

The Conservative Elliot Fund

INTRODUCTION:

In this paper our main intention was to construct a complete portfolio composed of an equity fund, debt fund, international fund and commodities or money market fund. However, we narrowed the analysis to mainly focus on the development of the equity fund, and we simply added some analysis of the other funds to further complement the entire portfolio (i.e. to further exploit diversification benefits).

Since the turning of the 20th century and especially after the 1950's (after Markowitz's modern portfolio theory) many investors have sought professional help in the management of their funds. Some were short-term investors willing to risk a lot for a handsome gain. While others pursued more conservative approaches by buying and holding equity funds (passive or active) for extended periods of time. All of this consequently lead some investors to use superior security selection and market timing in their every day portfolio management decisions, while others simply went along with the markets using index funds. In our analysis we have assumed an active management approach where we would identify undervalued securities (with momentum properties) through the use of technical analysis. That implied the use of the *Elliot Wave Principle* complemented with some technical indicators from the *Dow Theory*. However, we are not in any way suggesting that technical analysis is the only, or should be the only method in the security selection process (or forecasting process), but in order to have an in-depth and focused paper, we have chosen to give it more of our attention. Therefore, in the first part of the paper we will discuss some of the premises and reasons *why* we chose technical analysis in the forecasting of security returns. Then we will turn into the methodology used when selecting securities for the equity fund. In the second part we will discuss in detail *how* we selected those securities as well as some discussion regarding the debt fund and the international fund. Finally we will conclude with the results of our portfolio and some final thoughts.

PREMISES AND MOTIVATION

Before we begin discussion regarding our equity selection process we have to clarify the rationale behind using technical analysis, and in particular the Elliot Wave Theory, as the decision rule. First of all, we are assuming that markets are not perfectly efficient and that stocks are constantly (and randomly) being hit with firm specific information. Second, the average portfolio manager does not know more than the market and thus is not able to predict or acquire inside information. However, security returns respond sluggishly to fundamental firm specific news and prices eventually follow negative and positive trends since its residuals are serially correlated. With the help of the Elliot Wave Theory, along with some technical indicators, we are able to identify those securities whose residuals are positively serially correlated (i.e. have momentum properties) by establishing credible correction waves. These correction periods are part of a much larger “reversal effect” where rate of returns reflect correction waves followed by impulse waves. This implies that there is persistency in returns around a true or intrinsic value. So for our purpose, identifying intrinsic values is irrelevant. What is important is to identify the potential for momentum waves in the prices of securities. In a sense this strategy can be characterized by a contrarian strategy where recent “losers” (those securities that experienced correction properties) become future “winners” (exhibiting positive abnormal returns). In other words, by identifying specific correction wave patterns according to the Elliot wave principle, we would be able to determine with greater confidence, those securities that will experience momentum properties in the future. All of this implies that a proportion of that momentum is the result of a gradual response in prices to firm specific news (where the other part is the result of time varying risk premiums). Consequently our equity funds will be composed of securities that will trend upward towards their intrinsic value, hence diversifying firm specific risk is inconsequential since we are *assuming we only have “winners” in our portfolio* (i.e. those belonging in the upper half of the probability distribution).

Nevertheless diversification with the market (reducing the level of systematic risk) is still important since we would like to reduce return variability (or smooth out returns) in response to broad market movements. Therefore we have used those momentum securities with the lowest correlation with the market as the second decision rule in our equity selection process. *(Note: all we are doing is offering a more conservative portfolio in and of itself without relying on money market funds and hence capital allocation to diversify market risk)*.* This method not only increases the likelihood of including momentum stocks in the equity fund but it also reduces its cyclical nature.

In addition, we included a fixed income as well as an international fund to form the complete portfolio to further decrease systematic risk. For example, if domestic equity markets experience a negative macroeconomic shock, the debt and international funds would most likely dampen those effects. This assumes that when equity markets under-perform, debt markets over-perform as investors move their capital towards the bond market. This also assumes that when North American markets under-perform some foreign markets will out-perform. To recap, we will use the Elliot Wave Theory as well as some technical indicators (from the Dow Theory) to complement the identification of winning stocks, and we will pick those with the lowest betas to decrease market variability within the equity fund.

