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# Equity portfolio optimisation in South Africa under varying market conditions

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# Equity portfolio optimisation

# in South Africa

# under varying market conditions

*Maryam Loloee-Eshraghi*

**A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration.**

**Johannesburg, 2011**

# ABSTRACT

Investors always try to protect their investments under different market conditions (Schinasi and Smith 2000) by finding trends and predicting the future of the market. Investors use different investment strategies. Value and growth strategies are among these popular investment strategies. Some investors such as Bauman, Conover and Miller (1998) believe in superior performance of value over growth strategies.

The purpose of this research is to develop a financial model that identifies the optimal equity portfolio in South Africa, which yields positive and significant abnormal return for investors during bull and bear market conditions. The Black and Litterman optimisation approach is implemented on the JSE All share index (J203) to form optimum value and growth equity portfolios on a 10-year period, starting from January 2000 to December 2010.

The findings show that between the optimum value and growth portfolio formed based on the Black-Litterman optimisation model, the value portfolio outperforms the growth portfolio in different market conditions. However, statistical tests do not show a significance difference between the performances of these portfolios.

# DECLARATION

I, Maryam Loloee-Eshraghi, declare that this research report is my own, unaided work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

……..

Maryam Loloee-Eshraghi

October 2011

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# 1 INTRODUCTION

## 1.1 Purpose of the study

The purpose of this research is to identify how South African equity portfolios are affected by different market conditions to find the optimal equity portfolio in those market conditions (bull and bear).

## 1.2 Context of the study

Investor behaviour and behavioural theory have shown that investors always try to protect their investments (Schinasi and Smith 2000). Traders usually try to find market trends and predict what will happen to stocks' return in future so that they will be able to rebalance their portfolios according to environmental changes. These trends can be different during long, medium and short terms (Edwards and McGee 2007). These trends have different consequences on the market. For example in the study done by Majid and Kassim (2009), before the crisis, all stock markets recorded positive average daily returns, while in the period during the crisis all the stock markets witnessed negative average daily returns. All the stock markets recorded greater volatility in the period during the crisis compared to before the crisis. However, Markowitz (1991) believes that even if the consequences of the economic conditions can be predicted, non-economic influences can change the course of general prosperity, the level of the market, or the success of a particular security. Investors react to these environmental changes in different ways.

There are two types of general behaviours among investors. The first group of investors support an efficient market where returns are independent of past returns and returns occur randomly (Bachelier 1900; Cowles 1933; Kendall 1953; Mandelbrot 1963 and Fama 1965). In an efficient market all available information is fully reflected in the market price, as a result the expectation of an investor is zero relative to the average market (Fama 1991). The market is seen as being populated by competitive, rational, profit maximising and risk-averse agents. They

update their beliefs and make choices consistent with subjective expected utility theory, which is a measure of investors' preferences for return, and the amount of risk they are willing to take (Barberis and Thaler 2003). Their behaviour ensures that any inefficiency is quickly taken advantage of and therefore neutralised. Regular reviews of the literature have been conducted (Fama 1970; Fama 1991 and Fama 1998). These reviews make a strong case for market efficiency.

The second group of investors are not fully rational and are driven by the complex facets of human psychology (Barberis and Thaler 2003). These investors may not update their beliefs or may make choices consistent with subjective expected utility theory (Barberis and Thaler 2003). Therefore; they might under react or overreact to information. Under reaction to information that influences on share prices results in a slow adjustment of the price to new information (Poterba and Summers 1988 and Jegadeesh and Titman 1993) and overreaction to information causes share prices to overshoot the correct value and then reverse (De Bondt and Thaler 1985). Behavioural factors such as overconfidence, optimism, representativeness, and anchoring contribute to biases that reflect in share prices which affect portfolio selection and optimisation (Barberis, Schleifer and Vishny 1998; Daniel, Hirschleifer and Subrahmanyam and Hong and Stein 1999).

Based on these behavioural patterns, many policies and strategies are chosen after extensive analyses designed to determine a set of optimal strategies with different combinations of risk and return. The Capital Asset Pricing Model (CAPM) is one of the models which predict the relationship between risk and expected return (Bodie, Kane and Marcus 1992). In some cases, the analysis uses a standard Markowitz mean–variance approach. In others, the goal is to maximise an investor's expected utility (Sharpe 2010). Maximisation of expected utility is difficult for clients to both understand and implement. Some other asset allocation strategies focus on minimising the probability of falling short of an investor's long-term return target or of an investable benchmark (Stutzer 2004).

Value and growth strategies are among popular investment strategies. A study on some developed markets done by Bauman et al. (1998) investigates the performance of these two strategies. The result of this study shows the superior

performance of value stocks over growth stocks. However, not many studies are available on performance of these strategies in emerging markets.

## 1.3 Problem statement

### 1.3.1 *Main problem*

In the recent past, there have been major economic changes that affect investment portfolios, in particular, that affect the way portfolio managers decide on optimal portfolios and abnormal return thereof. The problem is that it is difficult to know what optimal portfolios investors should hold during different market conditions and whether those portfolios would yield positive and significant abnormal return for them. The problem of this research is to develop a financial model that identifies the optimal equity portfolio during different market conditions (bull and bear).

## 1.4 Significance of the study

The study will provide guidance as how to analyse portfolios more quantitatively. As new generations of increasingly scientific investment managers come to the task, they will rely more on analysis, process and structure than on intuition, advice, and whim. This does not mean that heroic personal investment insights are a thing of the past. It means that managers will increasingly capture and apply those insights in a systematic fashion (Grinold and Kahn 2000).

This research provides information to investors on possible investment strategies that can be investigated for different market conditions. It also provides an optimum portfolio index that investors can use as a JSE benchmark.

## 1.5 Delimitations of the study

This research is limited to the stocks on the Johannesburg Securities Exchange from January 2000 to December 2010.

## 1.6 Definition of terms

*Separation theorem*: An investor makes choices based on the net present value of the projected returns and not on his or her level of risk tolerance (Elton and Gruber 2000).

*Corner portfolio*: When securities enter and leave the efficient frontier at different risk-return, the points of entry or exit are called corner portfolios (Elton and Gruber 2000).

*Rebalancing*: The process of realigning the weightings of one's portfolio of assets is called rebalancing. Rebalancing is the periodic adjustment of a portfolio to restore the original asset allocation mix. This allows the investor to maintain the desired asset allocation of the chosen investment strategy. It is one of the important keys for effective risk management.

*Tragedy of the commons*: When an individual tries to get the greatest benefit from a given resource by neglecting the well-being of society.

*Optimal Portfolio*: A portfolio that maximises an investor's preferences with respect to return and risk is an optimal portfolio (Bodie et al. 1992).

## 1.7 Assumptions

- It is assumed that the market is efficient. In an efficient market, market prices at any point fully reflect all available information (Fama 1970).
- The portfolio transaction costs are assumed negligible.

# 2 LITERATURE REVIEW

## 2.1 Introduction

The literature review introduces important factors and different steps which an investor should consider in forming a portfolio. Section 2.2 starts with portfolio management in which portfolio theories and the importance of diversification in balancing risk and return are discussed. It also explains the role of portfolio rebalancing in reducing volatility during capital events, as well as the steps that investors usually take in such situations. Various types of risks have been reviewed giving attention to the influence certain types of risk have on the investor's control in mitigating risk.

Section 2.3 covers asset allocation strategies such as rational, tactical, contrarian and duration based strategies as well as the value and growth portfolio selection strategies. In each section the concept and philosophy of the strategy is analysed. Section 2.4 discusses market conditions by looking at the correlation between markets, different events such as financial crises and bull and bear market conditions. Being aware of such conditions is important for an investor to make appropriate decisions in her portfolio selection strategy.

## 2.2 Portfolio Management

### 2.2.1 *Portfolio Theory*

Portfolio management looks at the process of choosing securities (based on an investor's preferences), monitoring the portfolio and finally evaluating the performance of the portfolio (Bodie et al. 1992).

Modern portfolio theory aims specifically to allocate assets by minimising the expected risk premium per unit of risk (Campbell 2001). The primary functional areas of modern portfolio management are defined with a triangle with three intersections representing the major strategies including active management,

passive management and immunisation. Active management consists of rate anticipation and sector valuation. Key to this area is expectation of interest rate changes and sector spread which is the yield difference from treasury securities. Passive management includes buying, holding and indexing strategies. Active management is based on expectational inputs. The greater the expectational input, the greater the return and risks are. Passive management is based on non-expectational inputs. At the top of the triangle is a hybrid strategy or immunisation. It means that under some circumstances, an expectational, high expected risk return approach might be chosen in contrast to non-expectational, minimum risk approach (Fabozzi and Fabozzi 1995).

The traditional theory of immunisation as formalised by Fisher and Weil (1971) defines the conditions under which the value of an investment in a bond portfolio is protected against changes in the level of interest rates. The specific assumptions of this theory are that the portfolio is valued at a fixed horizon date, that there are no cash inflows or outflows within the horizon, and that interest rates change only by a parallel shift in the forward rates. Under these assumptions, a portfolio is said to be immunised if its value at the end of the horizon does not fall below the target value, where the target value is defined as the portfolio value at the horizon date under the scenario of no change in the forward rates. The main result of this theory is that immunisation is achieved if the duration of the portfolio is equal to the length of the horizon (Fong and Vasicek 1984).

To define a portfolio, two sources of information are usually used. First is the past performance of individual securities. Second source is beliefs of security analysts considering future performances. Uncertainty is a remarkable factor in security investment. There are economic forces that are hard to predict. Even if the consequences of the economic conditions can be predicted, non-economic influences can change the course of general prosperity, the level of the market, or the success of a particular security. There is a correlation among security returns. We generally expect the returns on a security to be more correlated in the same industry than those of unrelated industries (Markowitz 1991). Four steps are common in identifying a portfolio. The first step separates efficient from inefficient portfolios. The second step investigates the combination of likely return and

uncertainty of return available from efficient portfolios. The third step checks whether the chosen combination of likely return and uncertainty suits the investor's need. The final step chooses the portfolio which provides this most suitable combination of risk and return (Bodie et al. 1992).

It is very hard, almost impossible to find drives for all possible conclusions concerning portfolios. As a result, portfolio analysis is based on a guide that includes important, unimportant, relevant and irrelevant criteria, for example institutional considerations, legal restrictions, relationships between portfolios returns and the cost of living. These are relevant for some investors and irrelevant for others. However, there are two common objectives for all investors. First, they want a high return; second, they want this return to be dependable, stable, and not subject to uncertainty. It is important to consider that the portfolio with maximum likely return is not necessarily the one with minimum variance (uncertainty return) (Markowitz 1991).

A portfolio that maximises an investor's preferences with respect to return and risk is an optimal portfolio. Selecting an optimal portfolio follows the same above mentioned concept. It is important to distinguish between optimal portfolio and Markowitz's efficient portfolio which focuses on the highest return for the specific risk level. Optimal portfolio is very dependent to the investor's risk taking level (Bodie et al. 1992).

### 2.2.2 *Diversification*

Uncertainty is a remarkable factor in a security investment. There are economic forces that are hard to predict. Even if the consequences of the economic conditions can be predicted, non-economic influences can change the course of general prosperity, the level of the market, or the success of a particular security (Markowitz 1991). Portfolio diversification is the means by which investors minimise or eliminate their exposure to risks. Spreading investments across a large number of differently correlated assets can reduce the risk. The merits of diversification are particularly clear in linear factor models for asset returns. It is

assumed in these models that returns are generated by a small number of common factors plus an additional random component that can be diversified away in large portfolios (Lehmann and Modest 2005).

There is a correlation among security returns. We generally expect the returns on a security to be more correlated in the same industry than those of unrelated industries do. The fact that security returns are highly correlated, but not perfectly correlated, implies that diversification can reduce risk but not eliminate it. If correlation among security returns were perfect, which means returns on all securities moved up and down together in perfect unison, diversification could do nothing to eliminate risk (Markowitz 1991).

Investors always try to protect their investments, so they should rebalance their portfolios according to environmental changes such as financial crisis. Some investors reduce all risky assets in their portfolio, although an adverse shock impacts only one asset. This reaction can be justified by portfolio diversification and leverage. Schinasi and Smith (2000) explain that the reason for this reaction is that this framework is not suited to fleshing out formally the effects of portfolio reallocations on equilibrium asset prices and social welfare. Financial contagion is the term that means reduction of risky assets in an investment when there is a local adverse shock. Value-at-Risk (VaR) portfolio management rules do not have significantly different consequences for portfolio rebalancing than a variety of other rules.

There are two important effects of portfolio rebalancing due to an adverse shock. First, an adverse shock to a single asset's return distribution can change the return of other risky assets depending on the investor's target return as well as to the characteristics of asset returns. Secondly, it also depends on whether or not the investor is leveraged. In the case of adverse shock, a leveraged investor will always reduce risky asset (Schinasi and Smith 1999).

Calvo and Mendoza (2000) show that rumours can lead to asset sales unrelated to fundamentals. Another study on various groups of investors with different preferences and information also shows that asymmetric information reflects the propagation of local shocks to other markets (Kodres and Pritsker 1998). When an idiosyncratic shock happens in one market, if investors are not certain about whether the shock is idiosyncratic, they adjust themselves in the other markets too (King and Wadhwani 1990).

Some investors imitate the policy of informed investors who might trade for reasons, such as margin calls, other than just information. Since they are imitating, they might also rebalance their portfolio although there is not any informational change. (Calvo and Mendoza 2000).

There are some basic principles for portfolio diversification. In any period, the portfolio manager rebalances the portfolio according to these portfolio management rules and perceptions of the joint distribution of asset returns. There is an intertemporal link between equity capital and return on the portfolio. This link helps analysing the effect shock on equity capital. Returns have a conditional joint-normal distribution (Folkerts-Landau and Garber 1998).

There are three important portfolio Management Rules:

1. A return-benchmark rule: this includes choosing of the least risky portfolio that can achieve a target expected return on equity capital (Schinasi and Smith 2000).

2. Trade-off rule: this rule is more flexible in choosing both the expected return and risk of the portfolio. The higher the return, the riskier the portfolio is. As mentioned before, the flexibility depends on the investor's characteristics and risk tolerance parameters (Schinasi and Smith 1999).

3. Safety-First rule (loss-constraint rule): it is based on the downside risk of a portfolio. According to this rule, a portfolio is created based on the minimum acceptable return. As a result, investors will reduce the risk of not achieving their investment objective (Telser 1995).

There are two types of shocks which lead to rebalancing events. The first is an increase in the variance of an asset's return, which is called a volatility event. The second one is a capital event. In the following paragraphs, each one of these shocks and rebalancing of the portfolio based on portfolio rules is discussed (Schinasi and Smith 2000)

**2.2.2.1 Volatility events:** Two risky assets are assumed in a portfolio. If the optimal portfolio has long positions in both of these assets and the asset returns are positively correlated, volatility in one asset decreases the invested amount on that asset and increases the invested amount in the other asset. Both the return-benchmark and trade-off rules give the same result for such a situation. If they are negatively correlated, the same result is achieved with the return benchmark rule, but in trade-off rule, the amount of both assets will be decreased. The portfolio adjustment in the return-benchmark rule is driven by substitution effect. In trade-off rule, negative correlation weakens the substitution effect because diversification opportunities are significant. This leads to decrease and eventually sales of both risky assets. This is a fairly robust prediction (Best and Grauer 1991).

A volatility event has different effects for the loss-constraint rule, in case of volatility in one asset, the investment amount reduces on that asset and increase/decrease on the other asset depends on chances of losses. The loss-constraint rule can produce greater income effects, for this reason it might lead to selling of both risky assets. As a result small changes in the risk-return ratio have large effects on risk taking. A volatility event reduces the expected return per unit of risk in a portfolio, produces a large income effect and reduces the demand for risky assets generally (Schinasi and Smith 2000).

**2.2.2.2 Capital Events:** A capital event can be the result of a significant loss on one position or many positions. Capital event for all portfolio management rules is the same. If the portfolio is not leveraged, there are net purchases of risky assets during period t. If the portfolio is leveraged, there are net sales of risky assets during the period t. It is assumed that the desired portfolio weights are the same at the two dates (conditional distribution of asset returns is the same at the two dates). It explains that the amount of various assets is the same as the previous period. If the portfolio is unleveraged, in the rebalancing process the position in riskless assets will be reduced. Alternatively, the position in risky assets will be increased. If the portfolio is leveraged, again there is a decrease in riskless asset which means reducing the amount of borrowing in the investment. The optimal amounts of leverage and investments in risky assets are proportional to equity capital (Schinasi and Smith 2000).

With the same assumption if the realised return on the asset is greater than (less than) the return on the portfolio, the optimal amount invested in any asset is less than (greater than) the value of the position prior to rebalancing in period t. This is the same for all the portfolio rules. When a capital event happens, positions in the best-performing assets will be decreased and positions of other assets are increased in order to rebalance the portfolio and achieve the optimal portfolio weights. In the leveraged portfolio, the capital event might lead to sales of a very risky asset (Schinasi and Smith 2000).

Folkerts-Landau and Garber (1998) defined three steps for the rebalancing process according to VaR rules:

- First, when increase in overall market volatility is too strong, risky positions should be reduced.

- Second, a local increase in volatility event leads to a general reduction in higher risk positions under VaR rules. This result is impossible in other portfolio rules if the returns are positively correlated.

- Third, a capital event produces the same basic rebalancing dynamics for all of the portfolio management rules.

Different studies investigate the effect of financial crises, such as the 1997 Asian, the 1998 Russian and the 1999 Brazilian crisis, in various markets. Also a causality test was used in these studies to determine whether a particular market is affected by changes in other markets. Most of the results show that market crises cause an increase in market correlation and integration and eventually reduction in benefits of portfolio diversification (Patev and Kanaryan 2006).

Based on the studies of developed and emerging markets it has been proved that integration between developed markets is high and cannot satisfy investors' demand for portfolio opportunities. For example, they found a strong correlation between three European markets (UK, Germany and France) with the US market (Arshanapalli and Doukas 1993). Investors improve risk on return on their portfolios by international diversification among the other developed market regions. Emerging markets with their characteristic can still benefit from diversification. Stock markets do not have long run co-movements also; they do not necessarily follow the same stochastic trend even if they have common economic and geographic situations. Therefore, international diversification among stock markets may be effective.

The 1997 Asian crisis had a substantial effect on the co-movement among Asian markets. There was no co-movement among Asian markets before the crisis. During the crisis the integration increased sharply and reached its peak. After crisis, strong co-movements were created between these markets. Another interesting result is that during the sample period there was no integration between five Asian stocks in local currencies, but they were co-integrated with the US dollar (Patev and Kanaryan 2006).

For Latin American markets, benefits of diversification decreased after the crisis and the weight of Latin America indices in US investor portfolio decreased because

the correlation between Latin American markets increased (Meric and Meric 2001).

The Middle East markets (Egypt, Israel, Jordan, Lebanon, Morocco, Oman, and Turkey) could strongly benefit from diversification because of low and negative correlations between them. There were dynamic co-movements and low inter-linkages among the stock indices among these markets (Shachmurove 2001a).

In the Central Europe (CE) major markets, there was no long-term relationship between them and also no causality between the CE and the US markets. The specific risk return characteristics of these markets might be suitable for diversification opportunities (Shachmurove 2001b).

Variance decomposition of the forecast errors of the returns of a given market indicates the relative importance of the various markets in causing fluctuations in the given market's returns. Variance decomposition is sensitive to the assumed origin of the shock and to the order in which it is transmitted to other markets. During the crises volatility increases significantly (about double) compared to the pre-crisis period. After the crises the correlation decreases but it does not reach the pre-crisis level. Based on the studies, during the crisis period the investment is riskier but yields higher returns. After a crisis the correlation usually decreases and the level of the post-crisis correlation is approximately double that of the pre-crisis period (Patev and Kanaryan 2006).

### 2.2.3 *Risk*

In portfolio theory, rational risk-averse investors attempt to maximise their expected portfolio returns consistent with their individual acceptable levels of portfolio risk, therefore; they try to find optimal portfolios. A framework can be provided for the specification and measurement of investment risk, for developing relationships between expected security return and risk, and for measuring the

performance of managed portfolios by using portfolio theories as well as capital markets theories (Black, Fischer, Jenson and Scholes 1972).

For calculating the return on an investor's portfolio during a specific time, distributions received from the portfolio are added to the change in value of the portfolio. In other words, return can be defined as the amount that can be withdrawn at the end of the interval while maintaining the principal intact (Modigliani and Pogue 1974). Portfolio risk for most investors is the chance that the actual future return is less than expected return. So any deviation from predicated return creates a risk (Brealey 1969). For this reason, investors prefer to quantify this uncertainty by specifying the probability related to different portfolios' asset return. The expected return is the weighted average of possible outcomes, considering that the weights are the relative chances of occurrence (Fama and Macbeth 1972).

