has come from the National Football Conference (or is an old pre-merger NFL team like the Steelers or Colts) 25 years, and the market has risen in 22 out of the 25 years. In the 10 years that an American Football Conference team has won, the market has fallen 7 times. In fact, there are academic researchers who claim that the success rate of 83% (29 out of 35 years) is far too high to due to chance. [4]

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[3] For those unfamiliar with the Super Bowl, it is played between the winner of the American Football Conference (AFC) and the winners of the National Football Conference (NFC). It is played on the last Sunday in January.

[4] See Krueger and Kennedy, who claim to have been first to spot the correlation.

So why not invest in the market after observing who wins the Super Bowl? There are several potential problems. First, we disagree that chance cannot explain this phenomenon. When you have hundreds of potential indicators that you can use to time markets, there will be some that show an unusually high correlation purely by chance. Second, a forecast of market direction (up or down) does not really qualify as market timing, since how much the market goes up clearly does make a difference. Third, you should always be cautious when you can find no economic link between a market timing indicator and the market. There is no conceivable reason who wins the Super Bowl should affect or be correlated with overall economic performance. Indicators such as these may make for amusing anecdotes at parties but can be lethal to your portfolio as market timing devices.

Feel Good Indicators

When people feel optimistic about the future, it is not just stock prices that are affected by this optimism. Often, there are social consequences as well, with styles and social mores affected by the fact that investors and consumers feel good about the economy. In the 1920s, for instance, you had the Great Gatsby and the go-go years, as people partied and the markets zoomed up. In the 1980s, in another big bull market, you had the storied excesses of Wall Street, documented in books like Liars Poker and movies like Wall Street. It is not surprising, therefore, that people have discovered linkages between social indicators and Wall Street. Consider, for instance, an index that has been around for decades called the hemline index that finds a correlation between the hemlines on women's skirts and the stock market. This politically incorrect index is based on the notion that shorter dresses and skirts are associated with rising stock prices whereas longer dresses are predictors of stock market decline. Assuming the index works, we would argue that you are seeing a manifestation of the same phenomenon. As people get more upbeat, fashions do seem to get more daring (with higher hemlines following) and markets also seem to go up. You could undoubtedly construct other indices that have similar correlations. For instance, you should expect to see a high correlation between demand at highly priced restaurants at New York City (or wherever young investment bankers and traders go) and the market.

The problem with feel good indicators, in general, is that they tend to be contemporaneous or lagging rather than leading indicators. In other words, the hemlines don't drop before the markets drop but in conjunction with or after a market drop. As an investor, these indicators are off little use, since your objective is to get out before the market drops and to get in before the market goes up.

Hype Indicators

It is said that Joseph Kennedy, a well known speculator on stocks in his own time, knew it was time to get out of the market when he heard his shoe-shine boy talking about stocks. In our own time, there are some who believe that the market peaked when financial channel CNBC's ratings exceeded those of long-running soap operas. In fact, one recent indicator called the "cocktail party chatter" indicator tracks three measures – the time elapsed at a party before talk turns to stocks, the average age of the people discussing stocks and the fad component of the chatter. According to the indicator, the less time it takes for the talk to turn to stocks, the lower the average age of the market discussants and the greater the fad component, the more negative you should be about future stock price movements.

Harking back to our discussion of bubbles, remember that propagation is critical to bubbles getting bigger. In our media world, this will involve print, television and the internet and an overflow into day-to-day conversations. Thus, the discussion at the water cooler in a typical business is more likely to be about stocks than about football or other such daily (and more normal) obsessions, when markets are buoyant.

While hype indicators, of all non-financial indicators, offer the most promise as predictors of the market, they do suffer from several limitations. For instance, defining what constitutes abnormal can be tricky in a world where standards and tastes are shifting – a high rating for CNBC may be indicate too much hype or may be just reflecting of the fact that viewers find financial markets to be both more entertaining and less predictable than a typical soap opera. Even if we decide that there is an abnormally high interest in the market today and you conclude (based upon the hype indicators) that stocks are over valued, there is no guarantee that stocks will not get more overvalued before the correction occurs. In other words, hype indicators may tell you that a market is overvalued, but they don't tell you when the correction will occur.

Market Timing based upon Technical Indicators

In chapter 7, we examined a number of chart patterns and technical indicators used by analysts to differentiate between under and over valued stocks. Many of these indicators are also used by analysts to determine whether and by how much the entire market is under or over valued. In this section, we consider some of these indicators.

Past Prices

In chapter 7, we looked at evidence of negative long term correlation in stock prices – stocks that have gone up the most in recent periods are more likely to go down in future periods. Studies do not seem to find similar evidence when it comes to the overall market. If markets have gone up significantly in the most recent years, there is no evidence that market

returns in future years will be negative. If we consolidate stock returns from 1871 to 2001, into five-year periods, we find a positive correlation of .2085 between five-year period returns – in other words, positive returns over the last five years are more likely to be followed by positive returns than negative returns in the next 5 years. In table 12.1, we report on the probabilities of an up-year and a down-year following a series of scenarios, ranging from 2 down years in a row to 2 up years in a row, based upon actual stock price data from 1871 to 2001.

Table 12.1:Market Performance

Priors	*Number of occurrences*	*% of positive returns*	*Average return*
After two down years	19	57.90%	2.95%
After one down year	30	60.00%	7.76%
After one up year	30	83.33%	10.92%
After two up years	51	50.98%	2.79%

It is true that markets are more likely to go down after two years of positive performance than under any other scenario, but there is also evidence of price momentum, with the odds of an up year increasing if the previous year was an up year. Does this mean that we should sell all our stocks after two good years? We don't think so, for two reasons. First, the probabilities of up and down years do change but note that the likelihood of another good year remains more than 50% even after 2 consecutive good years in the market. Thus, the cost of being out of the market is substantial with this market timing strategy. Second, the fact that the market is overpriced does not mean that all stocks are over priced. As a stock picker, you may be able to find under valued stocks even in an over priced market.

Another price-based indicator that receives attention at least from the media at the beginning of each calendar year is the January indicator. The indicator posits that as January goes, so goes the year – if stocks are up, the market will be up for the year, but a bad beginning usually precedes a poor year.[5] According to the venerable Stock Trader's Almanac that is compiled every year by Yale Hirsch, this indicator has worked 88% of the time. Note, though that if you exclude January from the year's returns and compute the returns over the remaining 11 months of the year, the signal becomes much weaker and returns are negative only 50% of the time after a bad start in January. Thus, selling your stocks after stocks have gone down in January may not protect you from poor returns.

[5] Note that there are narrower versions of the January indicator, using just the first 5 or 10 days of January.

Trading Volume

There are some analysts who believe that trading volume can be a much better indicator of future market returns than past prices. Volume indicators are widely used to forecast future market movements. In fact, price increases that occur without much trading volume are viewed as less likely to carry over into the next trading period than those that are accompanied by heavy volume. At the same time, very heavy volume can also indicate turning points in markets. For instance, a drop in the index with very heavy trading volume is called a selling climax and may be viewed as a sign that the market has hit bottom. This supposedly removes most of the bearish investors from the mix, opening the market up presumably to more optimistic investors. On the other hand, an increase in the index accompanied by heavy trading volume may be viewed as a sign that market has topped out. Another widely used indicator looks at the trading volume on puts as a ratio of the trading volume on calls. This ratio, which is called the put-call ratio is often used as a contrarian indicator. When investors become more bearish, they sell more puts and this (as the contrarian argument goes) is a good sign for the future of the market.

Technical analysts also use money flow, which is the difference between uptick volume and downtick volume, as predictor of market movements. An increase in the money flow is viewed as a positive signal for future market movements whereas a decrease is viewed as a bearish signal. Using daily money flows from July 1997 to June 1998, Bennett and Sias find that money flow is highly correlated with returns in the same period, which is not surprising. While they find no predictive ability with short period returns – five day returns are not correlated with money flow in the previous five days – they do find some predictive ability for longer periods. With 40-day returns and money flow over the prior 40 days, for instance, there is a link between high money flow and positive stock returns.

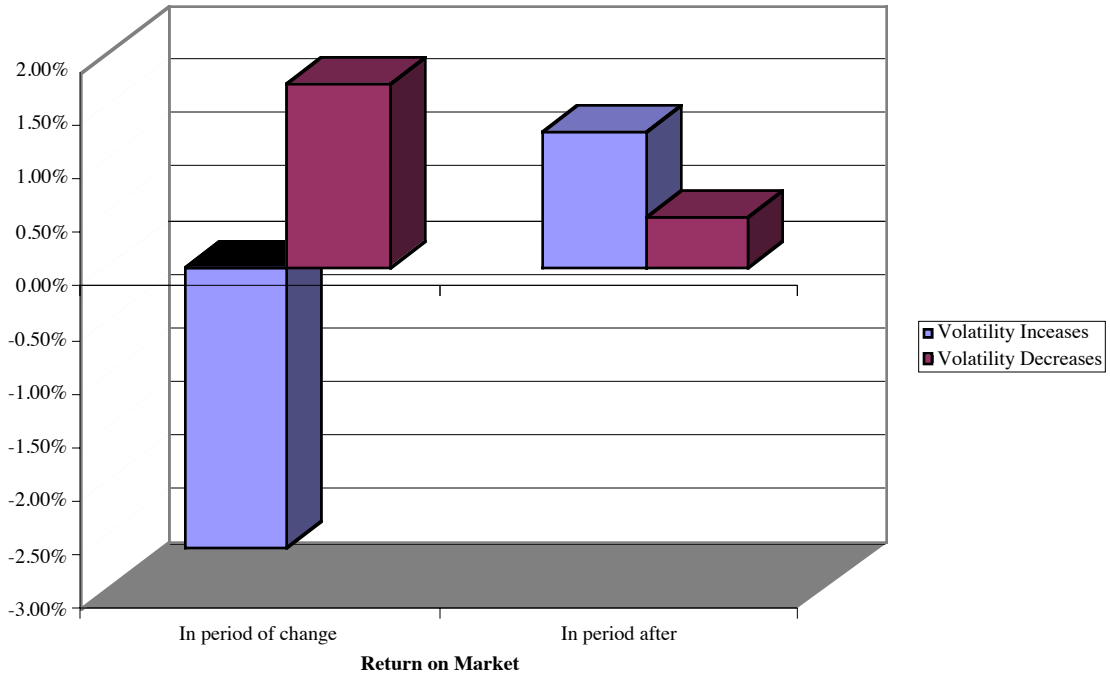
Chan, Hameed and Tong extend this analysis to global equity markets. They find that equity markets show momentum – markets that have done well in the recent past are more likely to continue doing well,, whereas markets that have done badly remain poor performers. However, they find that the momentum effect is stronger for equity markets that have high trading volume and weaker in markets with low trading volume.