OBJECTIVES AND METHODOLOGY

This portfolio was designed to meet the needs of an individual between the ages of 25 and 35. The investor would be in the early stages of his or her working life, and have a long time horizon along with a reasonable capacity to tolerate risk. The initial portfolio value of \$100,000 is invested by allocating 65 percent to equities, 20 percent to debt, 10 percent to treasuries and commodities, and 5 percent to international securities. The primary investment objective of this fund is to maximize the return to risk ratio over the three-month period of January 2002 – March

2002. While this goal is mainly sought by using a momentum strategy based on the Elliot Wave Principle for our security selection procedure, we do not attempt to incorporate market timing as a simple buy-and-hold strategy is then followed. With this in mind, the fund is not rebalanced to maintain the stated asset allocation, as following the buy-and-hold strategy will serve to eliminate transaction costs which immediately stifle capital gains achieved from any individual security. The secondary, or longer-term objectives, are then focused on minimizing the portfolio's exposure to excessive risk by attempting to diversify across firms, industries, asset classes, and countries. Given the time horizon and working age of the individual, we do not believe that liquidity is of major concern. However, a small proportion of the portfolio is invested in safe and defensive securities such as t-bills and gold, which are marketable and can be used to help the investor meet future liabilities and expenses which may arise in the medium term.

Finally, the managers of this investment fund seek to achieve the above objectives by predominantly focusing on a bottom-up security selection approach which does not leave much room for applying the traditional top-down process based on fundamentals. While asset weightings are used to reduce overall portfolio risk, the allocation within classes is such that each security receives equal weighting. The fund will have most investments in the U.S. market given its larger breadth and size compared to Canadian markets. The S&P 500 and NASDAQ are thus used throughout as our benchmark indices, and our portfolio is aiming to outperform, in terms of total return, both major U.S. equity markets.

GENERAL METHODOLOGY AND SELECTION PROCEDURE

The previous sections have highlighted the goals set out with this fund, along with an explanation of the underlying rationale for the use of technical analysis within the portfolio management framework. Within our fund, equities are carefully selected by following some simple decision rules, along with criteria that is more complex.

U.S. equities were chosen by first turning to the NASDAQ 100 (includes the most actively traded shares on the NASDAQ), and the S&P 100 (which includes all the DOW companies). The monthly returns of each 100 stocks from both groups were calculated over the period of January 1997 – December 2001, and each one was compared to the returns of its relative composite benchmark index. That is, the monthly returns of each of the NASDAQ 100 firms were plotted against the returns of the overall NASDAQ, and the returns of each of the S&P 100 firms were plotted against the returns of the S&P 500 during the last five years. Those stocks which consistently under-performed its respective benchmark index over the broad five-year period, were eliminated without condition. At this stage, approximately 25-30% of those firms from both groups were dropped from the analysis, as it was felt that consistent under-performance over a five-year horizon is enough to spell the idea that these securities' returns were more likely to be persistent, rather than mean reverting.

Next, the basket of stocks was further reduced to thirty from each group by using the Elliot Wave Theory which will be outlined in detail in the next section. The crux of our portfolio was determined at this stage by selecting those securities based on favorable momentum properties, which were extracted by distinguishing past price movements as either a bull or bear market trend, along with the corrections of those trends. And these corrections, which are generally characterized by a zigzag, a flat, or a triangle, will be important to understand to be able to choose a portfolio of winners.

Following the use of the Elliott Wave Theory, the third and final broad step in this security selection process is to reduce the number of equities in half, from sixty to a total of thirty (15 from the NASDAQ, and 15 from the S&P 500). This is done using a variety of technical indicators, along with looking at the correlation of each of the thirty securities from either group with that of their respective benchmark index. While the beta of each stock is given highest priority at this stage (the lower, the better), we also look at four technical indicators which

attempt to support our selections that have all been based on the Elliott Wave principal thus far. We therefore look at these four indicators given the following order of priority: 1) Moving Averages (200-day and 5-day); 2) Short Interest; 3) Volume; and 4) Insider Trading. And these indicators, along with the rest of the security selection analysis, will be elaborated and expanded upon further below.