There are different methods to measure risk. The most common methods are based on the variance and standard deviation of returns. Larger variance or standard deviation means that there is a greater possibility that the actual return is not the same as expected return. Therefore, the investor's uncertainty is high. According to the rules of symmetric distribution, roughly two-thirds of the possible returns will be found within one standard deviation either side of the expected value and that 95% will be within two standard deviations. If there is a constant risk level or constant standard deviation during each year, the longer the investment horizon, the riskier the investment is. The standard deviation after N years is equal to $\sqrt{N}$ times the standard deviation after one year. So extending the time of investment is not a good way to decrease the risk (Modigliani and Pogue 1974).

Diversification is one way to reduce the portfolio's risk. It results from combining securities that their returns are less correlated to minimise risk. However, it cannot eliminate risk entirely as systematic risk is always a factor. As discussed previously, regardless of how risky the securities of the portfolio are when

considered in isolation, the lower the correlation among security returns, the greater the impact of diversification (Wagner and Lau 1971).

Here a distinction is made between a security's unsystematic and systematic risks. Unsystematic risk can be eliminated by diversification, as opposed to systematic or market risk, which cannot be eliminated even in a diversified portfolio. The unsystematic component depends on factors unique to the company, such as labour difficulties and higher than expected sales. The remaining variability results from the fact that the return on nearly every security depends to some degree on the overall performance of the market. Consequently, the return on a well diversified portfolio is highly correlated with the market, and its variability or uncertainty is basically the uncertainty of the market as a whole. Investors are exposed to market uncertainty no matter how many stocks they hold (Modigliani and Pogue 1974).

Based on the above explanation, risk in each security is divided into two sections. The first section is a dependent or perfectly correlated return and the second one is market return which is independent and uncorrelated.

Security Return = Systematic Return + Unsystematic Return

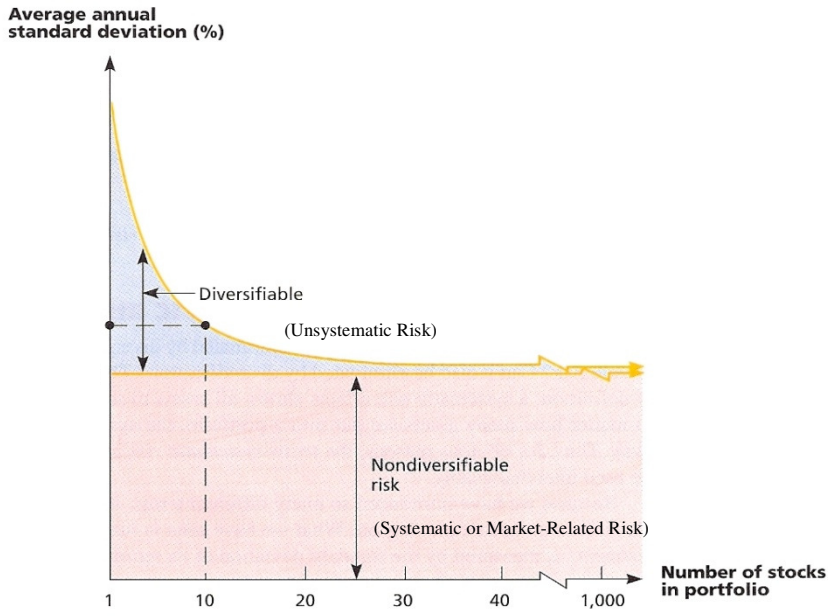



**Figure 1: Systematic and unsystematic risk (Modigliani and Pogue 1974)**

In quantifying the portfolio risk, some concepts need to be introduced. One is $\beta$ factor which is known as market sensitivity index. $\beta$ shows the sensitivity of security return to the market change. In a mathematical explanation, if market return $(Rm)$ is plotted versus security return $(R)$ and a linear regression line is drawn, $\beta$ will be the slope of the line, and it gives the expected increase in security return for a 1% increase in market return. The intercept of the line with security axis shows the average of the residual returns which is called $\alpha$. For most stocks, the alpha factor tends to be small and unstable. $\varepsilon$ is the residual return, the perpendicular distances from the line. The relationship between these factors can be explained according to a linear equation: (Modigliani and Pogue 1974).

$$R = \alpha + \beta\delta_m + \varepsilon$$

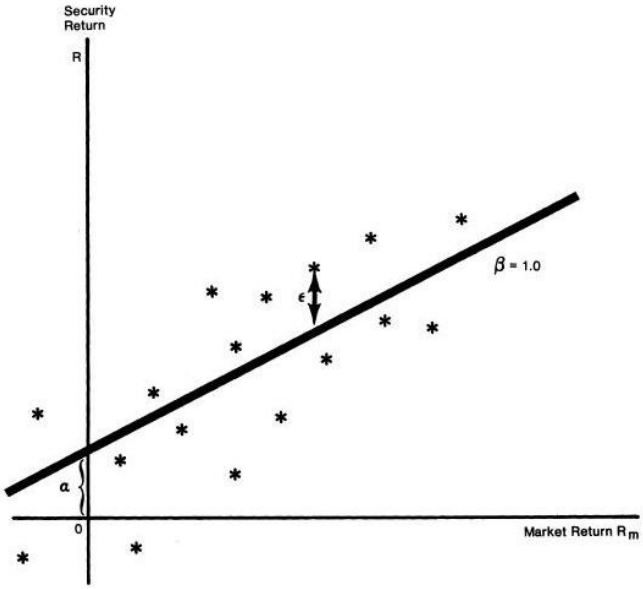



**Figure 2: The market model for security returns (Modigliani and Pogue 1974)**

According to the market model, the specification of systematic and unsystematic risk is straightforward; they are simply the standard deviations of the two return components (Fama and MacBeth 1972).

Systematic Risk = $\beta\delta_m$ ($\beta$ times the standard deviation of the market return)

Unsystematic Risk = $\delta\varepsilon$ (the standard deviation of the residual return factor $\varepsilon$)

Portfolio Systematic Risk = $\beta p\delta m$ ($\beta p$ times the risk of the market index $\delta m$)

$\beta p$ (average of individual security)

$\beta = \sum_{j=1}^{N\ (no.of\ securities)} Xj\ (\text{the poroportion of portfolio market value})\beta i$

The systematic risk of the portfolio is simply a weighted average of the systematic risk of the individual securities (Jacob 1971).

Several researchers have found that $\beta$, $\alpha$ and $\delta 2$ are highly correlated (Douglas 1969; Miller and Scholes 1973 and Black, Jensen and Scholes 1973). It is also believed that proper use of information of the relationships among these three variables helps to estimate $\beta$ (Maier, Peterson and Weide 1982).

Depending on different type of assets, investors tolerate different levels of risks. The extra return which investors earn due to tolerating more risk is called risk premium. As an example stocks normally produce more return (risk premium) than bonds. In order to measure risk premium for stocks relative to bond, the expected real bond return and stock return need to be measured, and the difference taken. Real expected bond return includes bond yields according to the inflation. Real stock return is based on stock dividend yield and expected real dividend growth. Some investors use historical records to gauge these factors, but it is not always a realistic prediction. Although they might find a pattern for market movement, it is trendless in the long run (Arnott and Bernstein 2002).

Risk premium has natural limits. As an example, it is unnatural that stocks, which are more volatile, have zero or negative risk premium, compare to bonds. It is believed that there is the no natural maximum level for risk premium. Expected returns and expected risk premiums both represent expectations, but one is objective and the other subjective (Arnott and Bernstein 2002).

## 2.3 Asset Allocation

The popular finance literature describes the asset allocation decision as one of the most important factors in determining investment performance (Elton and Gruber 2000). Since asset allocation is recognised as a major determinant of return and risk, advice on the optional allocation decision is provided by most brokerage firms and investment advisors. There are different policies and strategies in allocating assets. Some of these policies will be discussed in this section.

Many asset allocation policies are chosen after extensive analyses designed to determine a set of optimal strategies with different combinations of risk and return. The CAPM is one of the models which predict the relationship between risk and expected return. CAPM has two important aspects. First, it provides a benchmark rate of return for investment evaluation. Second, it helps investors to make an educated guess on the expected return (Bodie et al. 1992). In some cases, the analysis uses a standard Markowitz mean–variance approach. In others, the goal is to maximise an investor's expected utility (Sharpe 2010). Maximisation of the expected utility is difficult for clients both to understand and implement. Some other asset allocation strategies focus on minimising the probability of falling short of an investor's long-term return target or of an investable benchmark (Stutzer 2004).

In all various strategies, asset allocation policies are based on estimating the risks and returns of major asset classes and the correlations among their returns. Sharpe (2010) has defined this relationship in a form of function:

(1)Asset allocation=f (Investor characteristics $_t$, Market forecasts $_t$)

The interpretation of the above function is that the asset allocation at time *t is a function of* (depends on) the investor's characteristics as well as forecasts for asset returns and risks at the time t. If the investor considers historical returns as well as economical events, market forecast also depends on these factors.

(2)Market forecasts$_{>t}$ = *f* (History Economic theory$_{<=t}$, *Economic theory* $_t$, Market value $_t$)

Combining the above equations (1) and (2):

Asset allocation=f (Investor characteristics $_t$, History Economic theory$_{<=t}$, *Economic theory* $_t$, Market value $_t$)

Black and Litterman (1992) proposed a formal model based on the desire to combine neutral views consistent with market equilibrium and individual active views. They introduce confidence levels on the prior distribution and on individual beliefs and obtain the joint distribution. Based on a Bayesian approach, the relative weights on an investor's private views reflect the confidence the investor has in those views, therefore the expected return incorporates market views and individual expectations. The Black-Litterman model does not require that the portfolio manager forecast on all the securities in the universe managed. It blends any views the investor might have with market equilibrium. The investor's views can be formulated in different ways. They can be the result of a quantitative model or come from a more traditional process. They can be formulated as absolute or as relative. When no views are present, the resulting Black-Litterman expected returns are just the expected returns consistent with market equilibrium. They believed that, to be effective in optimization, risk and return forecasts have to be consistent with one another (Jones, Lim and Zangari 2007).

### 2.3.1 *Rational Asset Allocation*

Mean-variance is one of the simplest theories in asset allocation. Mean-variance investment analysis is the cornerstone of modern finance. In the mean-variance method, the investor uses mean return and standard deviation to choose assets based on an efficient portfolio which provides the greatest expected return for a given level of risk (standard deviation) or in the other words, it is the lowest risk for a given expected return (minimum standard deviation for any expected return). Thus in mean-variance analysis, investment decisions are made based on the probability distribution of returns (the expected value and the variance) (MacBeth and Emanuel 1993).

Depending on the investor's tolerance for risk, various efficient portfolios are defined so that the investor will be able to choose among them. The frontiers' shapes and characteristics depend on assumptions about the compositions of assets such as existence of a riskless asset and possibility of short sell of risky

assets (Lintner 1965). The characteristic of the efficient frontier is affected by allowance of short sells if a riskless asset does not exist. If short sell is allowed, investors will hold a combination of the risk-free asset and the market portfolio (two-fund theorem) and all portfolios on the efficient frontier are a linear combination of any two other efficient portfolios. So for an investment advisor to make rational allocation decisions, it is necessary to use the assumption of short sales allowed so that the allocation for any recommended portfolio will be a linear combination of any two other recommended portfolios. If short sales are not allowed, securities enter and leave the efficient frontier at different risk-return trade-offs. The points of entry or exit are called corner portfolios. In this case if advisors are rational, any allocation recommendation is not a linear combination of any two other portfolios unless all three lie at or between adjacent corner portfolios. Allocating money across a money market fund, a bond fund and a stock fund with no short sales of risky assets creates a logical model (Elton and Gruber 2000).

There is another concept in asset allocation called separation theorem in which an investor makes choices based on the net present value of the projected returns and not on his or her level of risk tolerance. The separation theorem holds if investors lend and borrow at the same rate whether short sales of risky assets are allowed or disallowed. In this situation finding an optimal mix of the riskless asset and the optimal risky portfolio is very difficult (Elton and Gruber 2000).

Canner, Mankiw and Weil (1997) believes that if an investor takes more risk, the ratio of bonds to stocks should rise. Increase or decrease in the ratio of bonds to stocks depends on the allowance of short sell. If short sales are allowed, an increase in the ratio of bonds to stocks in case of increase in risk does not follow from efficient set mathematics, but only holds under particular estimates of expected returns, variances and co-variances. But if short sales are not allowed, rising bond to stock ratio can be rational over the entire range of increasing risk. As long as stocks have the highest expected return, for high regions of expected return the ratio of bonds to stocks must decrease.

Following discussed logics, Elton and Gruber (2000) explain that when an investor starts with a low return portfolio and wants to increase the return, he can first increase the ratio of bonds to stocks and even for higher returns, he can substitute stocks for bonds or decrease the ratio of bonds to stocks until the ratio falls to zero. If short sales are allowed, the ratio of bonds to stocks increases or decreases monotonically, depending on the particular estimates of input data. If short sales are not allowed, the bond stock mix increases or decreases as risk increases over low risk levels, but it must decrease as risk increases over high risk levels. So the ration is downward sloping during the high risk segment.

Portfolio management requires the analyst's best estimate of future values. Analysts start with history and modify it. Some analysts put more emphasis on recent data. Analysts need to develop estimates of means, standard deviation, and correlation coefficients.

### 2.3.2 *Tactical Asset Allocation*

In a tactical strategy, investment proportions are changed regularly (monthly or quarterly or even more often). There are three common measures in tactical strategies. These measures are: the price/earnings ratio, the aggregate value of the stock market dividend yield, and the price/book ratio. Low (high) dividend yield or a high (low) price/earnings ratio or price/book ratio is a sign of overvaluation (undervaluation) of the market. In this situation, according to the tactical asset allocation, an investor's equity allocation should be reduced (increased) (MacBeth and Emanuel 1993). Some investors use intrinsic values in asset allocation. These values are based on price/earnings ratio, the aggregate value of the stock market dividend yield and the price/book ratio or the combination of these factors (Weigel 1991).

MacBeth and Emanuel (1993) explain some common advantages of using this strategy. First, the strong correlation between long-term returns and the intrinsic values has an important role in forecasting the stock market. Second, backrests

showing superior returns to the strategies; third, some of the variation in average returns across individual stocks are explained by the dividend yield, tracks changes in long-term average returns and the price/book ratio explains; and finally, real-time track records. An asset allocation strategy provides a recommended asset mix at each decision point which occurs every quarter, month or day.

Choosing intrinsic values has a critical role in asset allocation. Intrinsic values are selected based on the minimum and maximum equity. Reasons for the importance of these values are first, the variable ultimately forecasted price is used to calculate each one of the intrinsic values. Second, virtually all the variability in dividend yield and price/book ratio, and most of the variability in price/earnings ratio, comes from the price component (Weigel 1991). According to statistics, dividends and book values have grown steadily since 1945. The driver for this change is price changes and not dividends or book values (MacBeth and Emanuel 1993).

A benchmark portfolio is a tool that helps evaluating a strategy. But selecting a benchmark is not an easy task. MacBeth and Emanuel (1993) recognised that there is a possibility that a risky asset is either over or undervalued relative to another risky asset. In these cases, the portfolio will move between the two risky assets such as stocks and bonds. It is also possible that a risky asset is deemed to be under or overvalued relative to the past values of it, when the three intrinsic values are considered. For example the portfolio moves between the risky asset, stocks, and a safe asset, treasury bills. The investment proportions of the benchmark portfolio should probably be constant and equal to the proportions of a neutral position according to the asset allocation rule. This reasoning suggests a 50:50 stocks:bonds benchmark for the strategies considered.

A disadvantage to tactical strategy might be originated from the spurious correlation between long-term moving-average returns and the intrinsic values (Fama and French 1992). An investment decision is a decision to select a probability distribution which is usually associated with a future rate of return. Since the probability distribution of short-term equity returns changes over time, the

shape of the distribution might change but the location usually is unchanged. Overvaluation or undervaluation of a dividend yield or price/book makes the distribution graph negatively or positively skewed. When the investment opportunity set is changing, passive buy and hold or constant asset mix investment strategies are not the optimal investment strategies for all investors. Tactical asset allocation may allow investors to select optimal probability distributions (MacBeth and Emanuel 1993).

Sometimes it is difficult to distinguish between tactical and strategic asset allocation. The key distinction between these two methods is the time frame. Strategic asset allocation design long term goals under normal market conditions and for the period of two to ten years or over a full market cycle. As a result, the board of trustees conduct the study every three to five years. However, tactical asset allocation takes advantage of the abnormal market conditions. Therefore, it is reviewed more often than the strategic allocation. Investment staff in every organization is responsible to this task. Goals are also different in these strategies. Unlike tactical asset allocation, strategic asset allocation is not designed to beat the market or add extra return due to its long term nature. Tactical method actively looks at the alpha generators to generate excess return, so it decides how much to allocate to active accounts versus passive benchmarks. (Anson 2004)

As opposed to tactical asset allocation which presents new choices to investors in case of a changing investment opportunity set, a mean-variance method has a problem, although it is easy to get an answer from this method, but the answer may not be related to the question (Poterba and Summers 1988).

Investors sometimes prefer information about probability of positively skewed distributions of return provided by tactical asset allocation to the ones generated by passive fixed allocation strategies. Since tactical strategies are relatively new, it is not advisable to the prudent investors to use this method for 100% of portfolios, such as a retirement plan. But it could be applied to a small portion of the portfolio and the impact measured in terms of that small portion (MacBeth and Emanuel 1993). Tactical asset allocation is valuable in terms of incremental return as well as

timely forecasting of changes in the probability distribution of returns. Risk and skewness are considered as secondary issues.

### 2.3.3 *Contrarian Asset Allocation*

Most traditional asset allocation policies include acceptable ranges around each target weight of each particular asset class to accommodate disparities between policy proportions and actual portfolio holdings. Within this concept, there are several methods. Some funds actively rebalance holdings to avoid large discrepancies, as opposed to others which allow the proportions to change with market movements and then revise their asset allocation policies when the differences between actual and policy weights become large. A very common rebalancing normally happens after major market movements in order to minimise differences between actual and policy asset allocations. Such funds follow traditional asset allocation policies (Perold and Sharpe 1988). The purpose of rebalancing for balanced funds is to conform to a constant asset allocation over time, and for target-date funds is to conform to an asset allocation which has been changed over time (Sharpe 2010).

One of the other methods for asset allocation is called contrarian asset allocation. It is an investor style in which the investor goes against prevailing market trends by buying assets that are performing poorly and then selling when they perform well (Chan 1988). In this method, the performance of the assets is evaluated by the net number of sellers which is the number of sellers minus the number of buyers. The smaller the net number of sellers, the poorer an asset's performance. The number of contrarian investors is smaller than traditional investors and identifying them is more difficult compared to the traditional investors (Sharpe 2010). Meanwhile, statistics show that these investors earn large abnormal returns due to the market overreaction (De Bondt and Thaler 1985). The risk of this strategy has a positive correlation with the level of market risk premium (Chan 1988).

Sharpe (2010) has given two possible reasons why an investor follows a contrarian strategy. First, the investor believes in efficient markets and that the preferences and/or positions of the ultimate beneficiaries of a fund differ sufficiently from those of the average investor to warrant such a strategy. Second, the investor believes in inefficient markets and that the majority of investors do not realise that a contrarian strategy can provide a better combination of risk and return than can conventional trend following strategies.

Efficient Market Views based on the Perold and Sharpe (1988) definition is that the desirability of rebalancing to constant proportions of wealth depends on the movements of market prices. A strategy that buys stocks as they fall and sells as they rise will capitalise on reversals. The marginal purchase or sell decisions turn out to be good. A constant-mix strategy will do better compared to a buy-and-hold strategy in a flat (but oscillating) market because it trades in a way that exploits reversals. Alternatively, when there are no reversals, a constant-mix approach will underperform compared to a buy-and-hold strategy. Cases in which the market ends up near its starting point and are more characterised by reversals than trends that are likely to favour constant-mix strategies. The opposite case where markets end up far from the starting point and there is a major move in one direction is in favour of buy-and-hold strategies (Sharpe 2010).

In inefficient market views Arnott, Burns, Plaxco and Moor (2007) believe that rebalancing can take advantage of market inefficiency. They state that: “Not rebalancing may mean holding assets that have become overpriced, offering inferior future rewards. A commitment to rebalance to the strategic offers an effective way to dissuade clients from abandoning policy at inauspicious moments” (Arnott et al. 2007:702)

Rebalancing is a simple contrarian strategy. According to Sharpe (2007) there are two approaches that a contrarian investor might use. First, optimisation based on reverse optimisation and second, an adaptive asset allocation policy.

Why should market values inform forecasts? Because an asset's current market value reflects the collective view of the probabilities of future prospects (Sharpe, 1974, 1985). Sharpe (2007) also believed that even if the investor's characteristics are unchanged, an investor's asset allocation, a percentage of total value in each asset in traditional method, should change over time to reflect changing market values.

The risk exposure of a contrarian investor varies inversely with the level of consumption. These investors usually earn above market returns, considering that the excess return is due to the higher risk they take (Chan 1988). Fama and French (1993, 1995, 1996) believe that the risky aspect of a contrarian strategy is the reason for superior performance. Based on their view the expected risk premium is higher during bad times and lower during good times.

The traditional view, led by Fama and French (1993, 1995, 1996), is that the superior performance is a function of contrarian investment being relatively risky. This school of thought argues that the expected risk premium for value strategy is higher as value-firms are more prone to financial distress, and thus, strongly attributes value premium to time-varying risk factors.