Volatility

In recent years, a number of studies have uncovered a relationship between changes in market volatility and future returns. One study by Haugen, Talmor and Torous in 1991 found that increases in market volatility cause an immediate drop in stock prices but that stock returns increase in subsequent periods. They looked at daily price volatility from 1897 through 1988 and look for time periods where the volatility has increased or decreased

significantly, relative to prior periods. [6] They then look at returns both at the time of the volatility change and in the weeks following for both volatility increases and decreases, and their results are summarized in Figure 12.1:

Figure 12.1: Returns around volatility changes



Source: Haugen, Talmor and Torous

Note that volatility increases cause stock prices to drop but that stock prices increase in the following four weeks. With volatility decreases, stock prices increase at the time of the volatility change, and they continue to increase in the weeks after, albeit at a slower pace.

Does this mean that you should buy stocks after an increase in volatility? Not necessarily. The increase in returns in the weeks following a volatility increase may just reflect the reality that stocks are riskier. However, if you believe that a surge in volatility is temporary and that stock volatility will revert back to normal levels, a strategy of buying stocks after an increase in equity market volatility may bear fruit.

Other Technical Indicators

There are a number of non-price indicators that are used by analysts to forecast future market movements. As with stock-specific technical indicators, market-wide

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[6] Daily price volatility is estimated over four week windows. If the volatility in any four week window exceeds (falls below) the volatility in the previous four-week window (at a statistical significance level of 99%), it is categorized as an increase (decrease) in volatility.

indicators are often used in contradictory ways by momentum and contrarian analysts, with an increase in a specific indicator being viewed as bullish by one group and bearish by the other. Since we did cover technical indicators in depth in chapter 7, we will make only a short mention of some of these indicators in this section, categorized into price and sentiment indicators:

- Price indicators include many of the pricing patterns that we discussed in chapter 8. Just as support and resistance lines and trend lines are used to determine when to move in and out of individual stocks, they are also used to decide when to move in and out of the stock market.
- Sentiment indicators try to measure the mood of the market. One widely used measure is the confidence index which is defined to be the ratio of the yield on BBB rated bonds to the yield on AAA rated bonds. If this ratio increases, investors are becoming more risk averse or at least demanding a higher price for taking on risk, which is negative for stocks. Another indicator that is viewed as bullish for stocks is aggregate insider buying of stocks. When this measure increases, according to its proponents, stocks are more likely to go up.[7] Other sentiment indicators include mutual fund cash positions and the degree of bullishness among investment advisors/newsletters. These are often used as contrarian indicators – an increase in cash in the hands of mutual funds and more bearish market views among mutual funds is viewed as bullish signs for stock prices.[8]

While many of these indicators are used widely, they are mostly backed with anecdotal rather than empirical evidence.

Market Timing based upon Normal Ranges (Mean Reversion)

There are many investors who believe that prices tend to revert back to what can be called normal levels after extended periods where they might deviate from these norms. With the equity market, the normal range is defined usually in terms of price earnings (PE) ratios whereas with the bond market, a normal range of interest rates is used to justify betting on market direction.

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[7] Chowdhury, Howe and Lin (1993) find a positive correlation between aggregate insider buying and market returns but report that a strategy based upon the indicator would not earn enough to cover transactions costs.

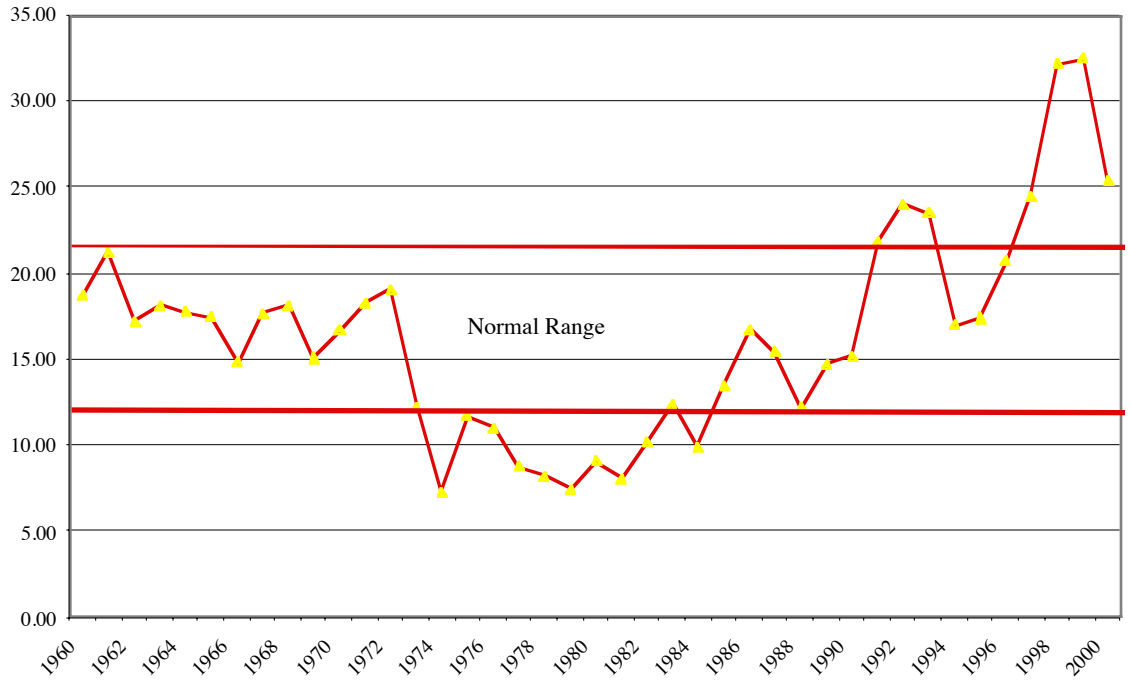
[8] See "Investor sentiment and Stock Returns' by Fisher and Statman, Financial Analysts Journal, March/april 2000. They examined three sentiment indicators – the views of Wall Street strategists, investment newsletters and individual investors - and concluded that there is indeed evidence supporting a contrarian investment strategy

Is there a normal range for PE ratios?

Buy if the PE drops below 12 and sell if it rises above 18. You will see variations of this advice in many market timing newsletters. A more academic version of this argument was made by Campbell and Shiller who looked at PE ratios from 1871 to recent years and concluded that stocks revert back to a PE ratio of about 16 times normalized earnings. They defined normalized earnings as the average earnings over the previous 10 years. The implicit belief here is that there is a normal range for PE ratio and that if the PE rises above the top end of the range, stocks are likely to be overvalued, whereas if they fall below the bottom of the range, they are likely to be overvalued. While the approach is straightforward, where does the normal range of PE ratios come from? In most cases, it seems to come from looking at history and attaching a subjective judgment on the upper and lower limits. A slightly more sophisticated approach to estimating a range would require us to estimate the standard deviation in PE ratios over time and use it to compute a range – two standard deviations on either side of the average would give you a range outside which you should fall only 5% of the time by chance.

Consider, for instance, figure 12.2 which presents PE ratios for the S&P 500 going back to 1960.

Figure 12.2: PE Ratio for S&P 500: 1960-2001



We have attempted to draw a normal range for interest rates in the United States, based upon history, though it indicates the subjective judgments that we had to make along the

way. Based upon our band, stocks would be considered as overvalued if they traded at a PE ratio greater than 22 or less than 12.

The limitations of this approach should be obvious. In addition to trusting history to repeat itself, we are making two other assumptions. The first is that we can identify a normal trading range by looking at historical data. As you can see from the graph, you will not get any consensus – someone else looking at this graph might end up with a different band for PE. The second assumption is that the fundamentals have not shifted significantly over time. If interest rates are much lower today than they have been historically, you would expect stocks to trade at much higher PE ratios than they have historically. How much higher? We will look at this question in more detail in the later parts of this chapter.

PE Ratios for U.S stocks: Take a look at the PE ratio for the S&P 500 each year going back to 1960.

Normal Range of Interest Rates

Some analysts hypothesize that market interest rates move within a normal range. Under this hypothesis, when interest rates approach the high end of the range, they are more likely to decrease, and when they approach the low end of the range, they are more likely to increase. This hypothesis is corroborated by two pieces of evidence:

1. Slope of the Yield Curve: The yield curve, which reflects future expectations about interest rates, is more likely to be downward sloping when interest rates are high than when there are low. Thus, investors are more likely to expect interest rates to come down if they are high now and go up, if they are low now. Table 12.2 below summarizes the frequency of downward sloping yield curves as a function of the level of interest rates.[9]

Table 12.2: Yield Curves and the Level of Interest Rates

	1-year Corporate Bond Rate	*Slope of Yield Curve*		
		Positive	*Flat*	*Negative*
	Above 4.40%	0	0	20
1900-70	3.25% - 4.40%	10	10	5
	Below 3.25%	26	0	0
1971-2000	Above 8.00%	4	1	3
	Below 8.00%	15	6	1

[9] Some of this table is extracted from Wood (1984).

This evidence is consistent with the hypothesis that maintains interest rates move within a normal range; when they approach the upper end (lower end) of the normal range, the yield curve is more likely to be downward sloping (upward sloping).

2. Interest rate level and expected change: More significantly, investors' expectations about future interest rate movements seem to be borne out by actual changes in interest rates. When changes in interest rates are regressed against the current level of interest rates, there is a negative and significant relationship between the level of the rates and the change in rates in subsequent periods, i.e., there is a much greater likelihood of a drop in interest rates next period if interest rates are high in this one, and a much greater chance of rates increasing in future periods if interest rates are low in this one. For instance, using treasury bond rates from 1970 to 1995 and regressing the change in interest rates (Δ Interest Rate$_t$) in each year against the level of rates at the end of the prior year (Interest Rate$_{t-1}$), we arrive at the following results:

$$\Delta \text{ Interest Rate}_t = 0.0139 - 0.1456 \text{ Interest Rate}_{t-1} \qquad R^2=.0728$$
$$(1.29) \qquad (1.81)$$

This regression suggests two things. One is that the change in interest rates in this period is negatively correlated with the level of rates at the end of the prior year; if rates were high (low), they were more likely to decrease (increase). Second, for every 1% increase in the level of current rates, the expected drop in interest rates in the next period increases by 0.1456%.