THE EQUITY FUND

Within this portfolio, the equity component will be paid the most attention as we have focused most of our energies on following a momentum strategy based on the Elliott Wave Theory. Since we have used this principle as the overriding tool in our analysis amidst the security selection process, a clear explanation of this aspect of technical analysis is essential. However, while using the Elliot Wave Theory in the second stage of the selection process, we have also attempted to look at other technical indicators which might hopefully support the conclusions reached by the Wave principle that was incorporated on the monthly returns of each stock.

As was mentioned in the previous section, the monthly returns of each stock from the NASDAQ 100, and S&P 100 were first observed over the last five years against that of their respective benchmark indices. Those stocks that consistently under-performed their benchmark over that period, based on depth and breadth of the individual stock's return below the market, were immediately removed from the remaining basket of securities. Please refer to the appendix as the above mentioned stocks were labeled as those that were rejected in the first round. We do not provide the graphs for any of the returns of these stocks, as this is the most trivial stage and not nearly as interesting as the next step in this process.

TECHNICAL ANALYSIS: THE ELLIOTT WAVE PRINCIPLE¹

The Wave Principle was founded by R.N. Elliott who was very much influenced by the Dow Theory. In fact, the Dow Theory has much in common with the Wave principle, and the basic idea of the Elliot Wave Theory was originally applied to the major stock market averages, particularly the Dow Jones Industrial Average. However, Elliott goes on to state that his principle is a much needed complement to the Dow Theory, and we have taken a similar view in that the stock market follows a repetitive system of waves. More specifically, the Elliot Wave Theory is centered on the idea that trends in stock prices are generally represented by a five-wave advance, followed by a three-wave decline. For example, in the bull market portion of the cycle, the rising waves are called impulse waves, and the declining waves are called corrective waves because they would serve to correct or reduce the impact of the main thrust of a bull market trend.

Determining between waves of threes and fives is of great importance to the application of this approach. With this information, the analyst will then be able to ascertain the direction a stock is going to follow in the next few months. Whether a given wave divides into five waves or three, is determined by the direction of the next larger wave. For instance an advancing wave will divide into five smaller waves if the next larger wave of which they are part is an advancing wave itself. And any waves moving against the trend set by the next larger wave, of which it is a part, will subdivide into only three waves. Thus one of the important rules of the Elliott Wave Theory to remember is that impulse waves will usually take place in five waves, and a correction can never take place in five waves. For example, if a three-wave advance is seen in a bear market, this should be followed by resumption of the downtrend.

¹ The Theory described within this section can be attributed to John J. Murphy, 1999, Technical Analysis of Financial Markets; New York Institute of Finance

Underpinning the ultimate success of using the Elliott Wave Principle in our security selection process will be the proper identification of corrective waves. These waves are not very clearly defined and tend to be more difficult to predict. In the following analysis, we focus on three types of corrective waves – zigzags, flats, and triangles. Murphy gives the following definitions regarding each of these different waves: A zigzag is a three wave corrective pattern against the major trend, which follows a 5-3-5 sequence. It is usually the easiest corrective pattern to identify in both a bull or bear market. The flat correction pattern is different from the zigzag because it follows a 3-3-5 pattern, and is considered more of a consolidation rather than a correction. Finally, Elliott also interprets the triangle as a continuation or consolidation pattern breaking down into five waves, with each wave having three waves of its own. He also describes four different kinds of triangles based on the trends of the correction highs and lows (see appendix)* and contends that the fifth and last wave within the triangle sometimes breaks its trendline, giving a false signal, before beginning its move in the other direction.