Adaptive asset allocation (AAA) is sometimes preferable to the traditional approach. The traditional approach aims 80/20 allocation without considering subsequent market proportions, but in AAA the policy proportions should be adjusted to market values so investors who have such policies transact with other investors whenever market prices change, as do traditional asset allocation policies (Sharpe 2010).

### 2.3.4 *Duration-Based Asset Allocation*

Duration has been used to indicate the sensitivity of bond prices to changes in interest rates. Duration indicates the extent to which it turns out that too much or too little have been put aside, as a result of the uncertainty of these assumptions.

Based on Bostock, Woolley and Duffy (1989), the duration of the asset portfolio is matched to the liability duration in order to minimise uncertainty about future fundings. It also enables specification of asset mix. By matching assets and liabilities, it is ensured that the value of the net portfolio (the surplus) is not affected by small changes in the assumed rate of return and this gives a net portfolio duration of zero and minimises the value of any surplus or deficit generated if future returns exceed or fall short of the long-term target. The aim is to maintain the adequacy of the fund.

There are different steps for quantitative asset allocations for long-term investors.

1. The advisor chooses a criterion function to optimise. This criterion is different based on the investor's characteristics, such as risk bearing and target return. In this step, the investor's aim is to maximise the expected constant relative risk aversion (CRRA), and long term growth of purchasing power considering various factors, such as inflation (Stutzer 2004). Rabin and Thaler (2001), believe that since there is not a successful method to measure a coefficient of relative risk aversion and people do not display a consistent coefficient of relative risk aversion, it is a waste of time to try to measure this factor. Olsen and Khaki (1998:58) state that: "Much recent empirical evidence suggests that perceived risk is primarily a function of loss and the possibility of realising a return below some target or aspiration level."
2. Historical time series of asset returns are used in computer optimisation algorithms to estimate optimised portfolio asset allocations, one allocation for each possible set of investor-specific information. Generally, the higher the target returns, the higher the minimum probability of a target shortfall. High-growth portfolios are more volatile than low-growth portfolios. Although their higher growth helps them exceed a target return, their higher volatilities increase the chance that they will not reach the target (Stutzer 2004).

3. Investor input is used to obtain the investor's specific portfolio asset allocation. This step is an interactive feedback between the adviser and the investor. This is a

trade-off between risk and satisfactory return. Finally, the investor is advised to select the optimal asset allocation associated with the satisfactory return target (Browne 1999).

Several difficulties arise in asset allocation no matter which method is used, whether it is mean-variance or expected-utility-maximising asset. One is determining an appropriate value for the required risk-aversion parameter (Lebowitz and Henriksson 1989). Another one is explaining the rationale for maximising these criteria. A paradox arises when the same concave utility function is used to evaluate differently scaled risks (Stutzer 2004).

### 2.3.5 *Asset Classes*

According to the Harvard project finance glossary (2007), an asset class is a group of securities with similar characteristics which behave similarly in the marketplace. There are three major asset classes, including equities (stocks/shares), fixed income (bonds) and cash equivalents (money market instruments). Some investors also add property and commodities to the asset classes. Each type of asset class has a different risk and return. For example, cash has lower risk and lower return compare to equities which has a higher risk and higher return.

Bond definition according to Esty (2007) is the paper which shows an evidence of a legal promise by the issuer to pay the investor on a declared term. While bonds typically earn lower returns than equity they are included into portfolios for a number of reasons. The first is that they offer another asset class for diversification. Bonds tend to be less volatile than equity and can therefore stabilise the value of a portfolio during a downturn or periods of high volatility. Where shares represent equity ownership on the balance sheet, bonds represent the debt component of a balance sheet. This difference creates an advantage for bonds.

Bonds can outperform equity at certain times in the economic cycle typically during a recession where stocks shed their value quickly. The majority of the return on bonds comes from the coupon payments and as such fluctuations in the price of

a bond will have little impact on the value of the investment. The last benefit of bonds is that the interest rates on bonds are typically greater than the rates paid by banks on fixed deposits.

## 2.4 Investment Strategies

### 2.4.1 *Value Strategy*

The value stock portfolio strategy was started in the 1930s by Benjamin Graham (Graham and Dodd 1934) who is the father of fundamental security analysis. A contrarian approach is considered as a subset to value strategy. Value and growth stocks are classified based on four valuation ratio measures: price to earnings (P/E), price to cash flow (P/CF), price to book value (P/B), and dividend yield. According to Basu (1977) value stocks are those stocks in which the market price is relatively low in relation to earnings per share, Lakonishok, Shleifer and Vishny (1994) compare the market price to cash flow per share, Fama and French (1992) compare it to book value per share, and also Blume (1980) and Rozeff (1984) compare it to dividends per share. For all the above definitions, this proportion is low for value stocks (Bauman et al. 1998). Visscher and Filbeck (2003) believe that value stocks have high dividend yields, low price-to-book ratios, low price-to-earnings ratios, and low expected growth rates as a result of negative overreacting to adverse company financial news (creating value stocks) as well as positive overreacting of value investors to superior company financial news (creating growth stocks).

### 2.4.2 *Growth Strategy*

The growth stock portfolio strategy became popular after World War II after used by some professional investors such as Babson (1951). Growth stocks have the opposite characteristics from value stocks. Their market price is high compare to earnings per share (Basu 1977). In addition, they have a high market price in relation to cash flow per share (Lakonishok et al. 1994) and book value (Fama and French 1992). However, the dividend yield is low compare to value stocks (Blume

1980; Rozeff 1984). Nicholson (1960) was an early advocate of the idea that stocks with low P/Es provide superior returns.

### 2.4.3 *Value stocks versus growth stocks*

Many studies have found that value stocks produce higher returns than growth stocks in the US stock market (Bauman et al. 1998). Several reasons have been identified for such performance. Fama and French (1992) believe that since value stocks may be riskier, they require a return premium; others have stated that the difference is the result of systematic suboptimal market behaviour on the part of institutional investors and security research analysts (Bauman et al. 1998). Although there are considerable empirical researches about the performance of value and growth stocks in the US stock market, there are not many researches on the same concept in the stock markets of emerging markets. The results of the study by Bauman et al. (1998) on 20 different countries including different European countries, Australia, the Far East and Canada indicate that although investors might behave differently in various countries, the superior performance of value stocks over growth stocks exists in both the US and the non-US developed markets.

As compared with value stocks, growth stocks are characterised as having high recent growth rates in EPS and market price appreciation. Kahneman and Tversky (1982) believe that forecasters' overweight more recent information relative to older data because the worth of stocks is estimated based on expectations. Lakonishok et al. (1994) explain that investors tend to extrapolate recent past performance and De Bondt and Thaler (1985, 1987) believe that investors overreact to recent past events. Some investors such as Ball and Watts (1972) relate the actual pattern of changes in annual corporate earnings corresponds to a random walk. In addition, Bauman and Miller (1997) found that investment research analysts usually overestimate the future EPS of growth stocks relative to value stocks. That is due to the decline in the high growth rates of growth stocks and increase in the low growth of value stocks.

Numerous studies have found that long-term value strategies tend to outperform the market in the US financial markets (Basu 1977; Ambachtsheer 1977 Ambachtsheer and Farrell 1979; Estep, Hanson and Johnson 1983; Sorensen and Williamson 1985; Harris and Marston 1994; Chan, Jegadeesh and Lakonishok 1995). Keppler (1991) discovered that global equity investors can achieve excess risk-adjusted returns over long holding periods by selecting markets with higher than average dividend yields. Based on a research by Chan and Lakonishok (2004) value stocks are not riskier than growth stocks. Their study also shows that value stocks suffer less than growth stocks in a bear market.

Value stocks and growth stocks show different responses to earnings surprises. Skinner and Sloan (2000) explain that growth stocks show an asymmetrically large response to negative earnings surprises which explains the return difference between growth and value stocks.

Lakonishok et al. (1994) argue that investors initially are very optimistic about the future price of growth stocks. When the price of growth stocks decline, they do not meet their expectations. Barberis et al. (1998) also confirm that stock prices overreact to consistent patterns of good or bad news. This causes growth stocks gradually becoming overpriced as investors observe a series of consistently good earnings reports, but then the price of those stocks declines dramatically and report earnings disappointments and investors realise their expectations were overly optimistic.

To overcome this problem, managers of growth firms use a special strategy in their financial reporting. In order to avoid negative surprises, they smooth earnings over a long period of time if they are aware that their firms' stock prices suffer (Brown 1998; Burgstahler and Eames 1998; Degeorge, Patel and Zeckhauser 1999; Myers and Skinner 1999). This strategy helps investors and analysts to predict future earnings more easily and avoid likelihood of shortfalls in future. Brown (1998) finds that this result is especially pronounced for growth stocks.

Divergence of opinion among investors plays an important role in asset pricing. Value stocks are affected by investors' disagreement more than growth stocks. Doukas, Kim and Pantzalis (2004) suggest that the return advantage of value

strategies is a reward for the greater disagreement about their future growth in earnings. Alternative multifactor asset pricing tests supported the proposition that investor disagreement plays an important role in explaining the superior return of value stocks. La Porta, Lakonishok, Shleifer and Vishny (1997) believe that abnormal return of value stocks on earnings announcement must be caused by some mechanism other than the surprise in the level of earnings.

The investor disagreement factor plays an important role in explaining the returns of value and growth stocks. Dispersion in analysts' earnings forecasts is considerably higher for value portfolios (high Book Value (BV)/ Market Value (MV)) than for growth portfolios (low-BV/MV) as a result the cash flows of growth stocks are perceived by investors as less uncertain and, therefore, less risky than the cash flows of value stocks. Small-cap and value stocks often earn higher returns. On the contrary, growth and large-cap stocks are not perceived by investors as being subject to the same degree of investor disagreement as are value and small-cap stocks (Doukas et al. 2004). These results provide additional evidence in support of the view that value stocks command a premium because investors hold more diverse beliefs about their future growth prospects.

## 2.5 Market Conditions

### 2.5.1 *Correlation between Markets*

Some stock markets are highly integrated, therefore they tend to move together and have a stable long run relationship. As a result, there is less diversification benefit investing in integrated stock markets which are highly correlated. Strong economic and financial ties as well as similarities in macroeconomic policy implementations between the countries are some reasons for this correlation. The degree of co-movement among the stock markets and how closely international stock market returns are correlated are important for investors in order to design a well-diversified portfolio (Majid and Kassim 2009). The increase in the correlation coefficients leads to short-term co-movements among the markets and limits the

benefits of short-term diversification within these markets during the crisis period (Majid and Kassim 2009).

### 2.5.2 *Bull and Bear Markets*

Traders usually try to find market trends to predict what will happen to stocks' return in future. These trends can be different during long, medium and short terms (Edwards and McGee 2007). In upward trends or bull market investors predict capital gain in future, therefore they have more confidence to increase their investment, as opposed to downward trends or bear market in which there is a decline in investment in stock markets. Pettengill, Sundaram and Mathur (1995) define bull market as a period with the greater or equal monthly return in comparison with the risk free return. According to their definition, in bear market the monthly return is smaller than the free risk return. A bullish trend in the stock market often begins before the general economy shows clear signs of recovery (O'Sullivan and Sheffrin 2003).

Most booms are followed by currency crises, banking crises or both (Mendoza and Terrones 2008). Many features of financial crises occur naturally in evolutionary and complex systems. The boom phase leading to this recent crisis (early 1980s through to 2006) and bust phase (2007-current) are associated with various structural changes in institutions, technologies, monetary processes, i.e. changing meso structures. Recent crises had a long boom phase (early 1980s-2006), followed by a turning point and continuing bust phase (2007-current) with many similar patterns to the other financial crises. The 1980s boom in leveraged financial transactions was thus a phase shift in a complex adaptive system, and it was a transition to a new meso structure in the language of evolutionary economics (Allen and Snyder 2009).

Government deregulation, advances in information-processing technology, and other aspects of financial liberalisation and globalisation which happened in the US

and UK lead to structural changes in normal money supply and demand. These changes were called logistic diffusion trajectories which happen in three self-organising phases called the emergent, inflexion and saturation phases (Foster and Wild 1996). As a result of these structural changes, financial markets absorbed newly-created money-power beyond levels predicted by general equilibrium models, which in turn were used to inflate asset prices and incentivise production or consumption beyond predictions; then, during the bust phase, these variables moved in the opposite direction more than expected including a greater than expected fall in stock and real estate prices and destruction of monetary wealth (Camerer and Lovallo 1999). The effects of these transfers and revaluations of monetary wealth in the global system depend on the magnitudes of these changes. In the new ordering of the global economy, it should be accepted that, increasingly, autonomous, invisible financial processes can drive changes in the physical relations of production, rather than vice versa. Any perceived initial creation and distribution of wealth or value that happens in the thin air of financial markets could not be sustained over time without correspondence to supportive GDP activity (Allen and Snyder 2009).

During a boom, the financial sector becomes richer and more influential, as a result regulation is reduced and the financial sector's profitability rises at the expense of greater crisis risk for society as a whole (Reinhart and Rogoff 2010). During a downturn, investors might underestimate the variability of future shocks; therefore, they either hold insufficient buffer stocks of assets or hold too much debt (Camerer and Lovallo 1999).

### 2.5.3 *Financial Crisis*

Financial crises show a basic failure of economics which sometimes undercuts some particular theories and approaches to economics. Therefore, imperfections in the operation of both markets and governments should be analysed in order to recognise the importance of limited information and uncertainty about correct models. In some cases creating perverse incentive structures causes financial

excesses that led to the crisis. Macroeconomic analysis should use as a base for financial consideration and financial risk analysis needs to consider economic considerations. Therefore paying attention to different theories and approaches prepares a comprehensive approach for analysis (Willett 2010).

De Bondt (2010) believes that a systemic risk regulator which is independent from business and political influence, as well as higher capital, restrictions on proprietary trading in commercial banks, transparency in derivatives, finding preventive ways for bankers that reduce the incentive to take excessive risks, consumer protection against defective financial products, and the re-establishment of the principle of fiduciary duty help to rebuild an effective global financial system.

The dot-com bubble that is believed has existed in Nasdaq stocks generally and internet stocks in particular in the 1999 to 2000 period (Battalio and Schultz 2006 and the recent financial crisis started in 2007 are two examples of financial crises. The subprime crisis which began in August 2007 in the US and has been labelled as the worst financial crisis since the Great Depression by many including George Soros, Joseph Stiglitz and the International Monetary Fund (IMF) (Jaffee 2008; Tong and Wei 2008). The crisis has developed into the largest financial shock, inflicting heavy damage on markets and institutions at the core of the global financial system (IMF 2008). The average external debt/Gross Domestic Product (GDP) ratio doubles during this period (Mendoza and Terrones 2008). There are some common characteristics in all financial crises; however there might be some particular effects in each period.

Firm characteristics as well as pricing behaviour followed from incentives created by these characteristics were unique during the dot-com bubble. As an example the unexpected pricing behaviour in pre-IPO ownership structure and insider selling behaviour over the same period can be mentioned. Also the frequency and magnitude of secondary sales by all insiders, for example CEOs, decreased sharply. Finally, purchase of shares by friends and family at the discounted offer

price, became ubiquitous. It is not easy to explain these effects by neither rational nor behavioural models during this period (Ljungqvist and Wilhelm 2003).

Some researchers have proposed that short-selling restrictions prevented rational investors from driving prices of internet stocks back to reasonable levels during this time. That was due to arbitrage opportunities that involve selling actual shares and buying synthetic shares as indications that short-sale constraints were binding. No evidence from arbitrage opportunities showed that short-sale restrictions prevented investors from shorting Internet stocks (Battalio and Schultz 2006).

The 2007 financial crisis has not only affected the financial markets and the economy of the US, but it has also been spreading over the other countries' financial markets worldwide including the emerging financial markets. Before the crisis, all stock markets recorded positive average daily returns, while in the period during the crisis, all the stock markets witnessed negative average daily returns. All the stock markets recorded greater volatility in the period during the crisis compared to before the crisis (Majid and Kassim 2009).

Some stock markets are co-integrated only during the crisis period, but not in the pre-crisis period. For these markets, long run equilibrium exists only during the crisis (Majid and Kassim 2009). Stock markets can be perfectly integrated, perfectly segmented, or partially integrated with the extent of integration constant over time (Bekaert and Harvey 1995). However, like the two major stock market crises, the 1987 crash and the 1997-1998 emerging stock market crisis, the 2007 US financial crisis has also been observed to strengthen regional integration between emerging Asian stock markets which reduces the benefit of diversification in these markets. Although the benefits in the long term might be reduced, it is not fully eliminated. A plausible explanation is that during the crisis period, the stock markets were driven by a common international factor, while country-specific factors have become less important than the international factors, leading to the long-run co-movements among the stock markets (Majid and Kassim 2009).

Based on a recent study by Reinhart and Rogoff (2010), there is a strong link between banking crises and sovereign default across the economic history of both advanced and emerging markets. There are different hypotheses regarding this relationship. First, private debt surges happen prior to banking crises. One of the reasons can be governments' contribution in the borrowing boom stage. Second, domestic or international banking crises occur before or accompany sovereign debt crises. Third, public borrowing accelerates markedly ahead of a sovereign debt crisis, governments' hidden debts exceed the level of external debt. These hidden debts encompass domestic public debts. Fourth, the hypothesis related to the final stages of the private and public borrowing frenzy on the eve of banking and debt crises and bursts of hyperinflation, the composition of debt shifts distinctly toward short-term maturities. Hyperinflation as defined by Reinhart and Rogoff (2010) is episodes where the annual inflation rate exceeds 500%.

Interesting findings show that currency crashes and inflation crises go hand in hand (Frankel and Rose 1996). By an inflation crisis it is meant a year in which inflation exceeds 20% (Cagan 1956), while a currency crash is an annual depreciation (devaluation) greater than or equal to 15% per annum. Domestic debt crises happen in a worse economic condition and they do not usually involve external creditors. That is why they are less noticeable (Eichengreen and Lindert 1989).

Banking crises often arise from a protracted deterioration in asset quality, a collapse in real estate prices or increased bankruptcies in the non-financial sector and not from a liability side. Two types of events can be signs for banking crisis: first, bank runs that lead to the closure, merging, or a takeover by the public sector of one or more financial institutions. Second, the closure, merging, takeover, or large-scale government assistance of an important financial institution that marks the start of a string of similar outcomes for other financial institutions even if there are no runs (Caprio, Klingebiel, Laeven and Noguera 2005).

Reinhart and Rogoff (2010:19) believe that: “As financial markets have developed in the smaller, poorer economies, the frequency of banking crises has increased. Private debts (external debt, broader private capital inflows, and domestic bank debt) usually happen ahead of banking crises and show a repeated cycle of boom and bust. The run-up in debts accelerates as the crisis nears. Also having public or private debts is a prerequisite to default. Increases in external debt systematically help predict increases in the share of countries in default and the comparable share of emerging markets with systemic banking crises. Domestic credit climbs sharply prior to the banking crisis and unwinds afterward.” Banking crises most often either precede or coincide with sovereign debt crises.

## 2.6 Conclusion of Literature Review

Portfolio management is the process of choosing securities, monitoring and evaluating the performance of portfolios. In defining a portfolio’s past performance of securities as well as prediction of their future performance are both considered. Therefore, there is always uncertainty in creating a portfolio which leads to a trade-off between risk and return. As Markowitz (1991) believes, investors usually look for a high stable return. Optimal portfolio is the portfolio which maximises an investor’s preferences with respect to return. It is important to distinguish between optimal portfolio and efficient portfolio which is looking at the highest return.

Diversification is a way to reduce the risk by spreading it among different securities. For example choosing securities which are not perfectly correlated from various industries can reduce the risk. Diversification cannot eliminate the risk completely, because market risk is inevitable. Since the environment is changing, an investor needs to rebalance its portfolio based on the market condition such as bull and bear markets.

When objectives and broad strategies pertaining to asset mix have been determined, investors face another critical issue which is choosing a right strategy for their portfolios. Value strategy and growth strategy are some of the popular investment strategies. Also it was mentioned in the literature review that many studies prove that value stocks usually outperform growth stocks. According to

Chan and Lakonishok (2004) value stocks suffer less than growth stocks in a bear market.

### 2.6.1 *Hypothesis / Proposition / Research Question 1:*

The null hypothesis ($H_0$) states that in a bull market, value investment strategies outperform growth investment strategies.

The alternative hypothesis ($H_A$) states that in a bull market, value investment strategies do not outperform growth investment strategies.

$$H_{0:}\ \mu_{v(bull)} \geq \mu_{g(bull)}$$

$$H_{A:}\ \mu_{v(bull)} < \mu_{g(bull)}$$

$\mu_v$ refers to mean of the returns for value stocks and $\mu_g$ refers to mean of the returns for growth stocks.

### 2.6.1 *Hypothesis / Proposition / Research Question 2:*

The null hypothesis ($H_0$) states that in a bear market, value investment strategies outperform growth investment strategies.