This evidence has to be considered with some caveats. The first is that the proportion of interest rate changes in future periods explained by the current level of rates is relatively small (about 7.28%); there are clearly a large number of other factors, most of which are unpredictable, that affect interest rate changes. The second is that the normal range of interest rates, which is based upon past experience, might shift if the underlying expectations of inflation change dramatically as they did in the 1970s in the United States. Consequently, many firms that delayed borrowing in the early part of that decade, because they thought that interest rates were at the high end of the range, found themselves facing higher and higher rates in each of the following years.

Hindsight is 20/20

Market timing always seems simple when you look back in time. After the fact, you can always find obvious signals of market reversals – bull markets turning to bear markets or vice versa. Thus, in 2001, there were investors who looked back at 1999 and bemoaned the fact that they missed getting out of stocks when the market topped at the end of that

year. At that time, though, the signs were not so obvious. There were analysts who argued that the market was overvalued and indicators that supported that point of view, but there were just as many analysts, if not more, who saw the market continuing to rise and had supporting models.

.In practice, there is almost never a consensus among investors on whether markets have hit bottom or peaked at the time that it occurs. It is an interesting fact that optimism about the future is greatest just as markets top out and the market mood is darkest just as markets turn around. To succeed at market timing, you cannot wait until a bottom has been established before buying or for a market top before selling. If you do, you will miss much of the subsequent payoff.

Market Timing based upon Fundamentals

Just as the prices of individual stocks must reflect their cashflows, growth potential and risk, entire markets (equity, bond and real asset) have to reflect the fundamentals of these assets. If they do not, you can argue that they are misvalued. In this section, we consider two ways in which we can bring fundamentals into market timing models. In the first, we try to develop market timing strategies based upon the level of fundamental variables – interest rates and economic growth, for instance. In the second, we try to extend the valuation techniques developed for individual stocks to markets.

Fundamental Indicators

You can try to time markets by developing simple signals based upon macro economic variables. In this section, we will consider some of these signals – some old and some new – that have been used by portfolio managers as market timing tools.

Short term Interest Rates

Buy stocks when short-term rates (treasury bills) are low and sell them when short term rates are high, or so goes the conventional wisdom. But is there a basis to this advice? In table 12.3, we examine stock returns under four treasury bill scenarios –after a decline in rates of more than 1% over the prior year, a drop of between 0 and 1%, an increase in rates of less than 1% and an increase of more than 1% between 1928 and 2001.

Table 12.3: Stock Returns and Treasury Bill Rates

		In following year	
Change in T.Bill rate	*Number of years*	*% of up years*	*Average Annual returns*
Drop by more than 1%	10	70%	10.58%
Drop between 0 and 1%	24	75%	13.17%

Increase between 0 and 1%	26	69.23%	11.94%
Incrase more than 1%	13	61.54%	8.90%

In this case, there is surprisingly strong empirical evidence backing up the proposition that a drop in the treasury bill rate seems to predict high stock market returns. Generally speaking, markets are more likely to go up in years after the treasury bill rate has decreased and earn higher returns for investors.[10]

This result has been confirmed by a number of academic studies. In 2001, Ang and Baekart documented that treasury bill rates dominate other variables as a predictor of short term stock market movements. A 1989 study by Breen, Glosten and Jagannathan evaluated a strategy of switching from stock to cash and vice versa, depending upon the level of the treasury bill rate and conclude that such a strategy would have added about 2% in excess returns to an actively managed portfolio.

In a 2002 study that does raise cautionary notes about this strategy, Abhyankar and Davies examine the correlation between treasury bill rates and stock market returns in sub-periods from 1929 to 2000. They find that almost all of the predictability of stock market returns comes from the 1950-1975 time period, and that short term rates have had almost no predictive power since 1975. They also conclude that short rates have more predictive power with the durable goods sector and with smaller companies than they do with the entire market.

In conclusion, then, you should be aware of how high or low short term rates are when you invest in the market, but the value of short term rates as a predictor of stock market movements has decreased over the last few decades. Its remaining predictive power seems to be restricted to the short term and to sub-sectors of the market.

Treasury Bond Rate

Intuitively, it is the treasury bond rate – the long-term riskless rate – that should have a much stronger impact on stock prices, since it offers a direct alternative to investing in stocks for the long term. If you can make 8% investing risklessly in treasuries for the next 30 years, why would you settle for less when investing in stocks? Thus, we should expect to see stock prices go up if the treasury bond rate comes down and go down, if the rate goes up. Figure 12.3 presents a scatter plot of returns on stock returns each year and the T.Bond rate at the end of the prior year:

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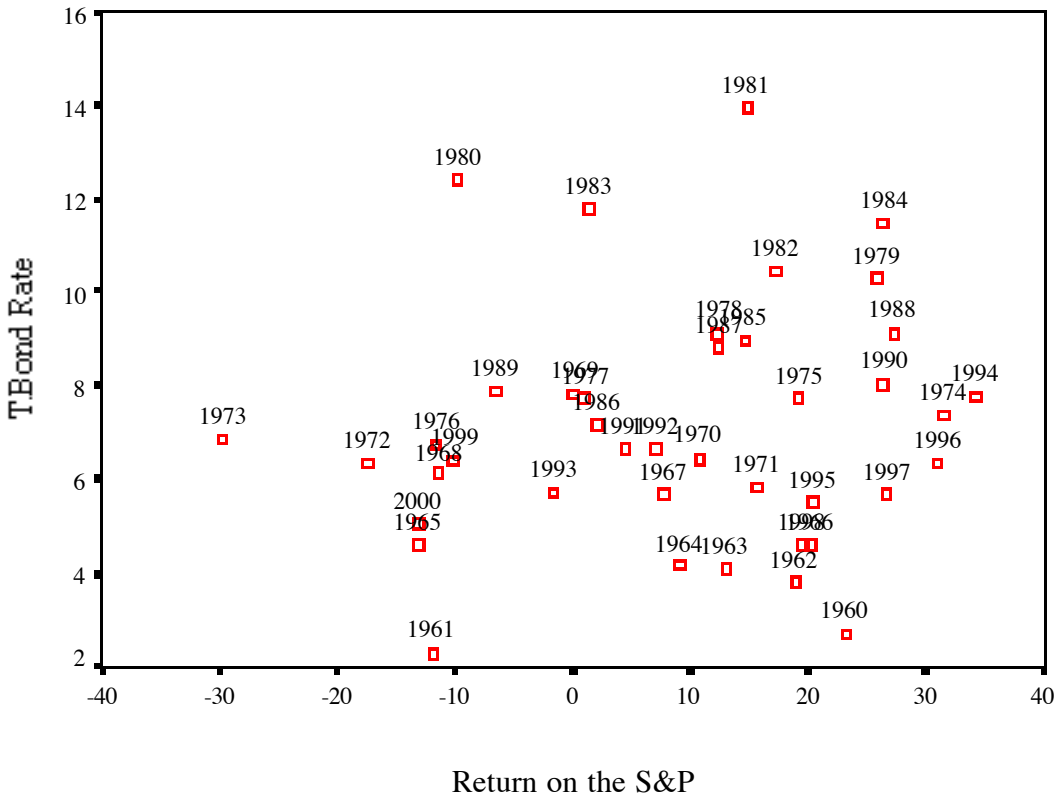
[10] You could do a similar study using the level of treasury bill rates, but treasury bill rates were much lower prior to the second world war.

Figure 12.3: T.Bond Rates and Stock Returns



In 1981, for instance, the treasury bond rate at the start of the year was 14% and the return on the stock index during the year was 15%. In 1961, the treasury bond rate was 2% and the return on stocks during the year was –11%. If there is a relationship between treasury bond rates at the start of a period and stock returns during the period, it is not strong enough to be obvious and there seems to be little support for the proposition that stock returns are high when interest rates are low and low when interest rates are high. In fact, stocks did very well in 1982, even though interest rates were very high at the beginning of the year and very badly in 1961, notwithstanding the fact that the treasury bond rate was only 2% at the end of the prior year.

This link between treasury bond rates and stock returns should become even stronger if we consider how much we can earn as a return on stocks. You could define this return narrowly as the dividend yield (dividends/current stock prices) or use a much broader measure, such as earnings yield, which looks at the overall earnings on the market as a percent of the current level of the index. The earnings yield is the inverse of the price earnings ratio and is used widely by market strategists. Rather than focus on the level of the treasury bond rate, market strategists often look at the difference between earnings yields

and the treasury bond rate. In simpler terms, they believe that it is best to invest in stocks when earnings yields are high, relative to the treasury bond rate. In fact, there are some strategists who believe that stocks are over valued when the earnings yield is lower than the treasury bond rate. To examine this proposition, we looked at the difference between the earnings yield and the T.Bond rate at the end of every year from 1960 to 2000 and the returns on the S&P 500 in the following year (see table 12.4)

Table 12.4: Earnings Yield, T.Bond Rates and Stock Returns: 1960 –2001

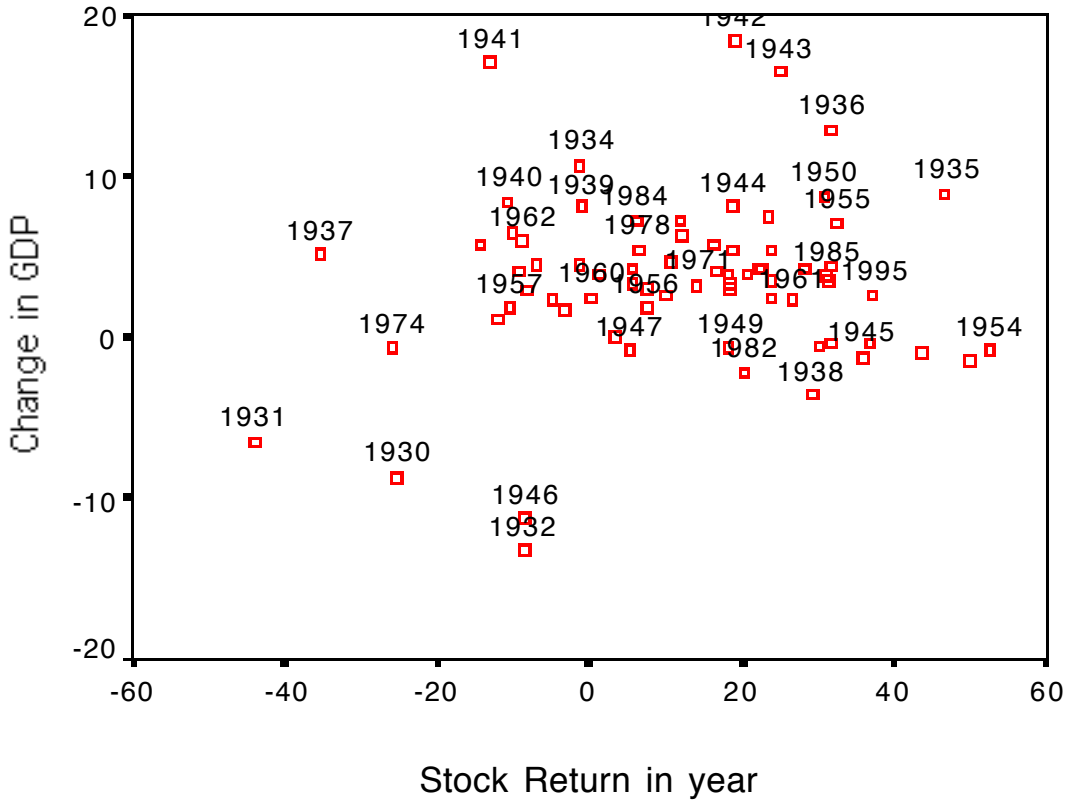
Earnings yield - T.Bond Rate	*Number of years*	*Average*	*Standard Deviation*	*Maximum*	*Minimum*
> 2%	8	11.33%	16.89%	31.55%	-11.81%
1 -2%	5	-0.38%	20.38%	18.89%	-29.72%
0-1%	2	19.71%	0.79%	20.26%	19.15%
-1-0%	6	11.21%	12.93%	27.25%	-11.36%
-2-1%	15	9.81%	17.33%	34.11%	-17.37%
< -2%	5	3.04%	8.40%	12.40%	-10.14%