THE WAVE THEORY AND THE CONSERVATIVE ELLIOTT EQUITY FUND

The Conservative Elliott Equity Fund was constructed based on the principles of the wave theory documented by Murphy, and the fund is extensively built to select potential winners, while eliminating potential losers from this portfolio. While diversifying across firms and industries can be an important consideration in most cases, it is only done here as a consequence of the security selection strategy based on the use of technical analysis. Please refer to the appendix for a complete listing of how each security (of the NASDAQ 100, and S&P 100) was analyzed (using both the Wave theory and other technical indicators), how they ranked with one another after the first and second round of elimination, and a break-down of the 3-month Conservative Elliott Equity Fund value based on major industry. For now, a discussion of how the wave principle was applied will follow by observing how three representative stocks from the portfolio were analyzed, and ultimately accepted. The three firms whose graphs are displayed in

the appendix are Anheuser-Busch Companies Inc. (BUD), Harrah's Entertainment Inc. (HET), and National Semiconductor Inc. (NSM). First of all, by using the Elliott Wave Theory with BUD, its price follows a bear market trend beginning in October/98, and it reached a new low at May/01. Since a new higher low was established at June/01, this represents the end of the bear market downtrend, and has therefore begun a new wave of a bull market advance. Second, HET exhibits a positive signal as well. The last wave of a 3-3-5 irregular bull market flat correction has ended at 08/01, and the first wave of a general bull market advance has resumed. Finally, NSM is in the final wave of the first three-wave sequence (5-3-5) advance of the continuing bull market, which began on 07/00.

TECHNICAL INDICATORS AND CORRELATION WITH THE MARKET

After performing the Elliott Wave Analysis on our group of stocks, 30 percent of the original stocks remained (this also took into account first round rejections where a stock was discarded if it had consistently under-performed its benchmark index over the past five years). Therefore it was necessary at this stage to measure the correlation of each of these stocks' returns against that of their respective market. A correlation of less than one means that the stock in question has not moved perfectly with the market, and the lower the correlation, the better that firm can withstand shocks to the overall market. Moreover, each of the 30 stocks remaining in the S&P, and NASDAQ, were ranked based on their correlation with market returns, with the best ranking going to the one with the lowest rating (see appendix 9). These rankings were then given the highest priority over and above all the technical indicators (see appendices 10, and 11). Our representative firms of BUD, HET, and NSM monthly returns' correlation with the S&P 500 were 0.13, 0.36, and 0.25 respectively.

Furthermore, Anheuser-Busch (BUD) exhibited some strong technical indicators in addition to a low correlation with the market index, and a bullish signal from the Elliott Wave Theory. From the information in appendix 6, the stock is trading above its 200-day MA and

rising, particularly in the latter part of Dec/01, which is a bullish signal. Short interest fell in Dec/01 (intra-month but not available to extract from Bloomberg) and volume is v-shaped for most of the month and buying pressure lifted the price above the MA in late Dec/01 which both also indicate bullish signals. And finally, insiders bought four times, while selling once which is also bullish (this idea was taken from Jaffe (1980's, Journal of Financial Economics) who stated that insider trading can reflect future bullish or bearish sentiment in the markets; bullish sentiment if there is a differential in favor of three or more insider purchases in any one month for any particular stock; a bearish sentiment if there is a differential in favor of three or more insider sales in any one month for any particular stock).

Harrah's Entertainment Inc. (HET) and National Semiconductor Inc. (NSM) also displayed some strong indicators which served to effectively compliment their positive outlooks through the Elliott Wave Theory. HET is trading above its 200-day MA and increasing since Oct/01 which is a bullish signal (see appendix 7). Its Short Interest is decreasing and the volume of shares traded on this stock has steadily increased early in Dec/01 as price is rising (these are both bullish signals). However, insiders did not entirely share the same feelings as they are bearish with four sales and zero purchases in December/01. And according to appendix 8, NSM has been trading well above its 200-day MA in Nov-Dec/01 which is bullish, however Short Interest has been rising over the last two years, and rising in Dec/01 which is a bearish sign (we are taking the traditional view in that as the number of short positions is increasing, it usually means that professional and institutional investors are short selling the stock with credible expectations that its price will fall in the future). Volume on shares traded is humped-shaped in the latter part of Dec/01, and in this case is neutral, however insiders were bullish in the past five months with five purchases and no sales.