The alternative hypothesis ($H_A$) states that in a bear market, value investment strategies do not outperform growth investment strategies.

$$H_{0:}\ \mu_{v(bear)} \geq \mu_{g(bear)}$$

$$H_{A:}\ \mu_{v(bear)} < \mu_{g(bear)}$$

$\mu_v$ refers to mean of the returns for value stocks and $\mu_g$ refers to mean of the returns for growth stocks.

# 3 RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter discusses the methods used in this study. Section 3.2 presents data and data source as well as population and sample for the study. In section 3.3 research design is discussed extensively.

## 3.2 Data and Data Source

Different sets of data, specifically closing weekly share prices and price/earnings ratio, are used in this research. Both data sets are obtained from I-Net Bridge. The returns can be measured daily, weekly, or monthly. There are some critics for using each interval especially when an event is studied. For example using short intervals such as daily returns may cause errors due to thin trading (Bondt and Thaler 1985). On the other hand, using of high frequency data such as monthly or weekly return might cause some flaws in estimation of variance and co-variance (Polson and Tew 2000). Considering the above mentioned reasons, weekly return is used in this research to mitigate against discussed issues.

### 3.2.1 *Population*

The research uses the whole JSE Securities Exchange main board population (specifically J203-all share index) in a ten-year period, starting from January 2000 to December 2010.

### 3.2.1 *Sample selection criteria and portfolio formation*

Sample selection process includes removing the stocks which do not have price or P/E ratios for the whole period of the study. That might be due to different reasons such as non-existence of the company at the time or that the company is not yet listed in J203. From the total number of 358 various shares, 170 shares have the information for the 10-year period. The remaining 170 shares are divided into two

groups of value stocks and growth stocks based on their P/E ratios, such that two portfolios are formed. The value portfolio consists of 100 shares with a relatively low P/E ratio and the growth portfolio consists of 100 shares with a relatively high P/E ratio.

## 3.3 Research Design

There are two different steps for analysing the data in this research. The first step deals with portfolio optimisation and the second step is the statistical study to compare returns for the value and growth portfolios based on the JSE stocks. Both steps will be approached quantitatively.

### 3.3.1 *Determining Optimal Portfolios*

As discussed in the literature review, there are several classic approaches to portfolio optimisation, such as Markowitz and Sharpe's theories. Modern portfolio theory (MPT) had other views to the classic ones and it changed the way that investors discuss investment. However, even the MPT had its own weaknesses. One problem of using this theory is to create an unrealistic portfolio with huge short positions and imaginary long positions. Historical asset returns data do not produce good predictions for future returns on their own (DeMiguel, Garlappi and Uppal 2007). Several investors tried to find a solution to have a better model to optimise their portfolios. Black and Litterman from Goldman Sachs created their own model to provide an intuitive solution to the two problems that have plagued quantitative asset allocation models. This model gives us a better tool to review the equity portfolios during the downturn and find the optimised portfolio based on the available data. In the following sections, the detail, the application of the model to this research and its advantages and disadvantages will be explained.

In today's computerized world, quantitative models play a dominant role in the global allocation process. This research also has a quantitative approach to find an optimal portfolio. The quantitative model which is specifically used in this research is published by Black and Litterman (1991). The Black-Litterman (B-L) mathematical model combines the principles of portfolio theories, the mean-

variance optimisation framework of Markowitz and the capital asset pricing model (CAPM) of Sharpe and Lintner to find a solution for its optimisation problem. This enables the researcher to find the right weighting for different assets in the value and growth portfolios (Black and Litterman 1992).

In The B-L Model based on Becker and Gurtler (2010), return vector $r$ of $N$ assets is multivariate normally distributed with $Nx1$ expected return vector $\mu$ and $NxN$ variance-covariance matrix.

$$\sum: r \sim N(\mu, \sum)$$

The variance-covariance matrix is defined:

$$\begin{matrix} \delta_{11} & \cdots & \delta_{1N} \\ \vdots & \ddots & \vdots \\ \delta_{N1} & \cdots & \delta_{NN} \end{matrix}$$

If $i = j\ then\ \delta_{ii} = \delta_{jj} = varince\ i$

If $i \neq j\ then\ \delta_{ij} = Covarince\ i, j$

Where $\delta_{ij} = cov(i,j) = \frac{1}{M-1} \sum_1^M (r_i - r_{iave}) * (r_j - r_{jave}),\ i = j = 1, \ldots, N$

Where M is return for N assets over M period and r is the mean return for the asset.

The vector of expected returns is a random vector that follows a multivariate normal distribution with the parameters $\prod, \tau$ and $\sum$: $\mu \sim N(\prod, \tau\sum)$. $\tau$ is the uncertainty factor which is very small. $\prod$ is equilibrium expected return vector $(Nx1)$. Black and Litterman (1992) use the market portfolio as a neutral point of reference. They believe that market returns compared to the other strategies generate the most balanced portfolios.

The expected return of the portfolio is calculated with the formula:

$$\emptyset = \mu_p - \frac{\lambda}{2} \delta_p^2 = X'\mu - \frac{\lambda}{2} X'\sum X$$

In the formula $\mu_p$ shows the expected portfolio return, $\delta_p^2$ represents the portfolio variance, $\lambda$ is the risk aversion parameter determined as the market price of the risk based on the CAPM model and $X$ is the optimal weight vector calculated with:

$$X = \frac{1}{\lambda} \sum^{-1} \mu$$

Based on the above equation, the vector of equilibrium returns is calculated:

$$\prod \equiv \mu = \lambda * \sum * X$$

An investor's view influences the model in a form of *Q*, which is a $Kx1$ vector of $K$ forecast return expectations, and $KxN$ Matrix of views $(P)$.

$$Q = P\mu + \varepsilon, \varepsilon \sim N(0, \Omega)$$

Where $\varepsilon$ is an error term $(Kx1)$ with a normal distribution and expected value zero and $\Omega$ is a diagonal matrix which presents the view confidence matrix.

After applying all the factors, the Black-Litterman expected return vector is:

$$\mu_{BL} = [(\tau\sum)^{-1} + P'\Omega^{-1}P]^{-1} * [(\tau\sum)^{-1}\prod + P'\Omega^{-1}Q]$$

### 3.3.2 *Statistical Test*

The B-L model is designed to identify the weekly returns for the optimum portfolios. This return is compared to the benchmark portfolio which in this case is market index (JSE all share index) on the JSE to evaluate the portfolio performance (abnormal returns) in bull and bear market conditions.

Due to the impact of economic events, abnormal returns will be found in the research which shows the difference in the distribution of the expected returns and actual returns (Strong 1992). Abnormal return is defined as the excess return of

the asset compared to benchmark. Ball and Brown (1968) suggest using cumulative abnormal returns during the testing period, because the exact time of the event influence cannot be identified.

In order to test the two hypothesis, the mean return of the optimized portfolios needs to be calculated ($\mu_{v(bull)}$, $\mu_{v(bear)}$, $\mu_{g(bull)}$,$\mu_{v(bear)}$) as well as their standard deviations to be able to do the t-test. The result of the t-test proves whether the null hypothesis can be accepted or rejected and if the result is significant. It is assumed that the data is normally distributed to use the t-test in analysing security returns. In the study by Ball and Brown (1968) the differences between the actual and assumed normal distribution in the t-test seems very small.

### 3.3.3 *Determining the market condition*

To identify the market condition (bull and bear) as Pettengill et al. (1995) explains (see section 2.5.2), a bull market is identified as a period where the market return is greater or equal to a risk free rate as opposed to a bear market in which monthly return is less than a risk free rate in that period. Risk free rate in each periods are used based on government bonds (R157).

### 3.3.4 *Portfolio rebalancing*

Rebalancing is a way to adjust a portfolio through the time and maintain the risk-reward ratio for the investment. A chosen portfolio might be too aggressive or defensive in different market conditions. In terms of rebalancing intervals, the result of the study by Liu (2009) shows that there are small rewards to increasing rebalancing frequency from quarterly up to several years, but this comes at the price of increased portfolio risk. As a result, the portfolios in this research are rebalanced every six months. Also in each rebalancing date, a year of historical data is used to cover both old and recent events on the share price for each firm. (Strong 1992)

## 3.4 Research Assumptions

Black and Litterman (1992) start their model based on some assumptions. These assumptions are:

- An investor chooses his optimal portfolio from among a given group of assets. This is called a bench mark portfolio (Black and Litterman 1992).
- In the absence of additional information, the benchmark cannot be outperformed. It means that it is very difficult to outperform a well diversified benchmark (Malkiel 2005).
- Expected returns are not likely to deviate too far from their equilibrium, so when they move away from their equilibrium values, imbalances in the market push them back (Black and Litterman 1992).

## 3.5 Advantages and Disadvantages of B-L model

This model, like any other model, has advantages and disadvantages that need to be considered for the purpose of the research.

There are several advantages for this model:

- It allows the investor to combine his views about the outlook for global equities, bonds and currencies with the risk premiums generated by Black's global version of CAPM equilibrium (Black 1989). Meanwhile it distinguishes between the views of the investor and the expected returns (Black and Litterman 1992).

- Equilibrium risk premiums provide a neutral reference point for expected returns. This allows the model to generate optimal portfolios that are much better behaved than the unreasonable portfolios that standard models typically produce, which often includes large long and short positions unless otherwise constrained (Black and Litterman 1992).

- This model makes adjustments in a manner as consistent as possible with historical co-variances of returns of different assets and currencies.

- It also takes the correlations of the asset returns into account (Meucci, 2010).

- Optimal portfolio weights from a mean-variance model are incredibly sensitive to minor changes in expected excess returns. The advantage of incorporating a global equilibrium will become apparent when it is shown how to combine it with an investor's views to generate well-behaved portfolios, without requiring the investor to express a complete set of expected excess returns (Meucci 2010).

Meucci (2010) recognises a few disadvantages in using this model:

- In this model views are expressed with the mean return, not on the market, as a result the confidence parameter only affects the estimation risk part of the covariance in and not its volatility-correlation component (Beach and Orlov 2007).

- There is no historical updating of the estimate of mean return, which does not depend on the time series of the past returns.

Several people tested the capabilities of the Black-Litterman model and its market formulation. The summary of the result is shown in table 1.

**Table 1: Capabilities of Black-Litterman by different analysts (Meussi 2010)**

| Capabilities | Black and Litterman (1992) | Almgren and Chriss | Qian and Gorman | Pezier | Meucci | the COP in Meucci | the COP in Meucci |
|---|---|---|---|---|---|---|---|
| normal market and linear views | X | | X | X | X | X | X |
| scenario analysis | X | | X | X | X | X | X |
| correlation stress-test | | | X | X | X | | X |
| trading desk: non-linear pricing | | | | | X | X | X |
| external factors: macro, etc. | | | | | X | X | X |
| partial specifications | | | | X | X | | X |
| non-normal market | | | | | | X | X |
| multiple users | | | | | | X | X |
| non-linear views | | | | | | | X |
| trading desk: costly pricing | | | | | | | X |
| lax constraints: ranking | | X | | | | | X |

Although one of the great advantages of using the B-L model for an investor is to express its own view regarding the market, it is emphasised by Black and Litterman (1992) that if an investor does not have a view about a specific market, it should avoid using it in the model. However, historical average approach might be used as a neutral point –set of expected returns that would clear the market if all investors have identical views – to form an optimal portfolio. This solution might lead to large short or long positions which make the portfolio unreasonable (Black and Litterman 1992). Since the reason for the boom and bust periods in the South African stock market is not the purpose of this research, the investor's view might not be used in some or all the study periods.

## 3.6 Limitations of the study

A mathematical model (excel spreadsheet) is used to form an optimised portfolio. This model is based on matrix functions which limit the number of shares that can be analysed in this model.

## 3.7 Validity and reliability

### 3.7.1 *External validity*

External validity refers to the extent to which generalisations into other areas can be made from the results of a specific study (Leedy and Ormrod 2001). The authors state that the external validity of a study can be improved by using a representative sample and by finding results that is consistent with similar studies. Based on the literature review, there are not many similar studies in this field. Since the analytical techniques are among the popular and well tested methods, it can provide confidence in the external validity of this research. It needs to be considered that the final result for different portfolios might be different due to their components of risk and return of the portfolios (Mankert 2006).

### 3.7.2 *Internal validity*

Leedy and Ormrod (2001) define internal validity as the extent to which the researcher is able to draw accurate conclusions from the study. They state that the internal validity of a study can be improved by reducing the possibility that the research results came about due to reasons other than those concluded in the study.

“Traditional quantitative financial models assume rational investors, arbitrage-free markets, normally distributed returns etc., research within behavioural finance claims that these assumptions do not apply in the real financial world. People are irrational (in relation to the assumptions of the efficient market hypothesis) in many different ways and this affects how financial models are used and how they should be used” (Mankert 2006:48). Research results within behavioural finance can be

seen as both opposing and supporting the use of quantitative models. Opponents may claim that quantitative financial models are built upon unrealistic assumptions regarding both the investors using them and the markets. Proponents on the other hand may claim that since humans are prone to act irrationally, the use of quantitative models may help them to overcome this failing (Mankert 2006).

In contrast to historical estimated returns, which lead to extreme asset weights within the Markowitz optimisation, the Black-Litterman model generally results in balanced portfolio weights (Becker and Gurtler 2010).

### 3.7.3 *Reliability*

Reliability examines how consistent results are within a study (Leedy and Ormrod 2001). Fund and portfolio managers are often evaluated in relation to a benchmark portfolio and hence often evaluate their own performance in relation to this benchmark portfolio. Since many financial managers are evaluated to a reference point, it seems reasonable that the fund manager would appreciate working with a portfolio model taking this reference point into consideration. The taking of bets in relation to benchmark could be one of the reasons why managers find the portfolios generated by the B-L model more realistic than portfolios generated by the Markowitz' model. If the status quo is biased, investors should be more comfortable working with a model using the same point of reference, as they are themselves to avoid feeling regret.

# 4 PRESENTATION OF RESULTS

## 4.1 Introduction

In this section the result of executing the discussed methodology is presented and the result is compared to the theories explained in the literature review. Section 4.2 explains the process of data collection. In section 4.3 the criteria for determining bull and bear markets and rebalancing intervals are explained. In addition, the summary of optimal portfolios including the stocks used to form the portfolios; portfolio characteristics such as mean return, median and standard deviation as well as statistical information regarding abnormal mean return, cumulative return are discussed. In order to accept or reject the hypotheses in this research, t-test results are also shown in this section.

## 4.2 Data Information

The data collected from I-Net Bridge includes the closing weekly prices as well as the price/earnings ratio for the stocks among the listed companies in the JSE Security Exchange. Only 170 shares with the available data for the whole period are used in this study. The list of 170 shares is available in Appendix A.

## 4.3 Data Analysis

### 4.3.1 *Determining the Market Condition*

Market condition is tested considering the suitable interval for rebalancing the portfolio (refer to section 3.3.4) and based on Pettengill et al. (1995) (refer to section 3.3.3). If the risk free rate (government bond R157) is higher than the annualised market return over a period of six months, this period is termed a bear market. On the other hand if the risk free rate is lower than the annualised market return over a six month period, the period is called a bear market. The portfolios are then rebalanced according to the periods indicated in Table 2. Based on the

following table, 13 bull periods and 9 bear periods of the total 22 periods are identified.

**Table 2: Market classification**

| Period | Dates | Market Condition |
|---|---|---|
| 1 | 2000/01/02-2000/07/02 | Bear |
| 2 | 2000/07/02-2001/01/07 | Bull |
| 3 | 2001/01/07-2001/07/01 | Bull |
| 4 | 2001/07/01-2002/01/06 | Bull |
| 5 | 2002/01/06-2002/07/07 | Bear |
| 6 | 2002/07/07-2003/01/05 | Bear |
| 7 | 2003/01/05-2003/07/06 | Bear |
| 8 | 2003/07/06-2004/01/04 | Bull |
| 9 | 2004/01/04-2004/07/04 | Bull |
| 10 | 2004/07/04-2005/01/02 | Bull |
| 11 | 2005/01/02-2005/07/03 | Bull |
| 12 | 2005/07/03-2006/01/01 | Bull |
| 13 | 2006/01/01-2006/07/02 | Bull |
| 14 | 2006/07/02-2007/01/07 | Bull |
| 15 | 2007/01/07-2007/07/01 | Bull |
| 16 | 2007/07/01-2008/01/06 | Bear |
| 17 | 2008/01/06-2008/07/06 | Bear |
| 18 | 2008/07/06-2009/01/04 | Bear |
| 19 | 2009/01/04-2009/07/05 | Bear |
| 20 | 2009/07/05-2010/01/03 | Bull |
| 21 | 2010/01/03-2010/07/04 | Bear |
| 22 | 2010/07/04-2011/12/26 | Bull |

### 4.3.2 *Rebalancing Portfolios*

To adjust the portfolio according to the market condition in each period, portfolios are rebalanced every six months. The rebalancing dates are based on the bull and bear market periods identified in Table 2.

### 4.3.3 *Summary of Optimal Portfolios*

In each rebalancing date, all 170 shares are sorted according to their P/E ratios. The 100 shares with the lowest P/E ratios are chosen to form a value portfolio, as the 100 shares with the highest P/E ratios are used in the growth portfolio. In each period, these two portfolios are analysed with the mathematical model based on the methodology discussed in section 3.3.1. The share codes as well as the identified weights for each share are available in Appendix B. Statistical characteristics of portfolios such as mean return, median and standard deviation are given in Table 3. All the calculations in the following tables are based on the weekly prices.

**Table 3: Optimal value and growth portfolios' characteristics**

| | | | Optimum Value Portfolio | | | Optimum Growth Portfolio | | |
|---|---|---|---|---|---|---|---|---|
| Period | Rebalancing Date | Market Condition | Mean Return | Median | Standard Deviation | Mean Return | Median | Standard Deviation |
| 1 | 2000/01/02 | Bear | -0.39% | -0.80% | 2.26% | -0.35% | -0.78% | 1.94% |
| 2 | 2000/07/02 | Bull | -0.01% | 0.18% | 1.65% | 0.33% | 0.33% | 2.28% |
| 3 | 2001/01/07 | Bull | 0.71% | 0.82% | 1.66% | 0.26% | 0.28% | 1.05% |
| 4 | 2001/07/01 | Bull | 0.64% | 0.76% | 1.43% | 0.31% | 0.57% | 2.15% |
| 5 | 2002/01/06 | Bear | 0.34% | 0.51% | 1.64% | 0.53% | 0.85% | 1.75% |
| 6 | 2002/07/07 | Bear | 0.45% | 0.60% | 1.27% | 0.31% | 0.43% | 1.03% |
| 7 | 2003/01/05 | Bear | 0.06% | -0.19% | 0.87% | 0.09% | 0.16% | 1.00% |
| 8 | 2003/07/06 | Bull | 0.58% | 0.56% | 0.82% | 0.59% | 0.49% | 0.79% |
| 9 | 2004/01/04 | Bull | 0.34% | 0.38% | 0.75% | 0.18% | 0.26% | 0.71% |
| 10 | 2004/07/04 | Bull | 0.83% | 0.90% | 0.56% | 0.81% | 0.94% | 0.79% |
| 11 | 2005/01/02 | Bull | 0.30% | 0.34% | 0.62% | 0.19% | 0.14% | 0.48% |
| 12 | 2005/07/03 | Bull | 0.39% | 0.46% | 0.65% | 0.25% | 0.22% | 0.56% |
| 13 | 2006/01/01 | Bull | 0.25% | 0.28% | 0.62% | 0.30% | 0.44% | 0.84% |
| 14 | 2006/07/02 | Bull | 0.41% | 0.37% | 0.38% | 0.28% | 0.36% | 0.44% |
| 15 | 2007/01/07 | Bull | 0.34% | 0.37% | 0.40% | 0.38% | 0.41% | 0.51% |
| 16 | 2007/07/01 | Bear | 0.04% | 0.03% | 0.30% | 0.11% | 0.10% | 0.54% |
| 17 | 2008/01/06 | Bear | 0.01% | 0.07% | 0.40% | -0.13% | -0.02% | 0.48% |
| 18 | 2008/07/06 | Bear | 0.01% | -0.13% | 0.92% | -0.22% | -0.26% | 0.93% |
| 19 | 2009/01/04 | Bear | 0.08% | 0.20% | 0.61% | 0.10% | 0.16% | 0.65% |
| 20 | 2009/07/05 | Bull | 0.16% | 0.10% | 0.34% | 0.28% | 0.30% | 0.47% |
| 21 | 2010/01/03 | Bear | 0.10% | 0.12% | 0.28% | 0.14% | 0.13% | 0.41% |
| 22 | 2010/07/04 | Bull | 0.15% | 0.22% | 0.26% | 0.22% | 0.25% | 0.28% |

The mean return of the optimal value equity portfolio is more than the one in the optimal growth equity portfolio in 12 periods out of 22 periods. If bull and bear markets are considered separately, in 9 out of 13 periods (69.2%) of the bull markets, the optimal value portfolio achieves a better mean return than the growth one. However, in bear markets, only in 3 out of 9 periods (33.3%), the optimal value portfolio has a better mean return than the growth portfolio.