The relationship is tenuous at best. When the earnings yield exceeds the treasury bond rate by more than 2%, which has occurred in 8 out of the 41 years, the return on the S& P 500 in the following year has averaged 11.33%. However, the returns are almost as good when the earnings yield has lagged the treasury bond rate by zero to 1%. It is true that the annual returns are only 3.04% in the five years following periods when the earnings yield was lower than the treasury bond rate by more than 2%, but the annual returns were also negative in the 5 years when the earnings yield exceeded the treasury bond rate by 1-2%. Thus, there seems to be little historical support for using earnings yield and treasury bond rates to predict future stock market movements.

Business Cycles

As with treasury bonds, there is an intuitive link between the level of stock prices and economic growth. You would expect stocks to do much better in economic booms than during recessions. What makes this relationship tricky, however, is that market movements are based upon predictions of changes in economic activity in the future, rather than levels of activity. In other words, you may see stock prices rising in the depths of a recession, if investors expect the economy to begin recovering in the next few months. Alternatively, you may see stock prices drop even in the midst of robust economic growth, if the growth does not measure up to expectations. In figure 12.4, we have graphed the S&P 500 index and GDP growth going back to 1960:

Figure 12.4: Real GDP Growth and Stock Retur



There is a positive relationship between GDP growth during a year and stock returns during the year, but there is also a lot of noise in the relationship. Even if the relationship were strong enough to pass muster, you cannot use it for market timing unless you can forecast real economic growth. The real question then becomes whether you can make forecasts of future stock market movements after observing economic growth in the last year. To examine whether there is any potential payoff to investing after observing economic growth in the prior year, we looked at the relationship between economic growth in a year and stock returns in the following year, using data from 1929 to 2001 in table 12.5:

Table 12.5:Real Economic Growth as a predictor of Stock Returns: 1960 – 2001

		Returns in Next Year			
GDP Annual Growth	*Number of years*	*Average Return*	*Standard deviation in returns*	*Best Year*	*Worst Year*
>5%	23	10.84%	21.37%	46.74%	-35.34%
3.5%-5%	22	14.60%	16.63%	52.56%	-11.85%
2-3.5%	6	12.37%	13.95%	26.64%	-8.81%

0-2%	5	19.43%	23.29%	43.72%	-10.46%
<0%	16	9.94%	22.68%	49.98%	-43.84%
All years	72	12.42%	19.50%	52.56%	-43.84%

There seems to be no clearly discernible relationship between returns next year and GDP growth this year. It is true that the years with negative GDP growth are followed by the lowest stock returns, but the average stock returns in this scenario are barely higher than the average returns you would have earned if you had bought after the best economic growth years (growth exceeds 5%).

If you can forecast future growth in the economy, it can be useful at two levels. One is in overall market timing, since you will steer more of your funds into stocks prior to better-than-expected economic growth and away from stocks when you foresee the economy slowing. You can also use the information to over invest in those sectors that are most sensitive to the economic cycle – automobile and housing stocks, for instance – if you believe that robust economic growth is around the corner.

Intrinsic Value Models

One way in which we can take the individual fundamentals that we considered in the last section and consolidate them into one market view is to do an intrinsic valuation of the entire market. What, you might ask, is an intrinsic valuation? Back in chapter 4, we consider how an individual stock can be valued using a discounted cash flow model as the present value of expected cashflows in the future. A market is composed of individual assets, and if individual assets can be valued using discounted cashflow models, we see no reason why the entire market cannot be valued as the present value of expected cashflows. In this section, we consider how best to extend discounted cashflow models to valuing the market, and the value that may be added from doing so.

Extending DCF Models to the Market

Consider, for instance, the dividend discount model that we introduced in chapter 4. We argued that the value of a stock can be written as the present value of the expected dividends from owning the stock, discounted back at the cost of equity. Extending this argument to an index, the value of an index can also be written as the present value of the expected dividends on the index. Thus, if the dividends on the entire stock index are expected to be $ 40 next year, the expected growth rate in perpetuity is expected to be 4% and the cost of equity for the average risk stock is expected to be 9%, you could value the index as follows:

Value of index = Expected dividends next year / (Cost of equity – Expected growth rate)

= 40 / (.09 - .04) = 800

As with an individual stock, this model can be extended to allow for high growth. Thus, if you expected dividends to grow 10% a year for the next 5 years and then expect the growth rate to drop to 4% in perpetuity, the value of the index can be computed in Table 12.6.

Table 12.6: Valuing an Index with High Growth

	Dividends	Terminal value	Present Value
1	$40.00		$36.70
2	$44.00		$37.03
3	$48.40		$37.37
4	$53.24		$37.72
5	$58.56	$1,218.13	$829.76
	Value of Index =		$978.59

Note that the dividends grow at 10% until year 5 and that the terminal value of the index is based upon a 4% growth rate forever.

Terminal value – 58.56 (1.04)/(.09-.04) = $1,218.13

We noted one limitation of dividend discount models is that companies may not pay out what they can afford to in dividends or may choose alternative ways of returning cash to stockholders (stock buybacks, for instance). You can modify this model by replacing dividends with potential dividends (free cashflows to equity for the index) or by augmenting dividends with stock buybacks on the index.

Some Caveats

While the building blocks for discounted cashflow valuation may remain the same for individual stocks and the markets, there are some cautionary notes that need to be added when valuing entire markets.

- While we allowed for the possibility of high growth in the last section, you should be much more cautious about assuming high growth, both in terms of the growth rate and how long high growth will continue - for a market than you would be for an individual stock, especially when the market is broadly based. Consider, for instance, the S&P 500. Since it includes the 500 companies with the largest market capitalization, arguing that earnings for these companies will grow at a rate much higher than the growth rate of the economy implies that the profit margins of these companies will increase over time. While this is feasible in the short term, especially

if the economy is coming out of a recession or if firms are restructuring, we do not see how this can be sustained in the long term.

- The cost of equity that we are considering here is the cost of equity for the entire index. If we are considering a broadly based equity index, this cost of equity should reflect the riskless rate and the risk premium that investors demand for investing in equities as a class.

On the plus side, you should have less trouble forecasting earnings and dividends for an index than you should with individual stocks. After all, you have the luxury of diversification. In other words, you may over estimate earnings on some stocks and under estimate earnings on other stocks, but your overall measure of earnings can still be fairly precise.

Illustration 12.1: Valuing the S&P 500 using a dividend discount model: January 1, 2001

On January 1, 2001, the S&P 500 index was trading at 1320. The dividend yield on the index based upon dividends paid in 2000 was only 1.43%, but including stock buybacks (from 2000) increases the composite dividend yield (dividends + stock buybacks) to 2.50%. Analysts were estimating that the earnings of the stocks in the index would grow 7.5% a year for the next 5 years. Beyond year 5, the expected growth rate is expected to be 5%, the nominal growth rate in the economy. The treasury bond rate was 5.1% and we will use a market risk premium of 4%, leading to a cost of equity of 9.1%:

*Intrinsic value of S*P 500 index*: Take a look at the most recent valuation of the S&P 500.

Cost of equity = 5.1% + 4% = 9.1%

The expected dividends (and stock buybacks) on the index for the next 5 years can be estimated from the current dividends and expected growth of 7.50%.

Current dividends = 2.50% of 1320 = 33.00

	1	*2*	*3*	*4*	*5*
Expected Dividends =	$35.48	$38.14	$41.00	$44.07	$47.38
Present Value =	$32.52	$32.04	$31.57	$31.11	$30.65

The present value is computed by discounting back the dividends at 9.1%. To estimate the terminal value, we estimate dividends in year 6 on the index:

Expected dividends in year 6 = $47.38 (1.05) = $49.74

$$\text{Terminal value of the index} = \frac{\text{Expected Dividends}_6}{r - g} = \frac{\$49.74}{0.091 - 0.05} = \$1213$$

Present value of Terminal value = $\frac{\$1213}{1.091^5} = \$785$

The value of the index can now be computed:

Value of index = Present value of dividends during high growth + Present value of terminal value = $32.52+32.04+31.57+$31.11+ $30.65+ $785 = 943

Based upon this, we would have concluded that the index was over valued at 1320.

How well do intrinsic valuation models work?

How well would a strategy of buying the index when it is intrinsically undervalued and selling when it is intrinsically overvalued do? It is difficult to answer this question because it depends upon the inputs you estimate for the intrinsic valuation model and your time horizon. Generally speaking, the odds of succeeding increase as the quality of your inputs improves and your time horizon lengthens. Eventually, markets seem to revert back to intrinsic value but eventually can be a long time coming.

There is, however, a significant cost associated with using intrinsic valuation models when they find equity markets to be overvalued. If you take the logical next step of not investing in stocks when they are overvalued, you will have to invest your funds in either other securities that you believe are fairly valued (such as short term government securities) or in other asset classes. In the process, you may end up out of the stock market for extended periods while the market is, in fact, going up. For instance, most intrinsic value models would have suggested that the equity market in the United States was overvalued starting in 1994. If you had followed through and not invested in equities until 2002 (when the models suggested that valuations were fair again), you would have lost far more (by not investing in the bull market between 1994 and 2000) than you would have gained (by not investing in the down markets of 2001 and 2002).