DEBT SELECTION, TREASURIES, AND COMMODITIES

WHAT TO LOOK FOR WHEN SELECTING BONDS

Bonds have an important place in the asset allocation process, but are poorly understood by many investors. Their total performance will closely track inflation expectations, and requires an understanding of the general direction of the macroeconomy, including the ability to accurately forecast future levels of interest rates. Unfortunately, since professional economists generally fail to predict the correct direction of interest rate movements, let alone their magnitudes, a fixed income strategy not completely relying on market expectations of inflation is preferred.

Many investors incorrectly believe that bonds are safe, and stocks are risky. Another misconception is that bonds always tend to do well when equities are not. While this may be true for short-term debt (bills or notes), it does not necessarily hold for long-term bonds. In fact historically, long-term bonds have not proven to be efficient securities. Over the last two decades, the volatility of 20-year treasury bonds has been higher than that of the S&P 500, while only producing about half the total return of the benchmark equity index. Thus long-term bonds are not very efficient, as they do not deliver a high enough rate of return for each unit of risk.

For this portfolio, bonds are part of the asset allocation process to provide a stable store of value for funding *short-term* cash flow needs, and to reduce risk at the overall portfolio level. Of course investors would like to have higher returns along with the perceived safety of bonds, and will attempt to increase the return on their portfolio by using a variety of techniques that sound promising, but ultimately fall short of the mark. The reason many active fixed income portfolio strategies can and will fail is because the bond market is very efficient, with very few arbitrage opportunities to take advantage of. While it makes sense to try and increase the potential returns in every aspect of the portfolio, it is imprudent to do so at the expense of excess volatility. If we are going to take on significant risk, it should be in an asset class where we are

anticipating meaningful returns. As a matter of portfolio strategy, we can increase risk in the equity component without increasing overall risk, by keeping risk in the bond portfolio adequately low.

SHORT-TERM DEBT

Given that risk increases dramatically as a bond's duration increases, it is optimal to confine ourselves to the short end of the maturity spectrum. To that end, we will avoid bonds with maturities of more than 10 years, as any small increase in yield will be swamped by huge declines in value. We feel that extending maturities to at most five years will pick up about a percent of additional yield over 30-day T-Bills without adding excessive risk.

Another dimension to consider when we look at this asset class is the likelihood that if another asset class changes in value, it will change in lock step with it. If two asset classes move together, there is not much diversification benefit in holding both in the portfolio. And by shortening the duration of bonds, we don't give up much in total return, while unloading lots of risk. Furthermore as interest rates rise, long-term bonds will plunge which may lead into a bear market. But short-term bonds are preferable and because of their duration, they will actually give up less in capital value. Therefore these securities provide a nice diversification benefit to the portfolio as they are not as negatively correlated to rising interest rates and inflation as equities and long-term bonds.

CORPORATE BONDS, TREASURIES, AND COMMODITIES

These types of securities are held in our portfolio, as it is always necessary to diversify across asset classes, not only across industries and firms. The addition of high quality Corporate Bonds will be held at the shorter end of the term structure. As it essential for the investor to have an almost guaranteed stream of cash flows into the indefinite future, the following DOW company corporate bonds have been selected with just that purpose in mind: AT&T, Home

Depot, General Motors, United Technology Services, and Citicorp. Furthermore, approximately 10 percent of the portfolio should be held in treasury bills and commodities, with equal weight given to either one. T-bills, which are free of default risk, are necessary to provide a guarantee of short-term income for any emergency liquidity needs. Commodities such as gold can serve as a hedge against a general market downturn as its price typically rises during a bear market.

INTERNATIONAL FUND:

Even though an extensive analysis of an international fund was not the focus of this paper we cannot ignore the potential benefits it may provide for our complete portfolio. Therefore we briefly mention its importance within our strategy and make some recommendations accordingly.