### 4.3.4 *Statistical Test*

Mean abnormal returns as well as cumulative abnormal returns are calculated for all the portfolios in various timelines. The reason for using mean abnormal return and cumulative abnormal return based on Ball and Brown (1968) is that the exact time of change in market conditions cannot be identified. The mean and cumulative abnormal returns for different periods are shown in Table 4. Based on the indicated result, there is not any specific pattern for abnormal returns. In the bull markets, the value portfolio has 8 (61.53%) periods with a negative cumulative return. This number for the growth portfolio is 11 (84.62%) periods with a negative cumulative return of the total of 13 periods. In the bear markets, both the value and the growth portfolios have less negative returns compared to the bull markets with respectively 33.33% and 22.22%.

Statistical analysis is done to test the acceptance of the two hypotheses. The results are indicated in Table 5. The first null hypothesis (H0) states that in a bull market, value investment strategies outperform growth investment strategies. In every period, t-tests are done in three different significance levels. There is not enough evidence to reject the null hypothesis during the bull markets in any of the confidence levels. Therefore, it is accepted that the value investment portfolios outperform the growth investment portfolios in bull markets. However the result is not significant.

For the second hypothesis, the null hypothesis ($H_0$) states that in a bear market, value investment strategies outperform growth investment strategies. The same result as the bull markets is reached. This means that the null hypothesis is accepted.

## Table 4: Performance of the value and growth portfolios

| | | Optimum Value Portfolio | | | Optimum Growth Portfolio | | |
|---|---|---|---|---|---|---|---|
| Period | Rebalancing Date | Mean Return (Abnormal) | Cumulative Mean Return (Abnormal) | Standard Deviation (Abnormal) | Mean Return (Abnormal) | Cumulative Mean Return (Abnormal) | Standard Deviation (Abnormal) |
| 1 | 2000/01/02 | 0.07% | 1.87% | 2.72% | 0.12% | 2.93% | 2.52% |
| 2 | 2000/07/02 | -0.35% | -9.49% | 1.72% | -0.01% | -0.36% | 1.75% |
| 3 | 2001/01/07 | 0.27% | 7.02% | 2.53% | -0.19% | -7.88% | 2.60% |
| 4 | 2001/07/01 | 0.13% | 2.74% | 3.36% | -0.19% | -4.02% | 2.54% |
| 5 | 2002/01/06 | 0.23% | 5.97% | 2.52% | 0.43% | 11.14% | 2.44% |
| 6 | 2002/07/07 | 0.94% | 24.33% | 2.38% | 0.79% | 20.62% | 2.21% |
| 7 | 2003/01/05 | 0.51% | 13.36% | 2.78% | 0.54% | 14.11% | 2.94% |
| 8 | 2003/07/06 | -0.24% | -6.15% | 2.08% | -0.23% | -5.95% | 1.83% |
| 9 | 2004/01/04 | 0.38% | 10.01% | 1.82% | 0.22% | 5.80% | 2.07% |
| 10 | 2004/07/04 | 0.05% | 1.21% | 1.66% | 0.03% | 0.65% | 1.68% |
| 11 | 2005/01/02 | -0.16% | -4.15% | 1.59% | -0.27% | -6.91% | 1.61% |
| 12 | 2005/07/03 | -0.57% | -14.88% | 1.92% | -0.71% | -18.46% | 1.93% |
| 13 | 2006/01/01 | -0.22% | -5.77% | 2.65% | -0.17% | -4.42% | 2.45% |
| 14 | 2006/07/02 | -0.31% | -8.41% | 1.78% | -0.44% | -11.88% | 1.86% |
| 15 | 2007/01/07 | -0.28% | -6.98% | 1.92% | -0.24% | -6.03% | 1.80% |
| 16 | 2007/07/01 | -0.03% | -0.76% | 2.73% | 0.04% | 1.01% | 2.67% |
| 17 | 2008/01/06 | -0.08% | -2.17% | 3.27% | -0.23% | -5.92% | 3.15% |
| 18 | 2008/07/06 | 1.43% | 37.11% | 6.07% | 1.20% | 31.21% | 5.72% |
| 19 | 2009/01/04 | -0.15% | -3.98% | 3.35% | -0.14% | -3.57% | 3.17% |
| 20 | 2009/07/05 | -0.66% | -17.06% | 2.05% | -0.54% | -13.96% | 1.92% |
| 21 | 2010/01/03 | 0.15% | 3.86% | 2.56% | 0.19% | 4.89% | 2.41% |
| 22 | 2010/07/04 | -0.47% | -12.28% | 1.73% | -0.40% | -10.32% | 1.60% |

**Table 5: Statistical analysis of the individual portfolios' performance**

| | | Statistical Tests | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Period | Rebalancing Date | Confidence Interval for α=.01 *** | Confidence Interval for α=.05 ** | Confidence Interval for α=.10 * | $t_{\text{mean return}}$ | Result | $t_{\text{mean abnormal return}}$ | Result |
| 1 | 2000/01/02 | +/-2.4032 | +/-1.6762 | +/-1.2988 | -0.0730 | Accept $H_0$ | -0.0587 | Accept $H_0$ |
| 2 | 2000/07/02 | +/-2.3999 | +/-1.6749 | +/-1.2981 | -0.6248 | Accept $H_0$ | -0.7166 | Accept $H_0$ |
| 3 | 2001/01/07 | +/-2.4065 | +/-1.6775 | +/-1.2995 | 1.1544 | Accept $H_0$ | 0.6250 | Accept $H_0$ |
| 4 | 2001/07/01 | +/-2.3999 | +/-1.6749 | +/-1.2981 | 0.6517 | Accept $H_0$ | 0.3995 | Accept $H_0$ |
| 5 | 2002/01/06 | +/-2.4032 | +/-1.6762 | +/-1.2988 | -0.4224 | Accept $H_0$ | -0.2887 | Accept $H_0$ |
| 6 | 2002/07/07 | +/-2.4032 | +/-1.6762 | +/-1.2988 | 0.4447 | Accept $H_0$ | 0.2239 | Accept $H_0$ |
| 7 | 2003/01/05 | +/-2.4032 | +/-1.6762 | +/-1.2988 | -0.1110 | Accept $H_0$ | -0.0364 | Accept $H_0$ |
| 8 | 2003/07/06 | +/-2.4032 | +/-1.6762 | +/-1.2988 | -0.0354 | Accept $H_0$ | -0.0145 | Accept $H_0$ |
| 9 | 2004/01/04 | +/-2.4032 | +/-1.6762 | +/-1.2988 | 0.7962 | Accept $H_0$ | 0.2989 | Accept $H_0$ |
| 10 | 2004/07/04 | +/-2.4032 | +/-1.6762 | +/-1.2988 | 0.1124 | Accept $H_0$ | 0.0463 | Accept $H_0$ |
| 11 | 2005/01/02 | +/-2.4032 | +/-1.6762 | +/-1.2988 | 0.6931 | Accept $H_0$ | 0.2395 | Accept $H_0$ |
| 12 | 2005/07/03 | +/-2.4032 | +/-1.6762 | +/-1.2988 | 0.8195 | Accept $H_0$ | 0.2547 | Accept $H_0$ |
| 13 | 2006/01/01 | +/-2.4032 | +/-1.6762 | +/-1.2988 | -0.2534 | Accept $H_0$ | -0.0733 | Accept $H_0$ |
| 14 | 2006/07/02 | +/-2.3999 | +/-1.6749 | +/-1.2981 | 1.1500 | Accept $H_0$ | 0.2595 | Accept $H_0$ |
| 15 | 2007/01/07 | +/-2.4065 | +/-1.6775 | +/-1.2995 | -0.2932 | Accept $H_0$ | -0.0721 | Accept $H_0$ |
| 16 | 2007/07/01 | +/-2.3999 | +/-1.6749 | +/-1.2981 | -0.5545 | Accept $H_0$ | -0.0891 | Accept $H_0$ |
| 17 | 2008/01/06 | +/-2.4032 | +/-1.6762 | +/-1.2988 | 1.1881 | Accept $H_0$ | 0.1622 | Accept $H_0$ |
| 18 | 2008/07/06 | +/-2.4032 | +/-1.6762 | +/-1.2988 | 0.8830 | Accept $H_0$ | 0.1386 | Accept $H_0$ |
| 19 | 2009/01/04 | +/-2.4032 | +/-1.6762 | +/-1.2988 | -0.0889 | Accept $H_0$ | -0.0172 | Accept $H_0$ |
| 20 | 2009/07/05 | +/-2.4032 | +/-1.6762 | +/-1.2988 | -1.0558 | Accept $H_0$ | -0.2159 | Accept $H_0$ |
| 21 | 2010/01/03 | +/-2.4032 | +/-1.6762 | +/-1.2988 | -0.4086 | Accept $H_0$ | -0.0575 | Accept $H_0$ |
| 22 | 2010/07/04 | +/-2.4065 | +/-1.6775 | +/-1.2995 | -0.9882 | Accept $H_0$ | -0.1599 | Accept $H_0$ |

The purpose of this research is to find an optimum portfolio for varying market conditions based on the hypotheses that in both bull and bear markets, value investment strategies outperform growth investment strategies. The overall value and growth portfolios are formed in order to enable comparing the performance of these two optimum portfolios to the market performance during the period of the study. The JSE all share index, which shows the price changes of an overall market, is used as a benchmark. The index data is extracted from I-Net Bridge. Indices for the portfolios are calculated as a proportion of the returns to the initial investment. The performance comparison of these indices is shown in Figure 3.

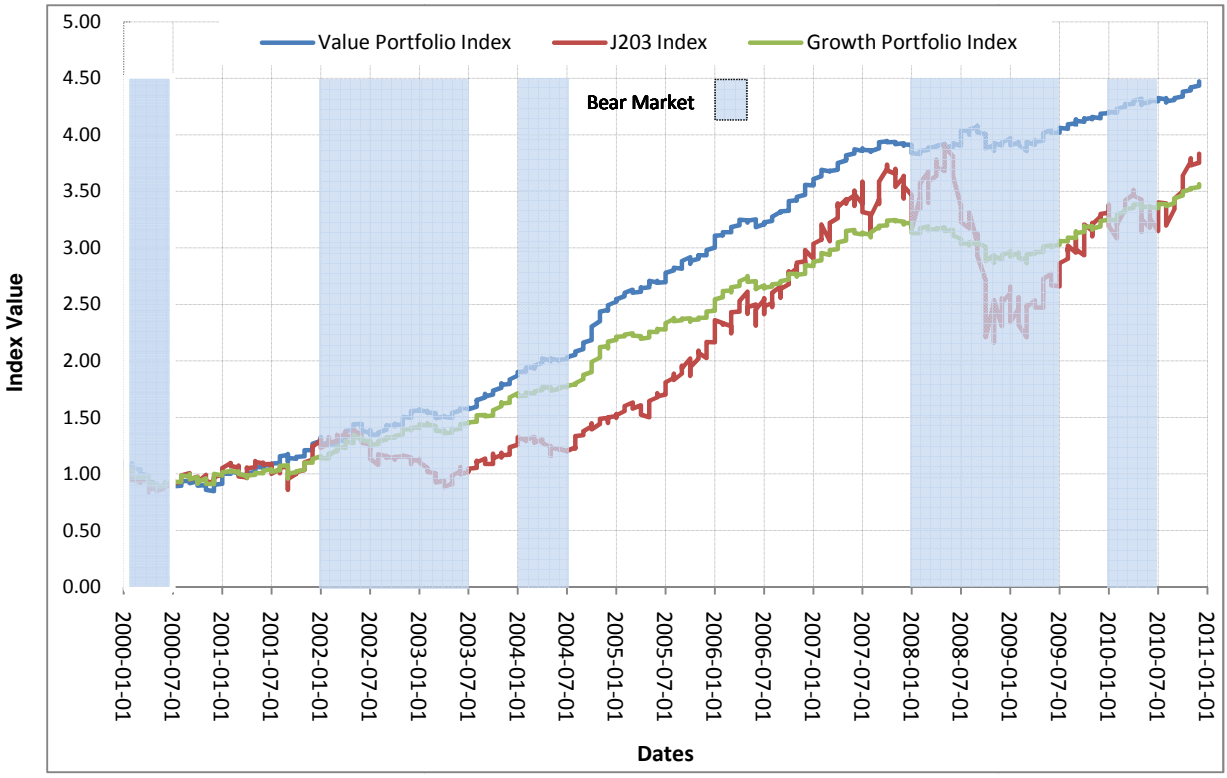



**Figure 3: Overall portfolio performance**

At the end of the 10-year study, value index achieve the value of 4.47 compared to the growth one which is 3.56 and the market value which is 3.83. The performance of the overall value portfolio is shown in Table 6. The abnormal mean return for the overall value portfolio during the period of study is 0.027% and it achieves the cumulative abnormal weekly return of 15.39% at the end of year 10. This gives an annual return of 80.04% for the optimum value portfolio. Looking at the similar figures for the overall growth portfolio shows that during the same timeline, the growth portfolio achieves a mean abnormal weekly return of -0.013% and a cumulative return of -7.31% at the end of year 10 which is much less than the value portfolio. The result is checked by t-tests which is indicated in Table 7 and it proves that the overall optimum value portfolio outperform the overall optimum growth portfolio for the study period, but the result is not significant.

**Table 6: Performance of the overall portfolios**

| | Value portfolio | | | Growth portfolio | | |
|---|---|---|---|---|---|---|
| Period | Mean Abnormal Return | Cumulative Mean Abnormal Return | Standard Deviation (Abnormal) | Mean Abnormal Return | Cumulative Mean Abnormal Return | Standard Deviation (Abnormal) |
| Overall | 0.027% | 15.39% | 2.67% | -0.013% | -7.31% | 2.54% |
| Bear Market | 0.345% | 83.27% | 3.14% | 0.316% | 82.22% | 3.07% |
| Bull Market | -0.237% | -67.90% | 2.14% | -0.286% | -89.50% | 1.97% |

**Table 7: Statistical analysis of the overall portfolios' performance**

| | Hypothesis Testing | | | | | |
|---|---|---|---|---|---|---|
| Period | n | Confidence Interval for α=.01 *** | Confidence Interval for α=.05 ** | Confidence Interval for α=.10 * | $t_{\text{mean abnormal return}}$ | Result |
| Overall | 1,146.00 | +/-2.326 | +/-1.645 | +/-1.282 | 0.260 | Accept $H_0$ |
| Bear Market | 520.00 | +/-2.326 | +/-1.645 | +/-1.282 | 0.107 | Accept $H_0$ |
| Bull Market | 626.00 | +/-2.326 | +/-1.645 | +/-1.282 | 0.298 | Accept $H_0$ |

The performance of the value and growth overall portfolios are checked separately during bull and bear markets to test the two hypothesis. The value portfolio outperforms the growth portfolio in both bull and bear markets. The results in Table 6 and 7 show that during the bear market the mean abnormal return of the value portfolio (0.345%) is higher than the mean abnormal return of the growth portfolio (0.316%). The standard deviations for both portfolios are approximately the same around 3.1%. The t-test shows that there is not enough reason to reject the null hypothesis.

The similar exercise is done for the overall portfolios during the bull market. Although the performance of none of the portfolios is as good as market but the mean abnormal return of -0.24% for the value portfolio shows a slightly better

performance than -0.29% for the growth portfolio. The t-test does not reject the null hypothesis.

**Table 6: Performance of the overall portfolios during bull and bear markets**

| | Value portfolio | | | Growth portfolio | | |
|---|---|---|---|---|---|---|
| Period | Mean Abnormal Return | Cumulative Mean Abnormal Return | Standard Deviation (Abnormal) | Mean Abnormal Return | Cumulative Mean Abnormal Return | Standard Deviation (Abnormal) |
| Overall | 0.027% | 15.39% | 2.67% | -0.013% | -7.31% | 2.54% |
| Bear Market | 0.345% | 83.27% | 3.14% | 0.316% | 82.22% | 3.07% |
| Bull Market | -0.237% | -67.90% | 2.14% | -0.286% | -89.50% | 1.97% |

**Table 7: Statistical analysis of the overall portfolios' performance**

| | Hypothesis Testing | | | | | |
|---|---|---|---|---|---|---|
| Period | n | Confidence Interval for α=.01 *** | Confidence Interval for α=.05 ** | Confidence Interval for α=.10 * | T | Result |
| Overall | 1,146.00 | +/-2.326 | +/-1.645 | +/-1.282 | 0.260 | Accept $H_0$ |
| Bear Market | 520.00 | +/-2.326 | +/-1.645 | +/-1.282 | 0.107 | Accept $H_0$ |
| Bull Market | 626.00 | +/-2.326 | +/-1.645 | +/-1.282 | 0.298 | Accept $H_0$ |

Based on statistical analysis of optimal value and growth portfolios in different market conditions and the presented result in this section, there is not a significant difference in performance of the value and growth portfolios in bull and bear market conditions. The comparison between market index and the value and growth portfolio indices shows that the value index outperforms the market index almost in any market condition.

# 5 DISCUSSION,CONCLUSION AND RECOMMENDATIONS

## 5.1 Introduction

Chapter 5 is the final chapter and conclusion of this research. In section 5.2 the findings of this research are compared to the theories discussed in the literature review. Section 5.3 explains the result of the study and in section 5.4 the related topics that can be a basis for future research are introduced.

## 5.2 Discussion

This research was an attempt to create an optimum portfolio based on the Black-Litterman model. In order to test the performance of such portfolio, it was rebalanced during different market conditions. The observation included both bull and bear markets. As the result shows, due to uncertainty of future performance of different stocks the optimal portfolio consists of diverse stocks from different industries which is selected based on the correlation between those stocks (Markowitz 1991) calculated in variance-covariance matrix for the portfolio. The selected stocks are differently correlated (Lehman and Modest 2005).The calculated weightings satisfy the investor's expectations which in this case is maximising the expected portfolio return consistent with the acceptable level of risk (Black et al 1972).

Stocks were divided into two groups of value stocks with the low P/E ratios and growth stocks with high P/E ratios. There was no statistically significant difference in performance of these portfolios during various market conditions. This finding is based on the t-test implemented on mean abnormal returns as well as cumulative abnormal returns of the portfolios. The analysis shows that unlike the findings of Bauman et al. (1998) on US stock market and some other non-US stock markets which show higher returns for value stocks compared to growth stocks, there is no significant difference between the performance of the value portfolio and growth portfolio in JSE under different market conditions. Therefore, although the result proves the theory of Chan and Lakonishok (2004) which believes that value

portfolios suffer less than growth portfolios in a bear market, the result does not explain the statistically significant difference between the average returns of both portfolios. Although the relative performance of the value and the growth portfolios in JSE does not follow a regular pattern on an annual basis, over the longer term the optimum value portfolio gain a higher return. The outperformance of the value portfolio index in relation to the growth portfolio index in the 10-year period of study shows the same result as the findings of the studies on US financial markets (Basu 1977; Ambachtsheer 1977 Ambachtsheer and Farrell 1979; Estep, Hanson and Johnson 1983; Sorensen and Williamson 1985; Harris and Marston 1994; Chan, Jegadeesh and Lakonishok 1995).

The standard deviations of both value and growth portfolios show greater volatility during the bear markets. Majid and Kassim (2009) also believe in a high volatility of market in financial crisis. This uncertainty is more considerable during the recent financial crisis from July 2007 to July 2009. In addition, the higher return of value stocks might be due to their higher risk which is shown by the higher standard deviations of the value portfolios. This finding is in line with the explanation of Fama and French (1992).

## 5.3 Conclusion

The result of this study does not show a significance difference between the performances of an optimum value portfolio with relatively low P/E ratios and an optimum growth portfolio. Although there was not a specific trend during the study timeline and the performance of optimum value and optimum growth portfolios are not significantly different, the outperformance of an optimum value portfolio index in the long run can be a good starting point for the investors to choose their portfolios. Meanwhile, the behaviour of the portfolio in the past gives an investor an idea about how to approach different market conditions, and it emphasises the importance of behavioural finance and an investor's opinion in predicting a market and forming a portfolio which is adaptable to that condition.

## 5.4 Recommendations

This research has a quantitative approach to an optimal portfolio's behaviour. Therefore, future research could study the reasons behind such behaviours in various market conditions during the period of the study.

Other studies can focus on different market securities or government bonds and test whether these securities perform better and gain more returns. This exercise can also be done on an international scale with international stocks in different stock markets. The correlation between various stocks in different markets and the effect of this correlation on a portfolio's performance in varying bull and bear markets is another interesting topic for a future study.