The problem with intrinsic value models is their failure to capture permanent shifts in attitudes towards risk or investor characteristics. This is because so many of the inputs for these models come from looking at the past. Thus, the risk premium used to come up with the cost of equity may have been estimated looking at historical data on stock and bond returns and dividends may reflect what companies did last year. If one or both have changed as a consequence of shifts in the market, you will get a misleading signal from intrinsic valuation models. In fact, many investors who used intrinsic value models bought stocks during the early 1970s as stock prices dropped and failed to take into account the seismic shifts created by the high inflation of that period.

Relative Value Models

In relative value models, you examine how markets are priced relative to other markets and to fundamentals. How is this different from intrinsic value models? While the two approaches shares some characteristics, this approach is less rigid, insofar as it does not require that you work within the structure of a discounted cashflow model. Instead, you either make comparisons of markets over time (the S&P in 2002 versus the S&P in 1990) or different markets at the same point in time (U.S. stocks in 2002 versus European stocks in 2002).

Comparisons Across Time

In its simplest form, you can compare the way stocks are priced today to the way they used to be priced in the past and draw conclusions on that basis. Thus, as we noted in the section on historic norms, many analysts argue that stocks today, priced at 25 times earnings, are too expensive because stocks historically have been priced at 15-16 times earnings.

While reversion to historic norms remains a very strong force in financial markets, we should be cautious about drawing too strong a conclusion from such comparisons. As the fundamentals (interest rates, risk premiums, expected growth and payout) change over time, the PE ratio will also change. Other things remaining equal, for instance, we would expect the following.

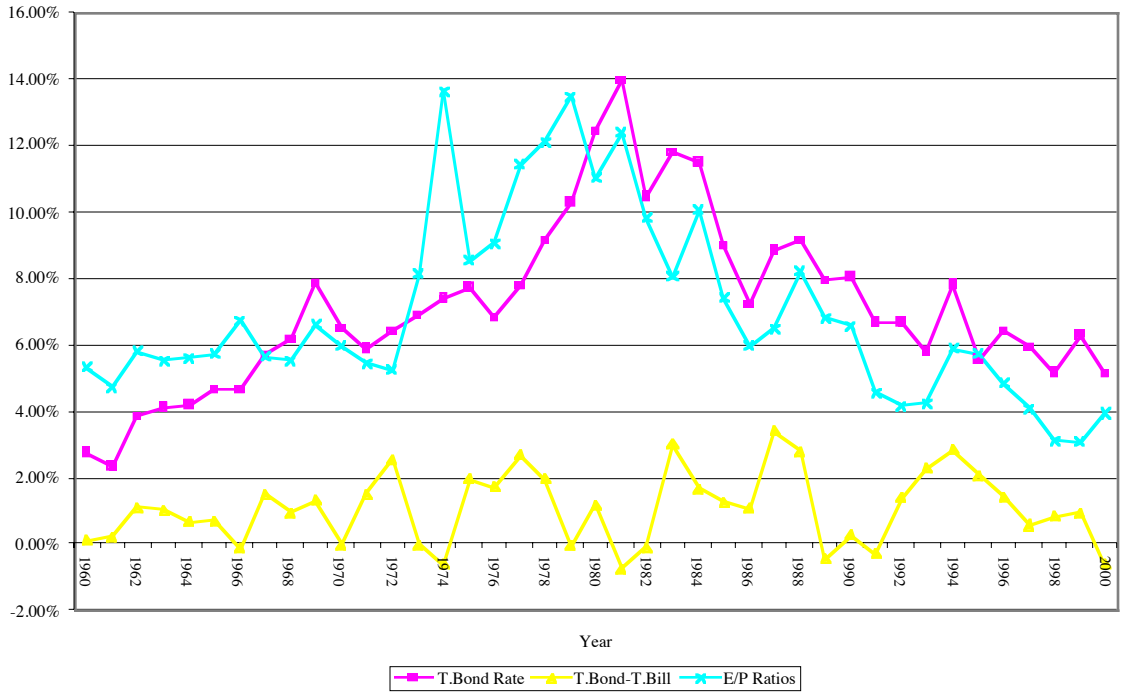
- An increase in interest rates should result in a higher cost of equity for the market and a lower PE ratio.
- A greater willingness to take risk on the part of investors will result in a lower risk premium for equity and a higher PE ratio across all stocks.
- An increase in expected growth in earnings across firms will result in a higher PE ratio for the market.

In other words, it is difficult to draw conclusions about PE ratios without looking at these fundamentals. A more appropriate comparison is therefore not between PE ratios across time, but between the actual PE ratio and the predicted PE ratio based upon fundamentals existing at that time.

Illustration 12.2: PE Ratios across time for the S&P 500

Figure 12.5 summarizes the Earnings/Price ratios for S&P 500, treasury bond rates and the difference between bond and bill rates at the end of each year from 1960 to 2000.

Figure 12.5: S&P 500- Earnings Yield, T.Bond rate and Yield spread



You do not need to be a statistician to note that earnings to price ratios are high (and PE ratios are low) when the treasury bond rates are high, and the earnings to price ratios decline when treasury bond rates drop. This strong positive relationship between E/P ratios and T.Bond rates is evidenced by the correlation of 0.6854 between the two variables. In addition, there is evidence that the term structure also affects the E/P ratio. In the following regression, we regress E/P ratios against the level of T.Bond rates and the yield spread (T.Bond - T.Bill rate), using data from 1960 to 2000.

$$E/P = 0.0188 + 0.7762\ \text{T.Bond Rate} - 0.4066\ (\text{T.Bond Rate-T.Bill Rate}) \qquad R^2 = 0.495$$
$$(1.93) \quad (6.08) \quad (-1.37)$$

Other things remaining equal, this regression suggests that

- Every 1% increase in the T.Bond rate increases the E/P ratio by 0.7762%. This is not surprising but it quantifies the impact that higher interest rates have on the PE ratio.
- Every 1% increase in the difference between T.Bond and T.Bill rates reduces the E/P ratio by 0.4066%. Flatter or negative sloping term yield curves seem to correspond to lower PE ratios and upwards sloping yield curves to higher PE ratios. While, at first sight, this may seem surprising, the slope of the yield curve, at least in the United

States, has been a leading indicator of economic growth with more upward sloped curves going with higher growth.

Based upon this regression, we predict E/P ratio at the beginning of 2001, with the T.Bill rate at 4.9% and the T.Bond rate at 5.1%.

$$E/P_{2000} = 0.0188 + 0.7762\ (0.051) - 0.4066\ (0.051-0.049) = 0.0599 \text{ or } 5.99\%$$

$$PE_{2000} = \frac{1}{E/P_{2000}} = \frac{1}{0.0599} = 16.69$$

Since the S&P 500 was trading at a multiple of 25 times earnings in early 2001, this would have indicated an over valued market. This regression can be enriched by adding other variables, which should be correlated to the price-earnings ratio, such as expected growth in GNP and payout ratios, as independent variables. In fact, a fairly strong argument can be made that the influx of technology stocks into the S&P 500 over the last decade, the increase in return on equity at U.S. companies over the same period and a decline in risk premiums could all explain the increase in PE ratios over the period.

*Relativc value of S*P 500 index*: Take a look at the most recent relative valuation of the S&P 500.

Comparisons across Markets

Comparisons are often made between price-earnings ratios in different countries with the intention of finding undervalued and overvalued markets. Markets with lower PE ratios are viewed as under valued and those with higher PE ratios are considered over valued. Given the wide differences that exist between countries on fundamentals, it is clearly misleading to draw these conclusions. For instance, you would expect to see the following, other things remaining equal:

- Countries with higher real interest rates should have lower PE ratios than countries with lower real interest rates.
- Countries with higher expected real growth should have higher PE ratios than countries with lower real growth.
- Countries that are viewed as riskier (and thus command higher risk premiums) should have lower PE ratios than safer countries

Countries where companies are more efficient in their investments (and earn a higher return on these investments) should trade at higher PE ratios.

Illustration 12.3: Comparing PE ratios across markets

Table 12.7 summarizes PE ratios across different countries in July 2000, together with dividend yields and interest rates (short term and long term) at the time.

Table 12.7: PE Ratios for Developed Markets – July 2000

Country	*PE*	*Dividend Yield*	*2-yr rate*	*10-yr rate*	*10yr - 2yr*
UK	22.02	2.59%	5.93%	5.85%	-0.08%
Germany	26.33	1.88%	5.06%	5.32%	0.26%
France	29.04	1.34%	5.11%	5.48%	0.37%
Switzerland	19.6	1.42%	3.62%	3.83%	0.21%
Belgium	14.74	2.66%	5.15%	5.70%	0.55%
Italy	28.23	1.76%	5.27%	5.70%	0.43%
Sweden	32.39	1.11%	4.67%	5.26%	0.59%
Netherlands	21.1	2.07%	5.10%	5.47%	0.37%
Australia	21.69	3.12%	6.29%	6.25%	-0.04%
Japan	52.25	0.71%	0.58%	1.85%	1.27%
United States	25.14	1.10%	6.05%	5.85%	-0.20%
Canada	26.14	0.99%	5.70%	5.77%	0.07%

A naive comparison of PE ratios suggests that Japanese stocks, with a PE ratio of 52.25, are overvalued, while Belgian stocks, with a PE ratio of 14.74, are undervalued. There is, however, a strong negative correlation between PE ratios and 10-year interest rates (-0.73) and a positive correlation between the PE ratio and the yield spread (0.70). A cross-sectional regression of PE ratio on interest rates and expected growth yields the following.

PE Ratio = 42.62 – 360.9 (10-year rate) + 846.6 (10-year rate– 2-year rate) R^2=59%

(2.78) (-1.42) (1.08)

The coefficients are of marginal significance, partly because of the small size of the sample. Based upon this regression, the predicted PE ratios for the countries are shown in Table 12.8.

Table 12.8:Predicted PE Ratios for Developed Markets – July 2000

Country	*Actual PE*	*Predicted PE*	*Under or Over Valued*
UK	22.02	20.83	5.71%
Germany	26.33	25.62	2.76%

France	29.04	25.98	11.80%
Switzerland	19.6	30.58	-35.90%
Belgium	14.74	26.71	-44.81%
Italy	28.23	25.69	9.89%
Sweden	32.39	28.63	13.12%
Netherlands	21.1	26.01	-18.88%
Australia	21.69	19.73	9.96%
Japan	52.25	46.70	11.89%
United States	25.14	19.81	26.88%
Canada	26.14	22.39	16.75%

From this comparison, Belgian and Swiss stocks would be the most undervalued, while U.S. stocks would have been most over valued.