One of the main reasons to consider investing internationally is the benefit investors receive from diversification. As long as domestic securities are less than perfectly correlated with foreign securities, there will always be an opportunity to substantially reduce systematic risk. (This naturally implies that national markets are less than perfectly correlated with foreign markets). The main purpose of considering international diversification for our complete portfolio is to reduce market risk since firm specific risk is not as important. (Since we are only holding “winning” stocks: *for explanations refer to premise section*). Throughout the investment literature it has been proven that international diversification has the power to reduce the domestic portfolio’s market risk by approximately 50 percent. This can be seen by the low correlation between US stock indices and other industrialized countries’ market indices compared to the relatively higher correlation between domestic equity funds. We therefore recommend ADR’s from countries such as Japan, Germany and U.K (i.e. those with the lowest correlation with the US) to be included in our complete portfolio to further smooth out return variability with market cycles. In addition to the diversification benefits these countries may provide, they also exhibit very little political as well as foreign risk. Thus given the benefits and the costs (risks),

the inclusion of an international fund would be a key component in the performance of the entire portfolio (i.e. it further increases the Sharpe ratio).

SUMMARY AND CONCLUSIONS

The main purpose of this paper was to construct a complete portfolio that would include an actively managed equity fund (based on superior security selection) complemented with a debt fund, international fund and a money market fund (or cash). However, in order to have an in depth and focused paper, we concentrated on the security selection process of the equity fund through the use of technical analysis. Therefore in the end we came up with 30 potential momentum stocks, of which half came from the NASDAQ and the other half came from the S&P indices. Nevertheless we wanted to test the power of our Conservative Elliott Equity Fund analysis by comparing its performance with both the S&P and NASDAQ (and a weighted market portfolio) as well as its Sharpe ratio with that of both markets (over 5 years; Jan 1997 – Dec 2001). Moreover, we calculated and compared the average returns of both indices with that of our equity fund portfolio between January 1st 2002 and March 31st 2002. (Note: this was done in order to correspond to the duration of the TD Challenge). Our results were actually quite impressive! First of all, of the 30 stocks chosen, 20 subsequently experienced price increases while the remaining 10 declined in price and experienced negative returns (see index for greater detail). Secondly, the equity fund portfolio delivered a 5.22% return over the sample period (3 months) while the NASDAQ delivered a disappointing negative return of 6.77%, as with the S&P 500 which yielded a *negative* 0.63% return over the same period. (For a more detailed comparison, please refer to the index). All this suggests to us that over the 3-month period, these stocks exhibited momentum properties followed by those correction waves forecasted by the Elliot Wave technique that was employed. Whether these momentum properties came as a result of time varying risk premiums or from sluggish response in prices to firm specific news is not very important for all practical purposes. (Even though we believe that a substantial part of that

momentum came from investors' under-reaction as a result of firm specific news; see premises for more detail). This may also possibly suggest that a contrarian investment strategy may not be that bad after all although we have no evidence to support it (nor did we attempt to support it). Finally, we compared, over 5 years, our equity fund's Sharpe ratio with that of both the NASDAQ's and the S&P's. We calculated the equity fund's Sharpe ratio to be 0.310 while the NASDAQ's and S&P's Sharpe ratio was 0.07841 and 0.08635 respectively (see index for more detail). This leads us to conclude that our Conservative Elliott Equity Fund is much more efficient (i.e. higher return per unit of risk assuming unconditional betas) than that of both markets. We also reached similar conclusions when comparing the Conservative Elliott Equity Fund with an equally weighted market index (half from S&P and half from NASDAQ). This implies that buying and holding our equity fund portfolio over the long term would be a more efficient strategy than simply buying and holding an index fund (without transaction costs). Thus we conclude that holding our Conservative Elliott Equity Fund portfolio accompanied by a debt fund and an international fund would provide a relatively higher rate of return for less risk than a simple passively managed portfolio or index fund.

	Nasdaq	Nasdaq Portfolio	SP 500	SP portfolio	Overall portfolio
T-bill	0.42%				
Mean	1.24%	3.94%	0.87%	1.63%	2.40%
StdDev	0.10	0.08	0.05	0.06	0.06
Sharpe ratio	0.08	0.43	0.09	0.21	0.31