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# APPENDICES

## Appendix A

| List of the used JSE Shares | | | | |
|---|---|---|---|---|
| ABL | CAC | GND | MTE | SBK |
| ADH | CAP | GRF | MTL | SBL |
| ADI | CAT | GRT | MTN | SBO |
| ADR | CCL | HAR | MUR | SBV |
| AFE | CKS | HDC | NBS | SER |
| AFR | CLH | HWA | NCS | SFN |
| AFX | CLI | HWN | NCT | SHF |
| AGL | CLS | HYP | NED | SHP |
| ALT | CMH | ILA | NHM | SIM |
| AMA | CPL | ILV | NPK | SNB |
| AME | CRG | IMP | NPN | SNU |
| AMS | CRM | INL | NTC | SOL |
| ANG | CRW | INP | MTA | SOV |
| AON | CSB | IPL | OCE | SPA |
| AOO | CUL | ITE | OCT | SRN |
| AOX | CVI | ITR | OMN | SUI |
| APK | DAW | IVT | PAM | SVN |
| APN | DCT | JCD | PAP | SYC |
| ART | DLV | JDG | PGR | TBX |
| ASA | DON | JSC | PIK | TFG |
| ASR | DRD | KGM | PMM | TMT |
| ATN | DST | KIR | PMV | TPC |
| AWT | DTA | LNF | PPC | TRE |
| BAT | DTC | LON | PPR | TRU |
| BAU | EHS | MAS | PWK | TRW |
| BCF | EOH | MDC | RBW | TSX |
| BDM | EXL | MFL | RLO | UCS |
| BEL | FBR | MIM | RMH | VIL |
| BIL | FPT | MMG | RNG | VLE |
| BNT | FSR | MMI | RTN | WBO |
| BRN | GDO | MOB | RTO | WHL |
| BRT | GFI | MPC | SAB | WNH |
| BSR | GIJ | MST | SAC | WWR |
| BVT | GMB | MTA | SAL | ZSA |

## Appendix B

| Optimal Value Portfolio 02.01.2000 to 02.07.2000 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 5.00% | EXL | 1.09% | OCT | 1.00% |
| ADH | 0.00% | FBR | 1.02% | OMN | 1.00% |
| ADI | 0.61% | FPT | 0.95% | PAM | 0.97% |
| AFE | 1.02% | GDO | 1.03% | PAP | 1.01% |
| AFR | 1.02% | GMB | 1.08% | PMM | 1.07% |
| AME | 0.64% | GND | 1.06% | PMV | 0.74% |
| AON | 1.05% | GRF | 1.03% | PPR | 0.97% |
| AOO | 1.04% | HDC | 1.06% | RLO | 1.05% |
| APK | 0.89% | HWA | 1.06% | RNG | 0.99% |
| ART | 1.02% | HYP | 0.97% | RTN | 0.98% |
| ASA | 1.00% | ILA | 0.97% | RTO | 0.98% |
| ASR | 1.08% | ITR | 0.92% | SAC | 0.97% |
| ATN | 1.02% | IVT | 1.05% | SAL | 0.90% |
| AWT | 0.89% | JCD | 0.93% | SBL | 1.07% |
| BAT | 0.92% | JSC | 0.69% | SBV | 0.86% |
| BAU | 0.92% | KGM | 0.93% | SFN | 0.83% |
| BCF | 0.99% | KIR | 0.73% | SIM | 1.16% |
| BDM | 0.91% | MAS | 1.00% | SNU | 1.09% |
| BSR | 0.86% | MDC | 1.05% | SOV | 0.79% |
| CAC | 0.96% | MIM | 1.03% | SPA | 0.86% |
| CAP | 0.63% | MMG | 1.34% | SRN | 1.10% |
| CKS | 1.01% | MMI | 1.04% | SVN | 0.87% |
| CMH | 1.02% | MOB | 0.95% | SYC | 0.98% |
| CPL | 0.98% | MST | 0.86% | TBX | 1.09% |
| CRG | 0.94% | MTA | 0.99% | TMT | 1.12% |
| CRW | 1.18% | MTE | 1.04% | TPC | 0.98% |
| CSB | 1.00% | MTL | 0.73% | TRE | 0.93% |
| CUL | 0.71% | MUR | 1.06% | TSX | 1.00% |
| CVI | 1.04% | NCS | 0.82% | VLE | 0.89% |
| DAW | 1.02% | NCT | 0.77% | WBO | 1.03% |
| DCT | 0.94% | NHM | 1.10% | WNH | 1.04% |
| DON | 0.80% | NPN | 1.19% | WWR | 1.00% |
| DRD | 0.92% | NTC | 1.03% | | |
| DST | 1.02% | OCE | 1.06% | | |

| Optimal Growth Portfolio 02.01.2000 to 02.07.2000 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | EXL | 0.00% | PIK | 0.00% |
| ADH | 0.00% | FBR | 0.00% | PMV | 0.00% |
| ADI | 0.20% | FSR | 0.00% | PPC | 0.00% |
| ADR | 0.00% | GFI | 0.00% | PWK | 0.00% |
| AFE | 0.00% | GIJ | 0.00% | RMH | 0.00% |
| AFX | 0.00% | GRT | 2.36% | RTN | 5.00% |
| AGL | 0.02% | HAR | 0.00% | RTO | 3.84% |
| ALT | 0.00% | HYP | 5.00% | SAB | 0.00% |
| AMA | 0.00% | ILV | 2.20% | SAC | 2.00% |
| AMS | 5.00% | IMP | 5.00% | SBK | 0.00% |
| ANG | 0.00% | INL | 0.00% | SBO | 0.00% |
| AON | 1.24% | INP | 0.00% | SER | 0.00% |
| AOO | 5.00% | IPL | 0.00% | SFN | 0.00% |
| AOX | 0.00% | ITE | 4.35% | SHF | 3.95% |
| ADH | 0.00% | ITR | 4.68% | SHP | 0.00% |
| ASA | 0.00% | JDG | 0.00% | SNB | 3.82% |
| BAT | 0.00% | KGM | 0.01% | SOL | 0.00% |
| BCF | 0.00% | LNF | 3.52% | SPA | 0.00% |
| BIL | 4.37% | LON | 5.00% | SRN | 0.01% |
| BNT | 0.00% | MFL | 0.00% | SUI | 0.01% |
| BVT | 0.00% | MIM | 0.00% | SYC | 4.03% |
| CAT | 0.00% | MMI | 0.00% | TFG | 0.00% |
| CCL | 0.00% | MOB | 0.00% | TMT | 0.00% |
| CLH | 0.00% | MPC | 1.66% | TRE | 0.00% |
| CLI | 0.00% | MST | 0.00% | TRU | 0.00% |
| CLS | 3.77% | MTN | 3.43% | TRW | 1.56% |
| CRM | 2.91% | MUR | 0.00% | TSX | 1.67% |
| CUL | 0.00% | NBS | 1.66% | UCS | 1.76% |
| DCT | 2.52% | NED | 0.00% | VIL | 1.25% |
| DLV | 1.93% | NHM | 5.00% | WHL | 0.00% |
| DTA | 0.16% | NPK | 0.00% | WWR | 0.00% |
| DTC | 0.00% | NWL | 0.00% | ZSA | 0.00% |
| EHS | 0.00% | OMN | 0.00% | | |
| EOH | 0.11% | PGR | 0.00% | | |

| Optimal Value Portfolio 02.07.2000 to 07.01.2001 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 5.00% | EXL | 1.09% | OCT | 1.00% |
| ADH | 0.00% | FBR | 1.02% | OMN | 1.00% |
| ADI | 0.61% | FPT | 0.95% | PAM | 0.97% |
| AFE | 1.02% | GDO | 1.03% | PAP | 1.01% |
| AFR | 1.02% | GMB | 1.08% | PMM | 1.07% |
| AME | 0.64% | GND | 1.06% | PMV | 0.74% |
| AON | 1.05% | GRF | 1.03% | PPR | 0.97% |
| AOO | 1.04% | HDC | 1.06% | RLO | 1.05% |
| APK | 0.89% | HWA | 1.06% | RNG | 0.99% |
| ART | 1.02% | HYP | 0.97% | RTN | 0.98% |
| ASA | 1.00% | ILA | 0.97% | RTO | 0.98% |
| ASR | 1.08% | ITR | 0.92% | SAC | 0.97% |
| ATN | 1.02% | IVT | 1.05% | SAL | 0.90% |
| AWT | 0.89% | JCD | 0.93% | SBL | 1.07% |
| BAT | 0.92% | JSC | 0.69% | SBV | 0.86% |
| BAU | 0.92% | KGM | 0.93% | SFN | 0.83% |
| BCF | 0.99% | KIR | 0.73% | SIM | 1.16% |
| BDM | 0.91% | MAS | 1.00% | SNU | 1.09% |
| BSR | 0.86% | MDC | 1.05% | SOV | 0.79% |
| CAC | 0.96% | MIM | 1.03% | SPA | 0.86% |
| CAP | 0.63% | MMG | 1.34% | SRN | 1.10% |
| CKS | 1.01% | MMI | 1.04% | SVN | 0.87% |
| CMH | 1.02% | MOB | 0.95% | SYC | 0.98% |
| CPL | 0.98% | MST | 0.86% | TBX | 1.09% |
| CRG | 0.94% | MTA | 0.99% | TMT | 1.12% |
| CRW | 1.18% | MTE | 1.04% | TPC | 0.98% |
| CSB | 1.00% | MTL | 0.73% | TRE | 0.93% |
| CUL | 0.71% | MUR | 1.06% | TSX | 1.00% |
| CVI | 1.04% | NCS | 0.82% | VLE | 0.89% |
| DAW | 1.02% | NCT | 0.77% | WBO | 1.03% |
| DCT | 0.94% | NHM | 1.10% | WNH | 1.04% |
| DON | 0.80% | NPN | 1.19% | WWR | 1.00% |
| DRD | 0.92% | NTC | 1.03% | | |
| DST | 1.02% | OCE | 1.06% | | |

| Optimal Growth Portfolio 02.07.2000 to 07.01.2001 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | EOH | 0.00% | NWL | 0.00% |
| ADR | 0.00% | FSR | 0.00% | PAP | 2.47% |
| AFE | 0.00% | GFI | 0.00% | PGR | 0.00% |
| AFX | 0.00% | GIJ | 0.00% | PIK | 1.18% |
| AGL | 0.00% | GMB | 0.04% | PPC | 0.86% |
| ALT | 0.02% | GRT | 0.00% | PWK | 1.00% |
| AMA | 0.04% | HAR | 0.00% | RBW | 0.00% |
| AMS | 3.82% | HWN | 0.00% | RLO | 0.00% |
| ANG | 0.31% | HYP | 3.09% | RMH | 0.00% |
| AON | 3.64% | ILV | 0.00% | RTN | 2.12% |
| AOO | 3.37% | IMP | 4.51% | RTO | 1.62% |
| AOX | 0.23% | INL | 0.00% | SAB | 0.00% |
| APN | 0.00% | INP | 0.00% | SAC | 0.27% |
| ASA | 0.00% | IPL | 0.00% | SBK | 0.00% |
| ADR | 0.00% | ITE | 4.12% | SBO | 0.01% |
| BAT | 0.00% | IVT | 2.02% | SER | 1.37% |
| BEL | 5.00% | JDG | 0.00% | SHF | 2.14% |
| BIL | 2.43% | KGM | 0.00% | SHP | 0.00% |
| BNT | 0.00% | LNF | 3.68% | SNB | 1.37% |
| BRN | 0.00% | LON | 3.32% | SNU | 0.19% |
| BRT | 0.00% | MAS | 0.00% | SOL | 0.29% |
| BVT | 0.00% | MDC | 2.63% | SRN | 3.94% |
| CAT | 0.52% | MFL | 0.00% | SUI | 1.14% |
| CCL | 0.00% | MIM | 0.00% | SYC | 2.35% |
| CLH | 0.00% | MMI | 0.00% | TFG | 0.00% |
| CLI | 0.94% | MOB | 0.00% | TRE | 0.00% |
| CLS | 2.45% | MPC | 2.48% | TRU | 0.00% |
| CRM | 4.91% | MTL | 0.00% | TRW | 0.00% |
| CSB | 3.83% | MTN | 5.00% | UCS | 0.00% |
| DCT | 0.00% | MUR | 0.00% | VIL | 0.97% |
| DLV | 2.30% | NBS | 0.92% | WHL | 0.00% |
| DTA | 0.86% | NED | 0.00% | ZSA | 1.98% |
| DTC | 0.00% | NHM | 2.19% | | |
| EHS | 0.35% | NPK | 0.72% | | |

| Optimal Value Portfolio 07.01.2001 to 01.07.2001 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 5.00% | EOH | 0.73% | PAM | 0.95% |
| ADH | 0.01% | FBR | 0.77% | PAP | 0.78% |
| ADI | 0.00% | FPT | 0.83% | PGR | 0.55% |
| ADR | 0.00% | GDO | 0.81% | PMM | 0.97% |
| AFE | 1.02% | GIJ | 0.68% | PMV | 0.70% |
| AFR | 0.90% | GMB | 0.79% | PPR | 1.00% |
| ALT | 0.75% | GND | 1.30% | RBW | 1.18% |
| AME | 0.04% | GRF | 1.21% | RNG | 1.06% |
| APK | 1.17% | GRT | 0.83% | SAC | 0.82% |
| ART | 1.07% | HDC | 1.08% | SAL | 0.92% |
| ASA | 0.94% | HWA | 0.49% | SBL | 1.02% |
| ASR | 0.99% | HWN | 0.67% | SBO | 0.42% |
| ATN | 0.91% | HYP | 0.88% | SBV | 0.98% |
| AWT | 0.84% | ILA | 1.23% | SER | 1.05% |
| BAT | 0.82% | IMP | 0.95% | SFN | 0.69% |
| BAU | 1.21% | ITR | 0.90% | SNU | 1.10% |
| BCF | 1.08% | IVT | 0.92% | SOL | 1.12% |
| BDM | 4.93% | JCD | 0.86% | SOV | 1.27% |
| BSR | 0.96% | JDG | 0.58% | SPA | 0.88% |
| CAC | 0.88% | JSC | 0.66% | SRN | 1.06% |
| CAP | 0.81% | KGM | 0.82% | SUI | 0.69% |
| CKS | 1.09% | MDC | 1.04% | SVN | 0.96% |
| CLH | 0.93% | MFL | 0.88% | SYC | 0.90% |
| CMH | 1.04% | MMG | 0.58% | TBX | 1.03% |
| CPL | 0.87% | MOB | 1.21% | TMT | 0.00% |
| CRG | 1.11% | MST | 1.08% | TPC | 0.31% |
| CRW | 0.70% | MTA | 1.15% | TRE | 1.20% |
| CSB | 5.00% | MTE | 1.06% | UCS | 0.75% |
| CUL | 0.73% | MTL | 0.45% | VIL | 0.78% |
| DAW | 0.66% | NBS | 0.77% | WBO | 1.05% |
| DCT | 0.80% | NHM | 0.78% | WNH | 0.91% |
| DON | 0.76% | NPN | 0.21% | WWR | 0.69% |
| DRD | 5.00% | NWL | 0.74% | | |
| DTC | 0.37% | OCT | 0.85% | | |

| Optimal Growth Portfolio 07.01.2001 to 01.07.2001 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| AFE | 0.00% | EXL | 0.00% | NHM | 0.00% |
| AFR | 0.01% | FPT | 2.42% | NPK | 0.00% |
| AFX | 0.00% | FSR | 0.00% | NTC | 5.00% |
| AGL | 0.00% | GFI | 5.00% | OCE | 5.00% |
| ALT | 0.00% | GIJ | 0.00% | OMN | 0.45% |
| AMA | 1.02% | GMB | 0.00% | PAP | 0.00% |
| AMS | 0.00% | HAR | 5.00% | PIK | 0.00% |
| ANG | 0.53% | HWN | 0.00% | PPC | 1.60% |
| AON | 0.00% | HYP | 0.66% | PWK | 0.00% |
| AOO | 0.00% | ILV | 3.22% | RLO | 4.98% |
| AOX | 4.84% | IMP | 0.00% | RMH | 0.00% |
| APN | 0.00% | INL | 0.00% | RTN | 0.00% |
| ASA | 0.01% | INP | 0.00% | RTO | 1.10% |
| ASR | 5.00% | IPL | 0.00% | SAB | 0.01% |
| AFR | 0.01% | ITE | 0.57% | SAL | 0.00% |
| BAT | 0.00% | JDG | 0.00% | SBK | 0.00% |
| BCF | 1.65% | KGM | 0.00% | SHF | 0.00% |
| BEL | 0.87% | KIR | 1.79% | SHP | 0.01% |
| BIL | 0.00% | LNF | 5.00% | SIM | 0.00% |
| BNT | 0.55% | LON | 0.01% | SNB | 0.00% |
| BRN | 0.00% | MAS | 0.00% | SOL | 0.00% |
| BRT | 0.03% | MDC | 5.00% | SRN | 1.31% |
| BVT | 0.00% | MFL | 0.00% | SUI | 0.00% |
| CAT | 0.01% | MIM | 0.00% | SYC | 2.58% |
| CCL | 0.02% | MMG | 0.00% | TBX | 0.85% |
| CLH | 0.01% | MMI | 0.00% | TFG | 0.00% |
| CLI | 0.00% | MOB | 1.99% | TRU | 0.01% |
| CLS | 0.00% | MPC | 0.00% | TRW | 1.31% |
| CRM | 5.00% | MTE | 2.93% | TSX | 0.00% |
| CVI | 0.01% | MTN | 0.00% | VLE | 0.02% |
| DLV | 0.00% | MUR | 5.00% | WHL | 0.00% |
| DST | 0.32% | NCS | 5.00% | ZSA | 5.00% |
| DTA | 3.58% | NCT | 3.73% | | |
| EHS | 0.01% | NED | 0.00% | | |

| Optimal Value Portfolio 01.07.2001 to 06.01.2002 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.01% | EOH | 0.00% | PAM | 1.07% |
| ADH | 0.00% | FBR | 0.10% | PAP | 1.38% |
| ADI | 0.00% | FPT | 1.87% | PGR | 0.00% |
| ADR | 0.00% | GDO | 0.52% | PMM | 2.75% |
| AFR | 1.29% | GND | 3.22% | PMV | 0.00% |
| AMA | 0.00% | GRF | 1.46% | PPR | 1.82% |
| AME | 0.00% | GRT | 1.54% | RBW | 3.19% |
| APK | 1.10% | HDC | 0.11% | RNG | 2.33% |
| ART | 2.17% | HWA | 0.04% | SAC | 1.12% |
| ASR | 2.44% | ILA | 1.86% | SAL | 0.17% |
| ATN | 1.16% | IMP | 1.53% | SBL | 0.97% |
| AWT | 0.00% | ITR | 0.00% | SBV | 0.35% |
| BAT | 0.31% | IVT | 1.71% | SFN | 0.00% |
| BAU | 0.04% | JCD | 1.00% | SIM | 0.95% |
| BCF | 1.80% | JSC | 0.00% | SOL | 2.93% |
| BDM | 0.43% | KGM | 1.27% | SOV | 1.72% |
| BSR | 0.00% | LNF | 1.16% | SPA | 0.94% |
| CAC | 0.04% | MDC | 3.00% | SRN | 1.64% |
| CAP | 0.00% | MFL | 0.00% | SVN | 0.01% |
| CKS | 1.96% | MOB | 1.90% | SYC | 1.99% |
| CLH | 1.01% | MST | 0.00% | TBX | 1.88% |
| CMH | 3.02% | MTA | 2.65% | TMT | 0.00% |
| CPL | 1.85% | MTE | 2.09% | TPC | 0.00% |
| CRG | 0.84% | MTL | 0.00% | TRE | 1.16% |
| CRW | 0.00% | NBS | 0.72% | TSX | 2.11% |
| CSB | 0.00% | NCS | 3.50% | UCS | 0.00% |
| CUL | 0.55% | NCT | 3.65% | VIL | 0.26% |
| CVI | 0.00% | NHM | 2.42% | VLE | 0.00% |
| DAW | 1.26% | NPN | 0.00% | WBO | 1.23% |
| DCT | 0.00% | NTC | 2.63% | WNH | 1.06% |
| DON | 0.00% | NWL | 0.00% | WWR | 0.21% |
| DRD | 0.57% | OCE | 2.33% | ZSA | 0.00% |
| DST | 0.00% | OCT | 1.54% | | |
| DTC | 0.00% | OMN | 1.08% | | |

| Optimal Growth Portfolio 01.07.2001 to 06.01.2002 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | DLV | 0.37% | MUR | 1.32% |
| ADI | 0.00% | DTA | 1.33% | NED | 1.03% |
| ADR | 0.00% | EHS | 0.57% | NPK | 0.49% |
| AFE | 5.00% | EXL | 0.64% | NTC | 5.00% |
| AFX | 0.01% | FPT | 1.08% | OCE | 1.24% |
| AGL | 5.00% | FSR | 0.82% | PAP | 0.94% |
| ALT | 5.00% | GFI | 1.08% | PIK | 0.65% |
| AMA | 0.00% | GIJ | 0.52% | PPC | 1.11% |
| AMS | 1.33% | GMB | 0.53% | PWK | 0.81% |
| ANG | 0.74% | GRF | 1.04% | RLO | 1.27% |
| AON | 0.26% | GRT | 0.96% | RMH | 0.85% |
| AOO | 0.11% | HAR | 0.83% | RTN | 0.10% |
| AOX | 0.76% | HWN | 0.63% | RTO | 0.00% |
| APN | 0.66% | HYP | 1.27% | SAB | 0.94% |
| ADI | 0.00% | ILV | 0.92% | SAC | 0.82% |
| ASR | 1.28% | IMP | 1.08% | SBK | 1.17% |
| ATN | 0.88% | INL | 0.63% | SBO | 0.88% |
| BAT | 0.52% | INP | 0.63% | SER | 1.00% |
| BCF | 1.04% | IPL | 0.83% | SHF | 0.78% |
| BEL | 1.05% | ITE | 0.82% | SHP | 0.49% |
| BIL | 0.97% | IVT | 1.09% | SNB | 1.16% |
| BNT | 0.14% | JDG | 0.58% | SNU | 5.00% |
| BRN | 0.40% | KGM | 0.94% | SOL | 1.36% |
| BRT | 0.28% | KIR | 0.63% | SRN | 1.13% |
| BVT | 0.74% | LNF | 0.95% | SUI | 1.17% |
| CAT | 0.57% | LON | 1.19% | SYC | 1.15% |
| CCL | 0.86% | MAS | 0.90% | TFG | 0.15% |
| CLH | 0.84% | MDC | 5.00% | TRU | 0.87% |
| CLI | 0.59% | MFL | 0.05% | TRW | 0.74% |
| CLS | 0.65% | MIM | 0.83% | TSX | 1.32% |
| CPL | 1.01% | MMG | 0.43% | UCS | 0.08% |
| CRG | 0.61% | MMI | 0.85% | WHL | 0.77% |
| CRM | 1.19% | MPC | 0.32% | | |
| DCT | 0.23% | MTN | 0.02% | | |