Illustration 12.7: An Example with Emerging Markets

This example is extended to examine PE ratio differences across emerging markets at the end of 2000. In table 12.9, the country risk factor is estimated, for the emerging markets.[11] It is scaled from zero (safest) to one hundred (riskiest).

Table 12.9: PE Ratios and Key statistics: Emerging Markets

Country	*PE Ratio*	*Interest Rates*	*GDP Real Growth*	*Country Risk*
Argentina	14	18.00%	2.50%	45
Brazil	21	14.00%	4.80%	35
Chile	25	9.50%	5.50%	15
Hong Kong	20	8.00%	6.00%	15
India	17	11.48%	4.20%	25
Indonesia	15	21.00%	4.00%	50
Malaysia	14	5.67%	3.00%	40
Mexico	19	11.50%	5.50%	30
Pakistan	14	19.00%	3.00%	45
Peru	15	18.00%	4.90%	50
Phillipines	15	17.00%	3.80%	45
Singapore	24	6.50%	5.20%	5

[11] These estimates come the Economist.

South Korea	21	10.00%	4.80%	25
Thailand	21	12.75%	5.50%	25
Turkey	12	25.00%	2.00%	35
Venezuela	20	15.00%	3.50%	45

Interest Rates: Short term interest rates in these countries

The regression of PE ratios on these variables provides the following –

PE = 16.16 – 7.94 Interest Rates + 154.40 Real Growth - 0.112 Country Risk R^2=74%

(3.61) (-0.52) (2.38) (-1.78)

Countries with higher real growth and lower country risk have higher PE ratios, but the level of interest rates seems to have only a marginal impact. The regression can be used to estimate the price earnings ratio for Turkey.

Predicted PE for Turkey = 16.16 – 7.94 (0.25) + 154.40 (0.02) - 0.112 (35) = 13.35

At a PE ratio of 12, the market can be viewed as slightly under valued.

Determinants of Success

Can you time markets by comparing stock prices now to prices in the past or to how stocks are priced in other markets? Though you can make judgments about market under or overvaluation with these comparisons, there are two problems with this analysis.

- Since you are basing your analysis by looking at the past, you are assuming that there has not been a significant shift in the underlying relationship. As Wall Street would put it, paradigm shifts wreak havoc on these models.
- Even if you assume that the past is prologue and that there will be reversion back to historic norms, you do not control this part of the process. In other words, you may find stocks to be over valued on a relative basis, but they become more over valued over time. In other words, convergence is neither timed nor even guaranteed.

Relative valuation of emerging markets: Take a look at the most recent relative valuation across emerging markets.

How can you improve your odds of success? First, you can try to incorporate into your analysis those variables that reflect the shifts that you believe have occurred in markets. For instance, if you believe that the influx of pension fund money into the equity markets over the last two decades has changed the fundamental pricing relationship, you can include the percent of stock held by pension funds into your regression. Second, you can have a longer time horizon, since you improve your odds on convergence.

The Information Lag with Fundamentals

If you are considering timing the market using macroeconomic variables such as inflation or economic growth, you should also take into account the time lag before you will get this information. Consider, for instance, a study that shows that there is high positive correlation between GDP growth in a quarter and the stock market's performance in the next. An obvious strategy would be to buy stocks after a quarter of high GDP growth and sell after a quarter of negative or low GDP growth. The problem with the strategy is that the information on GDP growth will not be available to you until you are two months into the next quarter.

If you use a market variable such as the level of interest rates or the slope of the yield curve to make your market forecasts, you are in better shape since this information should be available to you contemporaneously with the stock market. In building these models, you should be careful and ensure that you are not building a model where you will have to forecast interest rates in order to forecast the stock market. To test for a link between the level of interest rates and stock market movements, you would look at the correlation between interest rates at the beginning of each year and stock returns over the year. Since you can observe the former before you make your investment decision, you would have the basis for a viable strategy if you find a correlation between the two. If you had run the test between the level of interest rates at the end of each year and stock returns during the year, implementing an investment strategy even if you find a correlation would be problematic since you would have to forecast the level of interest rates first.

The Evidence on Market Timing

While we have looked at a variety of ways in which investors try to time markets from technical indicators to fundamentals, we have not asked a more fundamental question: Do those who claim to time markets actually succeed? In this section, we consider a broad range of investors who try to time markets and examine whether they succeed.

Mutual Fund Managers

Most equity mutual funds do not lay claims to market timing, but, in our view, they do try to time markets at the margin. We will begin by looking at whether they succeed on average. There are some mutual funds that claim market timing as their primary skill and these funds are called tactical asset allocation funds. We will look at the track records of these funds and pass judgment on whether their claims hold up.

Overall Evidence

How do we know that mutual funds try to time markets? While all equity mutual funds need to hold some cash – investments in treasuries and commercial paper – to meet redemption needs and for day-to-day operations, they collectively hold much more cash than is necessary. In fact, the only explanation for the cash balances that we observe at equity mutual funds is that mutual funds use them to signal their views of future market movements – they hold more cash when they are bearish and less cash when they are bullish. In figure 12.6 below, we present the average cash balance at mutual funds, each from 1980 to 2001 and the returns on the S&P 500 each year.

Figure 12.6: Mutual Fund Cash Holdings and Stock Returns

Source: Investment Company Institute

Note that the cash balances seem to increase after bad years for the market and decrease after good years, but there is little predictive power in the level of cash holdings. The question of whether mutual funds are successful at market timing has been examined widely in the literature going back four decades. A study in 1966 by Treynor and Mazuy suggested that we look at whether the betas of funds increase when the market return is large in absolute terms by running a regression of the returns on a fund against both market and squared market returns:

$$R_{\text{Fund, Period t}} = a + b\ \text{Return}_{\text{Market,t}} + c\ \text{Return}_{\text{Market,t}}^{2}$$

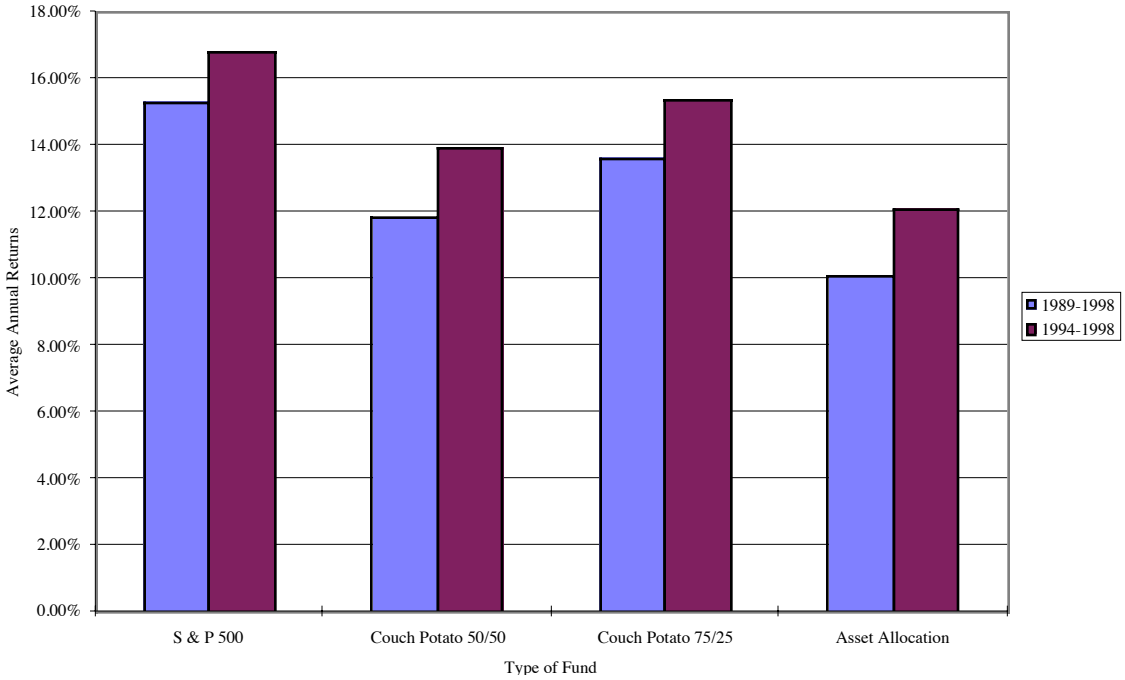
If a fund manager has significant market timing abilities, they argued, the coefficient "c" on squared returns should be positive. This approach, when tested out on actual mutual fund returns, yields negative values for the coefficient on squared returns, indicating negative market timing abilities rather than positive ones. In 1981, Merton and Henrikkson modified this equation to consider whether funds earned higher returns in periods when the market was positive, and found little evidence of market timing as well.

Tactical Asset Allocation and other Market timing Funds

In the aftermath of the crash of 1987, a number of mutual funds sprung up claiming that they could have saved investors the losses from the crash by steering them out of equity markets prior to the crash. These funds were called tactical asset allocation funds and made no attempt to pick stocks. Instead, they argued that they could move funds between stocks, treasury bonds and treasury bills in advance of major market movements and allow investors to earn high returns. Since 1987, though, the returns delivered by these funds has fallen well short of their promises. Figure 12.7 compares the returns on a dozen large tactical asset allocation funds over 5-year and 10-year periods (1987-97) to both the overall market and to fixed mixes – 50% in both stocks and bonds, and 75% stocks/25% bonds. We call the last two couch potato mixes, reflecting the fact that we are making no attempt to time the market.

Figure 12.7

Performance of Unsophisticated Strategies versus Asset Allocation Funds



Source: Money Magazine

One critique of this study may be its focus on a few tactical asset allocation funds. In 1998, Becker, Ferson, Myers and Schill examined a much larger sample more than 100 asset allocation funds between 1990 and 1995 and also find little evidence of success at market timing at these funds.

Investment Newsletters

There are hundreds of investment newsletters that investors subscribe to for sage advice on investing. Some of these investment newsletters are centered on suggesting individual stocks for investors but some are directed towards timing the market. For a few hundred dollars, we are told, we too can be privy to private signals of market movements.

Campbell and Harvey (1996) examined the market timing abilities of investment newsletters by examining the stock/cash mixes recommended in 237 newsletters from 1980 to 1992. If investment newsletters are good market timers, you should expect to see the proportion allocated to stocks increase prior to the stock market going up. When the returns earned on the mixes recommended in these newsletters is compared to a buy and hold strategy, 183 or the 237 newsletters (77%) delivered lower returns than the buy and hold strategy. One measure of the ineffectuality of the market timing recommendations of these investment newsletters lies in the fact that while equity weights increased 58% of the time

before market upturns, they also increased by 53% before market downturns. There is some evidence of continuity in performance, but the evidence is much stronger for negative performance than for positive. In other words, investment newsletters that give bad advice on market timing are more likely to continue to give bad advice than are newsletters that gave good advice to continue giving good advice.[12]

The only hopeful evidence on market timing comes from a study of professional market timers who are investment advisors. These timers provide explicit timing recommendations only to their clients, who then adjust their portfolios accordingly - shifting money into stocks if they are bullish and out of stocks if they are bearish. A study by Chance and Hemler (2001) looked at 30 professional market timers who were monitored by MoniResearch Corporation, a service monitors the performance of such advisors, and found evidence of market timing ability. It should be noted that the timing calls were both short term and frequent. One market timer had a total of 303 timing signals between 1989 and 1994, and there were, on average, about 15 signals per year across all 30 market timers. Notwithstanding the high transactions costs associated with following these timing signals, following their recommendations would have generated excess returns for investors.[13]

Market Strategists

The market strategists at major investment banks represent perhaps the most visible symbols of market timing. Their prognostications about the market are widely disseminated not only by their investment banks but also by the media. Abby Cohen (Goldman Sachs), Jeff Applegate (Lehman Brothers) and Byron Wien (Morgan Stanley) are all widely known. While much of what market strategists say about markets cannot be easily categorized as bullish or bearish– good market strategists are difficult to pin down when it comes to explicit forecasts – they also make specific recommendations on preferred asset allocation mixes that are presented in the Wall Street Journal. Table 12.10 provides the asset allocation mixes recommended by major investment banks in June 2002.

Table 12.10: Asset Allocation Mixes – Investment Bank Strategists

Firm	*Strategist*	*Stocks*	*Bonds*	*Cash*
A.G. Edwards	Mark Keller	65%	20%	15%

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[12] A good market timing newsletter is likely to repeat its success about 50% of the time. A poor market timing newsletter has a 70% chance of repeating its poor performance.

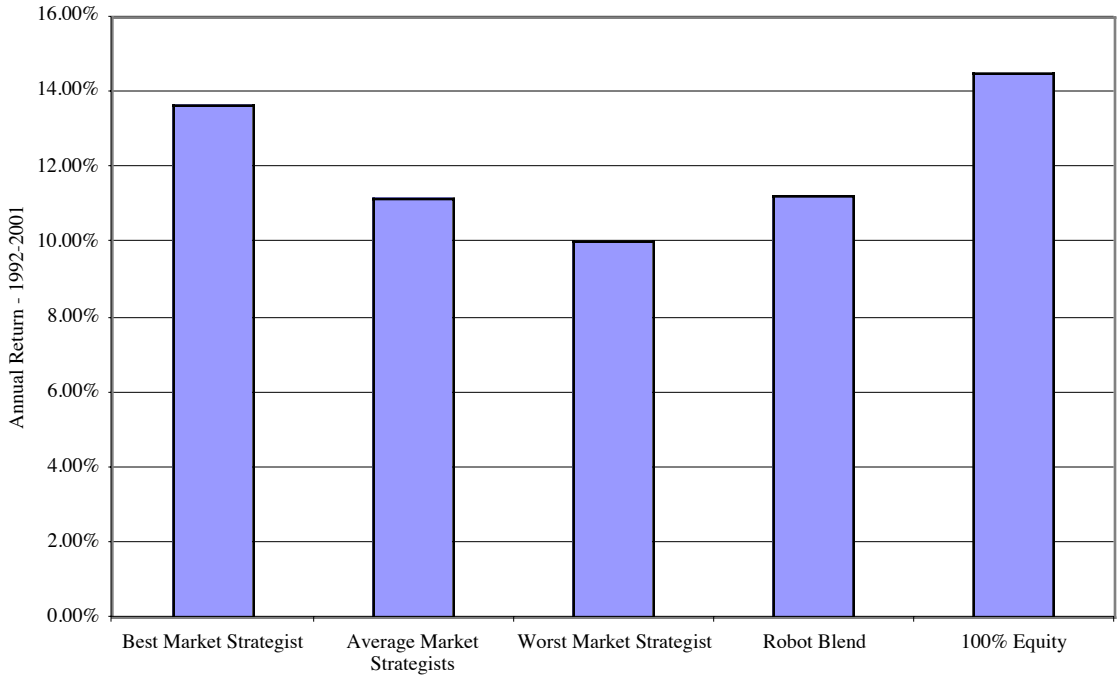
[13] The study looked at excess returns after transactions costs but before taxes. By its very nature, this strategy is likely to generate large tax bills, since almost all of your gains will be taxed at the ordinary tax rate.

Banc of America	Tom McManus	55%	40%	5%
Bear Stearns & Co.	Liz MacKay	65%	30%	5%
CIBC World Markets	Subodh Kumar	75%	20%	2%
Credit Suisse	Tom Galvin	70%	20%	10%
Goldman Sach & Co.	Abby Joseph Cohen	75%	22%	0%
J.P. Morgan	Douglas Cliggott	50%	25%	25%
Legg Mason	Richard Cripps	60%	40%	0%
Lehman Brothers	Jeffrey Applegate	80%	10%	10%
Merrill Lynch & Co.	Richard Bernstein	50%	30%	20%
Morgan Stanley	Steve Galbraith	70%	25%	5%
Prudential	Edward Yardeni	70%	30%	0%
Raymond James	Jeffrey Saut	65%	15%	10%
Salomon Smith	John Manley	75%	20%	5%
UBS Warburg	Edward Kerschner	80%	20%	0%
Wachovia	Rod Smyth	75%	15%	0%

How do these allocation mixes yield market predictions? One way is to look at the percent allocated to stocks. More bullish market strategists will recommend a larger proportion of the portfolio be invested in stocks, whereas bearish strategists will overweight cash and bonds. The other is to look at changes in holdings recommended by the same strategist from period to period – an increase in the proportion allocated to stocks would indicate more bullishness. On both dimensions, the market timing skills of strategists are questionable. The Wall Street Journal, in addition to reporting the asset allocation mixes of strategists also compares the returns that would have been generated by following each bank's allocation advice to the returns you would have made by being fully invested in stocks over 1-year, 5-year and 10-year periods. To counter the argument that it is unfair to compare a 100% equity portfolio to a asset allocation mix, the Journal also reports on the returns on a robot mix – a fixed allocation across stocks, bonds and bills. Figure 12.8 summarizes the returns on all three, as well as the returns you would have earned by following the strategist who had the best mixes over the period and the one with the worst mixes:

Figure 12.8

Annual Return from Market Strategists' Mixes: 1992-2001



Source: Wall Street Journal

Note that the returns on the robot mix are higher than the average returns generated by following the average market strategists. Of the 16 banks that the Wall Street Journal tracks, only 5 would have generated returns higher than the robot mix over the period and even those would have well within a statistical margin for error. Finally, even the best strategist's asset mix would have underperformed a strategy of being fully invested in stocks. Overall, the evidence indicates that the market timing skills of leading market strategies are vastly overstated.

Market Timers: From Livermore to Acampora

Market timers are the meteors of the investment universe. While they attract a great deal of attention when they shine, they fade quickly. Looking at the high profile market timers (Market Gurus) over time, from Jesse Livermore in the early part of this century to Ralph Acampora, Prudential's flamboyant market strategist, in the 1990s, we find a diverse

group.[14] Some were chartists, some used fundamentals and some were mysterious about their methods, but there are three common characteristics that they seem to share:

1. A capacity to see the world in black and white: Market gurus do not prevaricate. Instead, they make bold statements that seem outrageous when they make them about where the market will be 6 months or a year from now. Acampora, for instance, made his reputation with his call that the Dow would hit 7000 when it was at 3500.
2. A correct call on a big market move: All market timers make their reputation by calling at least one big market move. For Livermore, it was the market crash of 1929 and for Acampora, it was the bull market of the 1990s.
3. Outside personalities: Market gurus are born showmen (or show women), who use the media of their time as megaphones to publicize not only their market forecasts but the news of their successes. In fact, part of their success can be attributed to their capacity to make other investors act on their predictions, making these predictions, at least in the near term, self-fulfilling prophecies.

So why do great market gurus stumble? The very same factors that contribute to their success seem to underlie their failures. Their absolute conviction in their market timing abilities and their past successes seems to feed into more outrageous calls that ultimately destroy their reputations. Joe Granville, one of the market gurus of the late 1970s, for instance, spent all of the eighties recommending that people sell stocks and buy gold and his newsletter was ranked the worst, in terms of performance, for the decade.

Market Timing Strategies

If you can time markets, how can you take advantage of this skill? There are at least four ways you can do this, with varying degrees of risk associated with each. The first way is to adjust your mix of assets, allocating more than you normally would (given your time horizon and risk preferences) to markets that you believe are under valued and less than you normally would to markets that are overvalued. The second approach is to switch investment styles and strategies to reflect expected market performance. The third is to shift your funds within the equity market from sector to sector, depending upon your expectations of future economic and market growth. The fourth and most risky way to time markets is to speculate on market direction, using either financial leverage (debt) or derivatives to magnify profits.

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[14] One of the best books on Livermore is the classic "Reminiscences of a Stock Market Operator" by Edwin LeFevre.

Asset Allocation

The simplest way of incorporating market timing into investment strategies is to alter the mix of assets – stocks, cash, bonds and other assets – in your portfolio. In fact, we judged the capacity of mutual fund managers and investment newsletters to time the market by looking at whether changes that they recommended in the asset allocation mix were useful predictors or future market movements. The limitation of this strategy is that you will shift part or all of your funds out of equity markets if you believe that they are over valued and can pay a significant price if the stock market goes up. If you adopt an all or nothing strategy, shifting 100% into equity if you believe that the market is under valued and 100% into cash if you believe that it is overvalued, you increase the cost of being wrong.

Style Switching

There are some investment strategies that do well in bull markets and others that do better in bear markets. If you can identify when markets are overvalued or undervalued, you could shift from one strategy to another or even from one investment philosophy to another just in time for a market shift.