| Optimal Value Portfolio 06.01.2002 to 07.07.2002 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 5.00% | EOH | 0.73% | PAM | 0.95% |
| ADH | 0.01% | FBR | 0.77% | PAP | 0.78% |
| ADI | 0.00% | FPT | 0.83% | PGR | 0.55% |
| ADR | 0.00% | GDO | 0.81% | PMM | 0.97% |
| AFE | 1.02% | GIJ | 0.68% | PMV | 0.70% |
| AFR | 0.90% | GMB | 0.79% | PPR | 1.00% |
| ALT | 0.75% | GND | 1.30% | RBW | 1.18% |
| AME | 0.04% | GRF | 1.21% | RNG | 1.06% |
| APK | 1.17% | GRT | 0.83% | SAC | 0.82% |
| ART | 1.07% | HDC | 1.08% | SAL | 0.92% |
| ASA | 0.94% | HWA | 0.49% | SBL | 1.02% |
| ASR | 0.99% | HWN | 0.67% | SBO | 0.42% |
| ATN | 0.91% | HYP | 0.88% | SBV | 0.98% |
| AWT | 0.84% | ILA | 1.23% | SER | 1.05% |
| BAT | 0.82% | IMP | 0.95% | SFN | 0.69% |
| BAU | 1.21% | ITR | 0.90% | SNU | 1.10% |
| BCF | 1.08% | IVT | 0.92% | SOL | 1.12% |
| BDM | 4.93% | JCD | 0.86% | SOV | 1.27% |
| BSR | 0.96% | JDG | 0.58% | SPA | 0.88% |
| CAC | 0.88% | JSC | 0.66% | SRN | 1.06% |
| CAP | 0.81% | KGM | 0.82% | SUI | 0.69% |
| CKS | 1.09% | MDC | 1.04% | SVN | 0.96% |
| CLH | 0.93% | MFL | 0.88% | SYC | 0.90% |
| CMH | 1.04% | MMG | 0.58% | TBX | 1.03% |
| CPL | 0.87% | MOB | 1.21% | TMT | 0.00% |
| CRG | 1.11% | MST | 1.08% | TPC | 0.31% |
| CRW | 0.70% | MTA | 1.15% | TRE | 1.20% |
| CSB | 5.00% | MTE | 1.06% | UCS | 0.75% |
| CUL | 0.73% | MTL | 0.45% | VIL | 0.78% |
| DAW | 0.66% | NBS | 0.77% | WBO | 1.05% |
| DCT | 0.80% | NHM | 0.78% | WNH | 0.91% |
| DON | 0.76% | NPN | 0.21% | WWR | 0.69% |
| DRD | 5.00% | NWL | 0.74% | | |
| DTC | 0.37% | OCT | 0.85% | | |

| Optimal Growth Portfolio 06.01.2002 to 07.07.2002 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| AFE | 0.00% | EXL | 0.00% | NHM | 0.00% |
| AFR | 0.01% | FPT | 2.42% | NPK | 0.00% |
| AFX | 0.00% | FSR | 0.00% | NTC | 5.00% |
| AGL | 0.00% | GFI | 5.00% | OCE | 5.00% |
| ALT | 0.00% | GIJ | 0.00% | OMN | 0.45% |
| AMA | 1.02% | GMB | 0.00% | PAP | 0.00% |
| AMS | 0.00% | HAR | 5.00% | PIK | 0.00% |
| ANG | 0.53% | HWN | 0.00% | PPC | 1.60% |
| AON | 0.00% | HYP | 0.66% | PWK | 0.00% |
| AOO | 0.00% | ILV | 3.22% | RLO | 4.98% |
| AOX | 4.84% | IMP | 0.00% | RMH | 0.00% |
| APN | 0.00% | INL | 0.00% | RTN | 0.00% |
| ASA | 0.01% | INP | 0.00% | RTO | 1.10% |
| ASR | 5.00% | IPL | 0.00% | SAB | 0.01% |
| AFR | 0.01% | ITE | 0.57% | SAL | 0.00% |
| BAT | 0.00% | JDG | 0.00% | SBK | 0.00% |
| BCF | 1.65% | KGM | 0.00% | SHF | 0.00% |
| BEL | 0.87% | KIR | 1.79% | SHP | 0.01% |
| BIL | 0.00% | LNF | 5.00% | SIM | 0.00% |
| BNT | 0.55% | LON | 0.01% | SNB | 0.00% |
| BRN | 0.00% | MAS | 0.00% | SOL | 0.00% |
| BRT | 0.03% | MDC | 5.00% | SRN | 1.31% |
| BVT | 0.00% | MFL | 0.00% | SUI | 0.00% |
| CAT | 0.01% | MIM | 0.00% | SYC | 2.58% |
| CCL | 0.02% | MMG | 0.00% | TBX | 0.85% |
| CLH | 0.01% | MMI | 0.00% | TFG | 0.00% |
| CLI | 0.00% | MOB | 1.99% | TRU | 0.01% |
| CLS | 0.00% | MPC | 0.00% | TRW | 1.31% |
| CRM | 5.00% | MTE | 2.93% | TSX | 0.00% |
| CVI | 0.01% | MTN | 0.00% | VLE | 0.02% |
| DLV | 0.00% | MUR | 5.00% | WHL | 0.00% |
| DST | 0.32% | NCS | 5.00% | ZSA | 5.00% |
| DTA | 3.58% | NCT | 3.73% | | |
| EHS | 0.01% | NED | 0.00% | | |

| Optimal Value Portfolio 07.07.2002 to 05.01.2003 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ADH | 0.00% | DON | 0.56% | NTC | 3.05% |
| ADI | 0.00% | DRD | 4.55% | OCE | 1.40% |
| AFE | 0.00% | DST | 3.85% | OCT | 1.13% |
| AFR | 0.00% | FBR | 1.04% | PAM | 1.42% |
| ALT | 0.00% | FPT | 0.86% | PAP | 0.19% |
| AMA | 0.12% | GDO | 1.67% | PMM | 0.79% |
| AME | 0.00% | GFI | 2.09% | PMV | 0.00% |
| AON | 1.41% | GMB | 1.51% | PPR | 3.04% |
| AOO | 0.36% | GND | 1.74% | RBW | 0.68% |
| APK | 0.26% | GRF | 0.59% | RLO | 1.20% |
| ART | 1.41% | HAR | 1.61% | RNG | 0.77% |
| ASA | 0.00% | HDC | 2.05% | RTN | 0.77% |
| ASR | 3.49% | HWA | 0.00% | RTO | 1.31% |
| ATN | 0.56% | HWN | 0.00% | SAC | 0.80% |
| AWT | 0.22% | HYP | 0.30% | SAL | 0.00% |
| BAT | 0.00% | ILA | 1.82% | SBL | 1.31% |
| BAU | 0.00% | ILV | 1.14% | SBV | 1.95% |
| BCF | 1.47% | ITR | 1.85% | SFN | 0.00% |
| BDM | 0.00% | IVT | 0.72% | SIM | 0.00% |
| BEL | 1.14% | JCD | 0.00% | SNU | 1.50% |
| BRN | 0.27% | JSC | 1.44% | SOV | 2.10% |
| BRT | 0.00% | KGM | 0.91% | SUI | 0.00% |
| BSR | 0.86% | KIR | 1.67% | SVN | 0.97% |
| CAC | 3.00% | MAS | 1.18% | SYC | 0.78% |
| CAP | 0.00% | MDC | 1.03% | TBX | 0.00% |
| CKS | 2.27% | MMG | 0.00% | TPC | 0.00% |
| CLH | 1.83% | MST | 1.28% | TRE | 1.81% |
| CMH | 0.92% | MTA | 2.41% | TSX | 0.51% |
| CPL | 0.00% | MTE | 2.33% | VLE | 0.15% |
| CRG | 1.31% | MTL | 0.00% | WBO | 1.33% |
| CRW | 1.09% | NCS | 2.23% | WNH | 0.00% |
| CSB | 1.43% | NCT | 2.71% | WWR | 0.00% |
| CVI | 2.51% | NHM | 0.00% | | |
| DAW | 0.00% | NPN | 0.00% | | |

| Optimal Growth Portfolio 07.07.2002 to 05.01.2003 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | EXL | 1.05% | PIK | 1.07% |
| ADH | 0.01% | FBR | 1.20% | PMV | 0.80% |
| ADI | 0.00% | FSR | 0.67% | PPC | 1.08% |
| ADR | 0.50% | GFI | 2.36% | PWK | 1.13% |
| AFE | 1.10% | GIJ | 0.00% | RMH | 0.65% |
| AFX | 1.06% | GRT | 0.74% | RTN | 1.16% |
| AGL | 1.11% | HAR | 2.37% | RTO | 1.13% |
| ALT | 0.87% | HYP | 0.84% | SAB | 1.40% |
| AMA | 1.28% | ILV | 1.30% | SAC | 0.94% |
| AMS | 0.89% | IMP | 1.16% | SBK | 0.74% |
| ANG | 1.62% | INL | 0.30% | SBO | 0.00% |
| AON | 1.16% | INP | 0.30% | SER | 0.79% |
| AOO | 0.82% | IPL | 0.63% | SFN | 0.76% |
| AOX | 1.17% | ITE | 1.25% | SHF | 1.14% |
| ADH | 0.01% | ITR | 1.61% | SHP | 1.35% |
| ASA | 0.65% | JDG | 0.00% | SNB | 0.83% |
| BAT | 0.68% | KGM | 0.88% | SOL | 1.37% |
| BCF | 1.58% | LNF | 0.64% | SPA | 0.71% |
| BIL | 1.11% | LON | 1.13% | SRN | 1.11% |
| BNT | 0.20% | MFL | 0.54% | SUI | 0.65% |
| BVT | 0.86% | MIM | 0.45% | SYC | 0.93% |
| CAT | 1.04% | MMI | 0.37% | TFG | 1.31% |
| CCL | 1.15% | MOB | 1.72% | TMT | 0.00% |
| CLH | 1.43% | MPC | 1.55% | TRE | 1.77% |
| CLI | 0.92% | MST | 1.79% | TRU | 1.11% |
| CLS | 0.70% | MTN | 0.00% | TRW | 1.24% |
| CRM | 1.46% | MUR | 1.55% | TSX | 1.23% |
| CUL | 2.32% | NBS | 0.69% | UCS | 0.81% |
| DCT | 1.20% | NED | 0.57% | VIL | 0.73% |
| DLV | 1.30% | NHM | 0.84% | WHL | 1.14% |
| DTA | 1.06% | NPK | 1.19% | WWR | 1.48% |
| DTC | 0.81% | NWL | 0.99% | ZSA | 1.11% |
| EHS | 1.27% | OMN | 3.09% | | |
| EOH | 1.26% | PGR | 0.78% | | |

| Optimal Value Portfolio 05.01.2003 to 06.07.2003 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.01% | GIJ | 0.00% | PAP | 0.92% |
| ADH | 5.00% | GMB | 0.92% | PGR | 0.93% |
| ADI | 0.00% | GND | 1.13% | PMM | 0.82% |
| ADR | 0.73% | GRF | 1.09% | PMV | 0.78% |
| AFR | 0.99% | GRT | 0.95% | PPR | 0.99% |
| ALT | 0.97% | HDC | 1.16% | RBW | 0.92% |
| AME | 0.09% | HWA | 0.62% | RMH | 0.85% |
| APK | 1.02% | ILA | 1.38% | RNG | 1.26% |
| ART | 1.25% | ILV | 0.97% | SAC | 0.98% |
| ATN | 0.98% | IMP | 1.11% | SAL | 0.67% |
| AWT | 0.80% | INL | 0.77% | SBL | 1.20% |
| BAU | 0.63% | INP | 0.78% | SBO | 0.64% |
| BEL | 1.06% | ITR | 1.12% | SBV | 0.99% |
| BRT | 1.34% | IVT | 1.15% | SER | 1.19% |
| BSR | 1.32% | JCD | 1.00% | SFN | 0.90% |
| CAC | 1.25% | JSC | 1.56% | SHF | 0.88% |
| CAP | 0.55% | KGM | 1.04% | SNU | 1.00% |
| CKS | 1.16% | KIR | 0.47% | SOL | 1.08% |
| CMH | 0.88% | LNF | 0.87% | SOV | 0.88% |
| CPL | 0.87% | MAS | 1.33% | SPA | 0.69% |
| CRG | 1.29% | MDC | 1.02% | SRN | 1.22% |
| CSB | 1.29% | MFL | 0.27% | SVN | 1.07% |
| CUL | 1.73% | MMG | 0.54% | SYC | 0.94% |
| DAW | 1.11% | MOB | 0.90% | TBX | 0.82% |
| DCT | 1.10% | MST | 1.14% | TMT | 0.43% |
| DLV | 1.15% | MTA | 1.26% | TPC | 1.37% |
| DRD | 1.35% | MTL | 0.47% | TRE | 0.90% |
| DTC | 0.58% | MUR | 1.15% | TSX | 1.21% |
| EOH | 1.12% | NBS | 0.81% | UCS | 0.87% |
| EXL | 0.88% | NED | 0.86% | VLE | 1.09% |
| FBR | 1.11% | NPN | 0.97% | WBO | 1.11% |
| FPT | 0.94% | NWL | 0.95% | WNH | 1.18% |
| FSR | 0.87% | OCT | 0.93% | | |
| GDO | 1.63% | OMN | 1.45% | | |

| Optimal Growth Portfolio 05.01.2003 to 06.07.2003 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| AFE | 5.00% | DLV | 5.00% | NHM | 0.53% |
| AFX | 0.00% | DON | 0.99% | NPK | 0.56% |
| AGL | 0.00% | DST | 0.79% | NTC | 0.59% |
| ALT | 0.00% | DTA | 0.52% | OCE | 0.57% |
| AMA | 4.91% | EHS | 0.61% | PAM | 5.00% |
| AMS | 0.19% | FBR | 0.68% | PIK | 0.52% |
| ANG | 0.59% | FPT | 0.41% | PPC | 0.67% |
| AON | 0.97% | FSR | 0.21% | PPR | 0.51% |
| AOO | 0.69% | GFI | 1.02% | PWK | 0.55% |
| AOX | 0.59% | GRF | 0.72% | RLO | 0.44% |
| APN | 0.59% | GRT | 0.36% | RMH | 0.19% |
| ASA | 0.15% | HAR | 0.79% | RTN | 0.80% |
| ASR | 5.00% | HWN | 0.88% | RTO | 0.54% |
| AWT | 0.59% | HYP | 0.46% | SAB | 0.51% |
| AFX | 0.00% | ILV | 0.51% | SAC | 0.54% |
| BCF | 0.81% | IMP | 0.62% | SBK | 0.26% |
| BDM | 0.47% | IPL | 0.27% | SHF | 0.22% |
| BIL | 0.46% | ITE | 0.94% | SHP | 0.51% |
| BNT | 0.22% | JDG | 0.00% | SIM | 0.58% |
| BRN | 4.92% | KGM | 0.72% | SNB | 0.20% |
| BRT | 4.86% | LON | 0.07% | SUI | 0.58% |
| BVT | 0.29% | MDC | 0.60% | SYC | 0.44% |
| CAT | 0.64% | MIM | 0.00% | TFG | 0.79% |
| CCL | 0.34% | MMI | 0.00% | TRE | 0.33% |
| CLH | 4.53% | MOB | 0.12% | TRU | 0.46% |
| CLI | 0.27% | MPC | 0.60% | TRW | 0.55% |
| CLS | 0.28% | MTA | 4.91% | TSX | 0.98% |
| CRM | 0.70% | MTE | 0.55% | VIL | 0.48% |
| CRW | 0.60% | MTN | 0.04% | WBO | 0.91% |
| CSB | 4.94% | MUR | 0.75% | WHL | 0.66% |
| CUL | 4.51% | NBS | 0.12% | WWR | 3.89% |
| CVI | 0.80% | NCS | 0.27% | ZSA | 0.29% |
| DAW | 0.84% | NCT | 0.00% | | |
| DCT | 0.80% | NED | 0.28% | | |

| Optimal Value Portfolio 06.07.2003 to 04.01.2004 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | EXL | 0.00% | PIK | 0.00% |
| ADH | 2.00% | FBR | 2.57% | PMV | 0.00% |
| ADI | 0.00% | FSR | 0.00% | PPC | 3.67% |
| ADR | 0.55% | GFI | 0.00% | PWK | 0.00% |
| AFE | 0.00% | GIJ | 0.00% | RMH | 0.00% |
| AFX | 0.00% | GRT | 0.00% | RTN | 3.14% |
| AGL | 0.00% | HAR | 0.00% | RTO | 0.00% |
| ALT | 0.00% | HYP | 0.26% | SAB | 0.00% |
| AMA | 0.00% | ILV | 0.00% | SAC | 5.00% |
| AMS | 0.00% | IMP | 0.00% | SBK | 0.00% |
| ANG | 0.00% | INL | 0.00% | SBO | 0.00% |
| AON | 5.00% | INP | 0.00% | SER | 2.42% |
| AOO | 3.92% | IPL | 0.00% | SFN | 0.00% |
| AOX | 2.14% | ITE | 5.00% | SHF | 0.00% |
| APN | 0.00% | ITR | 0.00% | SHP | 0.00% |
| ASA | 0.00% | JDG | 2.32% | SNB | 0.00% |
| BAT | 0.00% | KGM | 5.00% | SOL | 0.00% |
| BCF | 5.00% | LNF | 0.00% | SPA | 0.47% |
| BIL | 0.00% | LON | 0.00% | SRN | 0.76% |
| BNT | 0.00% | MFL | 0.00% | SUI | 0.00% |
| BVT | 0.00% | MIM | 0.00% | SYC | 5.00% |
| CAT | 5.00% | MMI | 0.00% | TFG | 5.00% |
| CCL | 2.79% | MOB | 0.00% | TMT | 0.00% |
| CLH | 5.00% | MPC | 0.00% | TRE | 0.00% |
| CLI | 0.00% | MST | 0.44% | TRU | 0.00% |
| CLS | 0.00% | MTN | 0.00% | TRW | 5.00% |
| CRM | 0.00% | MUR | 0.00% | TSX | 0.00% |
| CUL | 4.37% | NBS | 0.00% | UCS | 0.58% |
| DCT | 5.00% | NED | 0.00% | VIL | 0.00% |
| DLV | 0.00% | NHM | 0.00% | WHL | 1.44% |
| DTA | 0.00% | NPK | 0.00% | WWR | 1.17% |
| DTC | 0.00% | NWL | 0.00% | ZSA | 0.00% |
| EHS | 0.00% | OMN | 5.00% | | |
| EOH | 5.00% | PGR | 0.00% | | |