For instance, in our discussion of growth versus value strategies in chapter 9, we noted the research done by Richard Bernstein which showed that growth investing does better that value investing when earnings growth is low for the entire market and that value investing beats growth investing when earnings growth is high. Bernstein also notes that growth investing tends to do much better when the yield curve is flat or downward sloping. In a related result, Pradhuman presents evidence that small cap investing yields higher returns than value investing when inflation is high and bond default spreads are low. You could take advantage of your market timing skills to shift from growth to value investing if you believe that markets are over valued and headed for a correction, or from value to growth investing if you consider them undervalued and likely to increase. In a paper that examines the payoff to style timing, Kao and Shumaker estimate the returns an investor would have made if she had switched with perfect foresight from 1979 to 1997 from value to growth stocks and back for both small cap and large cap stocks.[15] The annual returns from a perfect foresight strategy each year would have been 20.86% for large cap stocks and 27.30% for small cap stocks. In contrast, the annual return across all stocks was only 10.33% over the period.

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[15] See "Equity Style Timing" by Kao and Shumaker, Financial Analysts Journal, Jan/Feb 1999, v55,37-48.

While this strategy looks promising, there may less to it than meets the high. In addition to the higher transactions costs and taxes that come with switching from one investment style to another, you also have the problem that most switches occur after the fact, reflecting not market timing skills but reaction to market performance. Thus, value investors seem to switch to growth investing after a market slowdown has occurred and not in advance of a slow down and growth investors switch to value investing well into a bull market. If, in fact, you do have skills as a market timer that make you confident enough to switch investment styles, you could argue that you would get a much bigger payoff by speculating, using index futures or options.

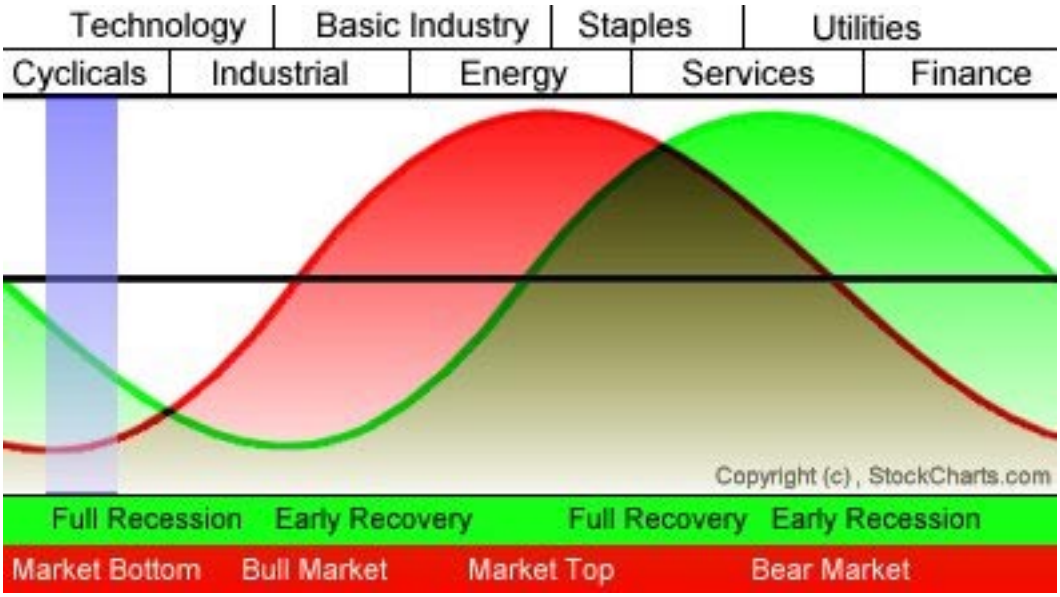
Sector Rotation

There are some investors who believe that staying out of the market, because of their views on the market is either too costly (because of the possibility that they could be wrong) or not feasible (because they are required to invest in the market). They may be able to parlay their market timing skills into superior returns by switching across sectors of the market as their views of the market changes. Thus, if they believe that the market will increase in the coming periods, due to stronger than expected real economic growth, they may switch into cyclical sectors. Alternatively, if their view is that interest rates will go up in the coming year and that this will cause the market to drop, they may switch out of financial stocks into companies that are less sensitive to interest rates (consumer products).

Best performing and worst performing sectors: Take a look at the 5 best performing and worst performing sectors of the last year.

While there are undoubtedly differences across sector rotation models, Stovall provides an excellent summary of the conventional wisdom on which sectors do best at each stage of the market in his book on sector rotation. Figure 12.9, which is extracted from this book, is presented below:

Figure 12.9: Sector Rotation - Sector Emphasis as a function of Market Cycle



Source: Stovall

Note that the market lead is captured by the fact that the market both bottoms out and peaks before the economy. Your sector bets reflect this leading effect. You invest in cyclicals as the economy enters a recession (and the market hits bottom) and you shift into industrial and energy companies as the economy improves. If you can pick the right sectors to invest in each period, you would undoubtedly earn very high returns. For instance, a strategy where you would have invested in only the best performing sectors each year from 1970 to 1977 instead of the S&P 500 would have generated excess returns of 289%.[16] While this may not be feasible, investing in sectors that have done well in recent periods seems to provide at least short-term excess returns to investors. [17]

Building on the last point, sector rotation is not always based upon market timing views. There are some investors who use the stock selection approaches described in earlier chapters to pick sectors to invest in. For instance, investors who believe in price momentum may invest in sectors that have done well in the recent past, whereas those who are contrarians may invest in the sectors that delivered the worst performance in prior periods.

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[16] See James Farreell, Jr., " Homogeneous Stock Groupings: Implications for Portfolio Management" in Guide to Portfolio Management.

[17] Sorensen and Burke (1986) report superior returns for at least two quarters from investing in industry groups that have done well in recent periods.

Speculation

The most direct way to take advantage of your market timing abilities is to buy assets in a market that you believe is under valued and sell assets in one that you believe is over valued. In the last decade, this is the strategy that has been adopted by market timing hedge funds to trade across equity, bond and currency markets to take advantage of what they see as potential mispricing, with varying degrees of success. Success can generate large returns because your have relatively little equity invested and because you benefit from both sides of the transactions – the under valued markets increasing and the over valued markets decreasing.

What can go wrong? The high leverage implicit in strategies where you buy some investments and sell short others exaggerates the effects of both success and failure. Thus, while the payoff to predicting markets is very large, the cost of failure is also very large. Whether you should adopt a speculative strategy based upon market timing is entirely dependent upon how confident you are about your predictions. The more confidence you have in your market timing abilities, the more leverage you can use in your strategies. Reviewing the empirical evidence on the performance of market timing strategies, it is quite clear that there are very few strategies that yield high success rates in equity markets. In contrast, though, there seem to be strategies that work a high percentage of the time in the currency and commodity markets, It should come as no surprise, therefore, that some of the biggest successes of hedge funds have come in these markets. Even in these markets, though, as the number of hedge funds increases, the potential for excess returns decreases.

Connecting Market Timing to Security Selection

Can you be a market timer and a security selector? We don't see why not, since they are not mutually exclusive philosophies. In fact, the same beliefs about markets that led you to become a security selector may also lead you to become a market timer. For example, if you believe that markets over react to new information, you may buy stocks after big negative earnings surprises but you may also buy the entire market, after negative economic or employment reports. In fact, there are many investors who combine asset allocation and security selection in a coherent investment strategu.

There are, however, two caveats to an investment philosophy that includes this combination. First, to the extent that you have differing skills as a market timer and as a security selector, you have to gauge where your differential advantage lies, since you have limited time and resources to direct towards your task of building a portfolio. Second, you may find that your attempts at market timing are under cutting your asset selection and that

your overall returns suffer as a consequence. If this is the case, you should abandon market timing and focus exclusively on security selection.

Conclusion

Everyone wants to time markets, and it is not difficult to see the reasons for the allure. A successful market timer can deliver very high returns, with relatively little effort. The cost of market timing, though, is high both in terms of transactions costs (higher turnover ratios and tax bills) and opportunity costs (staying out of the market in years in which the market goes up). In fact, you need to be right about two-thirds of the time for market timing to pay off.

If you do decide to time markets, you have a wide range of market timing tools. Some are non-financial and range from the spurious like the Super Bowl indicator (whose correlation with the market is pure chance) to feel-good indicators (that measure the mood of people and thus the level of the market) to hype indicators (such as cocktail party chatter). Some market timing is centered around the macroeconomic variables that affect stocks prices – interest rates and economic growth – with the intuitive argument that you buy stocks when interest rates are low and in advance of robust economic growth. While the intuition may be impeccable, markets are tough to time because they are based upon predictions of these variables. Thus, high economic growth, by itself, may not lead to higher stock prices, if the growth was less than anticipated. One way to incorporate forecasted growth and risk into the analysis is to estimate the intrinsic value of the market – i.e., value the market as the present value of the expected cashflows you would get from investing in it. While this may yield good long term predictions, a better way of getting short term predictions may be an assessment of the value of the market, relative to its own standing in prior years and to other markets.

While the menu may be varied when it comes market timing strategies, there is little evidence of actual market timing success, even when we focus on those who claim to have the most expertise at it. Collectively, mutual funds seem to exhibit reverse market timing skills, at worst, and neutral market timing skills, at best, switching out of stocks (and into cash) just before big up movements in the markets and doing the reverse before stock price declines. Even those mutual funds that market themselves as market timers– the asset allocation funds – do not add any value from market timing. The asset allocation advice that comes from investment newsletters and market strategists also seems to suffer from the same problem of no payoffs.

If you believe that are the exception to this general rule of failure and that you can time markets, you can do it with varying degrees of gusto. The simplest strategy is to alter

your asset allocation mix to reflect your market views, but this may require you to be out of stocks for extended periods. If you want to be fully invested in equities, you can try to switch investment styles ahead of market moves, moving from value investing (in periods of high earnings growth) to growth investing (if growth levels off) or shift your money across sectors of the market. Finally, if you have enough faith in your market timing abilities to pull it off, you can buy under valued and sell over valued markets, and make significant profits when they converge. The risk, of course, is that they will diverge and that you will see your portfolio suffer as a consequence.

Lessons for investors

To be a successful market timer, you have to

1. Be right about two thirds of the time: The payoff to timing markets correctly is high, but the cost of getting it wrong is also high. The payoff comes from staying out of the market in bad years, but the cost is that you may stay out of the market in good years.
2. Find an indicator that works consistently: There are dozens of indicators that are used to time markets but few of them seem to work consistently over long periods. Even those that do give you a sense of direction (up or down) but not of magnitude (how much up or how much down).
3. Recognize that you do not have many successful role models: Attempts at market timing on the part of professionals – money managers, investment newsletters and market strategists – have generally failed. Most of them tend to follow markets rather than lead them.