| Optimal Growth Portfolio 06.07.2003 to 04.01.2004 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | DCT | 5.00% | NPK | 0.00% |
| ADH | 0.00% | DLV | 0.00% | NTC | 0.00% |
| ADR | 0.24% | DON | 0.00% | OCE | 0.00% |
| AFE | 0.00% | DST | 0.00% | OCT | 5.00% |
| AFX | 0.00% | DTA | 0.00% | PAP | 5.00% |
| AGL | 0.00% | FBR | 1.54% | PIK | 0.00% |
| ALT | 0.00% | FPT | 0.00% | PMM | 0.00% |
| AMA | 0.00% | FSR | 0.00% | PPC | 3.95% |
| AMS | 0.00% | GFI | 0.00% | PPR | 0.00% |
| ANG | 0.00% | GIJ | 0.00% | PWK | 0.00% |
| AOX | 2.00% | GMB | 0.00% | RLO | 0.00% |
| APN | 0.00% | GRT | 0.00% | RMH | 0.00% |
| ASA | 0.00% | HAR | 0.00% | SAB | 0.00% |
| ASR | 5.00% | HWN | 0.00% | SAC | 1.37% |
| ADH | 0.00% | HYP | 3.29% | SBK | 0.00% |
| BCF | 4.10% | IMP | 0.00% | SBV | 1.95% |
| BDM | 0.00% | INL | 0.00% | SFN | 0.00% |
| BIL | 0.00% | INP | 0.00% | SHF | 0.00% |
| BNT | 0.08% | IPL | 0.00% | SHP | 0.00% |
| BSR | 0.00% | ITE | 2.84% | SIM | 0.38% |
| BVT | 0.00% | JDG | 3.24% | SNB | 0.00% |
| CAT | 5.00% | KGM | 5.00% | SPA | 0.00% |
| CCL | 0.00% | LNF | 0.00% | SVN | 5.00% |
| CLH | 4.98% | LON | 0.00% | SYC | 5.00% |
| CLI | 0.00% | MAS | 2.75% | TFG | 1.29% |
| CLS | 0.00% | MDC | 0.00% | TRU | 0.00% |
| CPL | 0.00% | MPC | 0.00% | TRW | 3.68% |
| CRG | 1.48% | MTA | 3.12% | TSX | 0.00% |
| CRM | 0.00% | MTN | 0.00% | UCS | 0.43% |
| CRW | 0.00% | MUR | 0.00% | VIL | 0.09% |
| CSB | 5.00% | NBS | 0.00% | WHL | 0.00% |
| CUL | 4.24% | NCS | 2.94% | ZSA | 0.00% |
| CVI | 0.00% | NCT | 0.00% | | |
| DAW | 5.00% | NED | 0.00% | | |

| Optimal Value Portfolio 04.01.2004 to 04.07.2004 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 5.00% | GDO | 1.31% | PMV | 0.94% |
| ADI | 0.00% | GIJ | 0.16% | PPR | 1.02% |
| AFR | 0.01% | GMB | 1.10% | RBW | 1.23% |
| ALT | 5.00% | GND | 1.21% | RMH | 0.99% |
| AME | 0.00% | GRF | 1.10% | RNG | 1.21% |
| AON | 1.00% | HDC | 1.06% | RTN | 0.94% |
| AOO | 1.00% | HWA | 1.40% | RTO | 0.97% |
| APK | 1.32% | HWN | 1.31% | SAL | 0.54% |
| ART | 1.04% | ILA | 1.30% | SBK | 0.99% |
| ASA | 1.01% | ILV | 0.74% | SBL | 0.73% |
| ATN | 1.06% | IPL | 1.06% | SBO | 0.82% |
| AWT | 0.77% | ITR | 0.75% | SBV | 1.04% |
| BAT | 0.76% | IVT | 1.04% | SER | 0.73% |
| BAU | 0.03% | JCD | 1.16% | SFN | 1.04% |
| BDM | 0.79% | JSC | 0.54% | SHF | 0.92% |
| BEL | 0.77% | MAS | 0.97% | SIM | 1.01% |
| BRN | 1.42% | MFL | 0.00% | SNB | 0.99% |
| BRT | 1.41% | MIM | 0.95% | SNU | 1.32% |
| BSR | 0.70% | MMG | 0.39% | SOL | 0.83% |
| CAC | 0.69% | MMI | 0.96% | SOV | 0.96% |
| CAP | 0.93% | MOB | 1.03% | SRN | 0.75% |
| CLI | 0.98% | MST | 1.08% | SUI | 1.13% |
| CMH | 1.09% | MTA | 1.02% | SVN | 0.95% |
| CPL | 1.10% | MTL | 0.79% | TBX | 0.77% |
| CRM | 0.78% | MUR | 0.90% | TPC | 1.36% |
| CRW | 0.96% | NCS | 0.88% | TRE | 1.03% |
| CVI | 0.93% | NCT | 0.82% | VIL | 0.87% |
| DCT | 1.08% | NHM | 0.40% | VLE | 1.46% |
| DTA | 0.78% | NPK | 0.84% | WBO | 1.19% |
| DTC | 1.12% | NWL | 1.12% | WNH | 1.32% |
| EHS | 0.79% | OCE | 0.94% | WWR | 0.60% |
| EOH | 1.20% | OMN | 1.00% | ZSA | 0.89% |
| EXL | 0.49% | PAP | 1.16% | | |
| FBR | 1.18% | PGR | 0.76% | | |

| Optimal Growth Portfolio 04.01.2004 to 04.07.2004 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ADH | 5.00% | DRD | 0.00% | NPK | 0.00% |
| ADR | 5.00% | DST | 0.57% | NPN | 1.17% |
| AFE | 0.00% | EHS | 0.00% | NTC | 1.52% |
| AFX | 0.00% | FBR | 1.26% | NWL | 1.09% |
| AGL | 0.04% | FPT | 1.18% | OCE | 0.80% |
| ALT | 1.05% | FSR | 0.53% | OCT | 2.41% |
| AMA | 1.83% | GFI | 0.00% | PAM | 0.00% |
| AMS | 0.00% | GMB | 1.47% | PAP | 2.04% |
| ANG | 0.16% | GRF | 0.88% | PGR | 0.00% |
| AOX | 1.30% | GRT | 1.07% | PIK | 0.84% |
| APK | 2.13% | HAR | 0.00% | PMM | 2.03% |
| APN | 1.57% | HWN | 2.20% | PPC | 0.81% |
| ASR | 0.57% | HYP | 1.33% | PWK | 0.89% |
| BCF | 1.69% | ILA | 1.46% | RLO | 0.51% |
| ADR | 5.00% | IMP | 0.00% | RMH | 0.66% |
| BIL | 0.04% | INL | 0.00% | SAB | 0.09% |
| BNT | 1.59% | INP | 0.00% | SAC | 1.66% |
| BVT | 0.72% | IPL | 1.05% | SBK | 0.89% |
| CAT | 1.23% | ITE | 1.43% | SFN | 0.50% |
| CCL | 1.21% | JDG | 2.00% | SHP | 0.60% |
| CKS | 1.35% | KGM | 2.52% | SNB | 0.90% |
| CLH | 1.04% | KIR | 0.14% | SPA | 0.00% |
| CLI | 1.06% | LNF | 0.00% | SYC | 1.48% |
| CLS | 0.47% | LON | 0.00% | TFG | 1.50% |
| CPL | 0.99% | MDC | 1.96% | TMT | 1.12% |
| CRG | 1.25% | MMG | 0.00% | TRU | 1.14% |
| CRM | 0.00% | MPC | 0.88% | TRW | 1.15% |
| CSB | 1.99% | MTE | 0.80% | TSX | 0.57% |
| CUL | 1.71% | MTN | 2.11% | UCS | 2.15% |
| CVI | 0.91% | NBS | 0.40% | WBO | 1.56% |
| DAW | 2.69% | NCS | 0.91% | WHL | 1.53% |
| DCT | 1.51% | NCT | 0.38% | ZSA | 1.14% |
| DLV | 0.01% | NED | 0.00% | | |
| DON | 0.44% | NHM | 0.00% | | |

| Optimal Value Portfolio 04.07.2004 to 02.01.2005 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 4.94% | GND | 5.00% | PPR | 0.70% |
| ADH | 4.20% | GRF | 0.96% | RBW | 0.79% |
| ADI | 1.27% | HAR | 0.00% | RMH | 0.79% |
| AFE | 0.47% | HDC | 0.86% | RNG | 0.00% |
| AFR | 0.91% | HWA | 0.54% | RTN | 0.48% |
| AME | 0.00% | HWN | 0.45% | RTO | 0.82% |
| AON | 0.87% | ILA | 1.16% | SAC | 0.73% |
| AOO | 0.78% | IPL | 0.68% | SAL | 0.51% |
| APK | 1.03% | ITR | 0.59% | SBK | 0.72% |
| ART | 1.20% | IVT | 0.96% | SBO | 0.22% |
| ASA | 0.87% | JCD | 0.45% | SBV | 0.59% |
| ATN | 1.09% | JSC | 0.00% | SER | 0.00% |
| AWT | 0.00% | KIR | 0.16% | SFN | 5.00% |
| BAU | 0.24% | MAS | 0.95% | SHF | 0.66% |
| BDM | 0.00% | MDC | 0.89% | SIM | 0.00% |
| BNT | 0.00% | MFL | 0.00% | SNB | 0.72% |
| BRN | 1.09% | MIM | 0.68% | SNU | 1.01% |
| BRT | 1.01% | MMI | 0.76% | SOV | 1.75% |
| BSR | 0.00% | MOB | 0.74% | SPA | 1.42% |
| CAC | 0.00% | MPC | 0.96% | SRN | 0.11% |
| CAP | 0.64% | MTA | 1.09% | SVN | 0.60% |
| CCL | 0.66% | MTL | 1.08% | TBX | 1.03% |
| CLI | 1.00% | MUR | 0.50% | TFG | 0.83% |
| CMH | 5.00% | NPK | 0.70% | TMT | 0.62% |
| CPL | 0.57% | NTC | 0.23% | TPC | 0.84% |
| CVI | 0.83% | NWL | 1.16% | TRE | 0.84% |
| DCT | 0.31% | OCE | 0.54% | TSX | 0.23% |
| DON | 0.52% | OCT | 1.01% | VIL | 0.67% |
| DTA | 0.26% | OMN | 0.30% | VLE | 4.27% |
| DTC | 0.51% | PAM | 0.36% | WBO | 5.00% |
| EOH | 5.00% | PAP | 0.77% | WNH | 4.39% |
| EXL | 0.81% | PGR | 0.55% | ZSA | 1.09% |
| GDO | 0.32% | PMM | 1.04% | | |
| GIJ | 0.00% | PMV | 0.09% | | |

| Optimal Growth Portfolio 04.07.2004 to 02.01.2005 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 5.00% | DAW | 3.41% | NCS | 0.00% |
| ADH | 0.42% | DCT | 0.00% | NCT | 0.00% |
| ADR | 2.70% | DLV | 1.36% | NED | 0.00% |
| AFE | 0.00% | DRD | 0.00% | NHM | 0.00% |
| AFX | 0.00% | DST | 0.00% | NPK | 0.00% |
| AGL | 0.00% | DTA | 0.00% | NPN | 0.00% |
| ALT | 1.46% | EHS | 0.00% | NTC | 0.00% |
| AMA | 2.36% | EOH | 5.00% | NWL | 4.34% |
| AMS | 0.00% | FBR | 2.67% | OCE | 0.00% |
| ANG | 0.00% | FPT | 0.00% | OCT | 0.00% |
| AON | 5.00% | FSR | 0.00% | PIK | 0.00% |
| AOO | 5.00% | GFI | 0.00% | PMM | 0.00% |
| AOX | 0.00% | GMB | 0.00% | PPC | 0.00% |
| APN | 0.00% | GND | 0.00% | PWK | 0.00% |
| ADH | 0.42% | GRF | 5.00% | RLO | 4.68% |
| ATN | 5.00% | GRT | 0.00% | RMH | 0.00% |
| BAT | 0.00% | HYP | 5.00% | SAB | 0.00% |
| BCF | 0.00% | ILV | 0.00% | SAC | 0.00% |
| BEL | 0.17% | IMP | 0.00% | SBK | 0.00% |
| BIL | 0.00% | INL | 0.00% | SBL | 1.85% |
| BVT | 0.00% | INP | 0.00% | SHP | 0.00% |
| CAT | 0.00% | IPL | 0.00% | SNB | 0.00% |
| CCL | 1.02% | ITE | 2.74% | SOL | 0.00% |
| CKS | 0.00% | JDG | 1.65% | SUI | 0.00% |
| CLH | 0.00% | KGM | 5.00% | SYC | 0.60% |
| CLI | 0.44% | LNF | 0.10% | TFG | 0.00% |
| CLS | 0.00% | LON | 0.00% | TRU | 0.00% |
| CPL | 0.00% | MDC | 4.44% | TRW | 0.00% |
| CRG | 2.46% | MMG | 0.57% | UCS | 0.00% |
| CRM | 0.00% | MPC | 1.14% | WBO | 5.00% |
| CRW | 0.00% | MST | 0.00% | WHL | 0.00% |
| CSB | 1.40% | MTE | 3.62% | WWR | 0.10% |
| CUL | 0.43% | MTN | 2.11% | | |
| CVI | 5.00% | NBS | 1.76% | | |

| Optimal Value Portfolio 02.01.2005 to 03.07.2005 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.14% | EHS | 1.02% | OMN | 0.00% |
| ADH | 1.18% | EOH | 5.00% | PAM | 0.00% |
| ADI | 1.68% | EXL | 0.00% | PAP | 5.00% |
| AFE | 0.00% | FPT | 0.00% | PGR | 4.18% |
| AFR | 0.00% | FSR | 0.21% | PMM | 0.00% |
| AME | 0.00% | GDO | 0.00% | PMV | 0.00% |
| APK | 2.60% | GIJ | 0.00% | PPR | 0.00% |
| ART | 4.45% | GMB | 0.01% | RBW | 0.00% |
| ASA | 2.92% | GND | 3.65% | RMH | 4.18% |
| ASR | 2.85% | GRF | 4.12% | RNG | 0.00% |
| ATN | 2.29% | HAR | 0.00% | SAC | 1.91% |
| AWT | 0.00% | HDC | 0.00% | SAL | 1.41% |
| BAT | 0.00% | HWA | 5.00% | SBO | 4.79% |
| BAU | 0.23% | HWN | 0.00% | SBV | 0.00% |
| BDM | 0.00% | ILV | 0.00% | SER | 0.00% |
| BEL | 0.00% | IMP | 0.00% | SFN | 5.00% |
| BNT | 0.00% | IVT | 0.00% | SHF | 0.00% |
| BRN | 0.82% | JCD | 0.00% | SIM | 1.07% |
| BRT | 0.17% | JSC | 0.50% | SNU | 0.00% |
| BSR | 0.00% | KIR | 0.00% | SOV | 3.46% |
| CAC | 2.04% | MDC | 0.00% | SRN | 0.00% |
| CAP | 2.04% | MFL | 0.00% | SVN | 0.00% |
| CCL | 0.00% | MIM | 0.00% | TMT | 0.00% |
| CMH | 5.00% | MMI | 0.00% | TPC | 0.00% |
| CPL | 0.00% | MOB | 0.00% | TRE | 0.00% |
| CRG | 5.00% | MTA | 0.22% | TSX | 0.00% |
| CRM | 0.00% | MTL | 0.88% | UCS | 1.02% |
| CRW | 1.97% | MUR | 0.10% | VIL | 0.50% |
| CVI | 0.00% | NHM | 0.00% | VLE | 1.59% |
| DCT | 0.63% | NPK | 0.00% | WNH | 5.00% |
| DLV | 0.00% | NTC | 0.00% | WWR | 0.00% |
| DON | 0.45% | NWL | 0.00% | ZSA | 3.57% |
| DRD | 0.00% | OCE | 0.00% | | |
| DTC | 0.00% | OCT | 0.15% | | |

| Optimal Growth Portfolio 02.01.2005 to 03.07.2005 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 3.06% | DCT | 0.00% | NED | 0.00% |
| ADH | 0.00% | DST | 0.00% | NPK | 0.00% |
| ADR | 5.00% | DTA | 0.00% | NPN | 3.32% |
| AFE | 0.00% | EHS | 0.00% | NTC | 0.00% |
| AFX | 0.00% | EOH | 4.46% | NWL | 0.59% |
| AGL | 0.00% | EXL | 0.00% | OCT | 0.00% |
| ALT | 0.00% | FBR | 1.11% | PIK | 0.00% |
| AMA | 0.00% | FPT | 0.85% | PPC | 0.00% |
| AME | 1.02% | FSR | 1.31% | PWK | 0.00% |
| AMS | 0.70% | GFI | 0.92% | RLO | 3.63% |
| ANG | 0.00% | GMB | 2.64% | RMH | 2.31% |
| AON | 0.80% | GRF | 5.00% | RTN | 0.00% |
| AOO | 0.00% | GRT | 0.00% | RTO | 0.00% |
| AOX | 0.00% | HYP | 0.00% | SAB | 3.13% |
| ADH | 0.00% | ILA | 1.38% | SAC | 0.27% |
| APN | 3.64% | IMP | 0.00% | SBK | 0.05% |
| ASR | 0.00% | INL | 0.00% | SBL | 0.00% |
| ATN | 0.00% | INP | 0.00% | SHF | 0.00% |
| BCF | 5.00% | IPL | 0.00% | SHP | 0.00% |
| BIL | 0.00% | ITE | 5.00% | SNB | 0.00% |
| BVT | 0.00% | ITR | 0.00% | SOL | 0.85% |
| CAT | 0.00% | JDG | 0.00% | SPA | 5.00% |
| CCL | 0.24% | KGM | 5.00% | SUI | 0.00% |
| CKS | 0.76% | LNF | 2.79% | SYC | 0.60% |
| CLH | 1.77% | LON | 0.00% | TBX | 0.88% |
| CLI | 0.57% | MAS | 0.00% | TFG | 0.00% |
| CLS | 0.00% | MMG | 3.09% | TRU | 0.00% |
| CMH | 2.41% | MPC | 0.00% | TRW | 0.00% |
| CPL | 0.00% | MST | 0.00% | TSX | 0.00% |
| CRM | 0.20% | MTE | 1.56% | UCS | 0.00% |
| CSB | 0.00% | MTN | 0.00% | WBO | 5.00% |
| CUL | 2.57% | NBS | 5.00% | WHL | 0.00% |
| CVI | 3.24% | NCS | 0.00% | | |
| DAW | 3.27% | NCT | 0.00% | | |

| Optimal Value Portfolio 03.07.2005 to 01.01.2006 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.01% | DST | 2.21% | OCT | 0.88% |
| ADI | 1.56% | EHS | 1.80% | OMN | 0.28% |
| ADR | 1.92% | EOH | 1.79% | PAM | 0.00% |
| AFR | 0.00% | EXL | 0.06% | PGR | 1.66% |
| AFX | 0.38% | FBR | 0.90% | PMV | 0.20% |
| AMA | 0.08% | FSR | 0.72% | RBW | 0.59% |
| AME | 0.00% | GDO | 0.00% | RLO | 0.95% |
| AOX | 0.41% | GIJ | 1.17% | RMH | 0.76% |
| AOX | 0.41% | GMB | 0.00% | RNG | 0.00% |
| APK | 0.89% | GND | 0.90% | RTN | 0.71% |
| ART | 3.23% | GRF | 0.93% | SAC | 1.48% |
| ASA | 2.07% | GRT | 1.44% | SAL | 0.00% |
| ASR | 4.07% | HAR | 0.85% | SBK | 0.88% |
| ATN | 0.73% | HDC | 0.85% | SBO | 0.91% |
| AWT | 0.00% | HWA | 1.94% | SBV | 1.52% |
| BAT | 0.67% | HWN | 1.95% | SER | 0.00% |
| BAU | 0.14% | ILA | 1.13% | SFN | 2.28% |
| BCF | 3.43% | IVT | 1.51% | SIM | 0.24% |
| BDM | 1.17% | JCD | 0.00% | SNB | 0.92% |
| BEL | 1.58% | JDG | 0.27% | SNU | 1.22% |
| BRN | 0.48% | KIR | 0.39% | SOV | 3.63% |
| BRT | 1.99% | MDC | 0.58% | SRN | 0.76% |
| BSR | 0.00% | MFL | 0.92% | SVN | 1.09% |
| CAC | 3.11% | MIM | 1.62% | TBX | 0.37% |
| CAP | 1.03% | MMI | 1.50% | TFG | 1.57% |
| CLS | 0.00% | MPC | 0.32% | TMT | 0.00% |
| CMH | 1.56% | MST | 0.00% | TPC | 0.35% |
| CRG | 1.89% | MTA | 2.10% | VIL | 0.00% |
| CRM | 1.11% | MTL | 0.94% | VLE | 0.88% |
| CRW | 0.89% | MTN | 0.00% | WNH | 0.49% |
| CVI | 1.73% | MUR | 0.00% | WWR | 1.87% |
| DCT | 2.18% | NPK | 0.00% | ZSA | 1.65% |
| DON | 3.03% | NPN | 0.92% | | |
| DRD | 0.42% | NWL | 0.00% | | |

| Optimal Growth Portfolio 03.07.2005 to 01.01.2006 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | DTA | 0.00% | NPN | 0.01% |
| ADH | 0.00% | DTC | 0.00% | NTC | 0.00% |
| ADR | 5.00% | EOH | 0.00% | OCE | 0.00% |
| AFE | 0.00% | FBR | 0.00% | OCT | 0.00% |
| AFR | 0.00% | FPT | 0.00% | PAP | 0.00% |
| AFX | 0.00% | FSR | 0.00% | PIK | 0.00% |
| AGL | 0.00% | GFI | 0.00% | PMM | 0.00% |
| ALT | 0.00% | GRF | 0.00% | PPC | 0.00% |
| AMS | 2.85% | HWN | 3.46% | PPR | 0.36% |
| ANG | 0.00% | HYP | 2.87% | PWK | 0.00% |
| AON | 3.43% | ILA | 3.92% | RLO | 3.22% |
| AOO | 3.23% | ILV | 0.00% | RMH | 4.01% |
| AOX | 0.00% | IMP | 4.16% | RTO | 0.00% |
| APK | 0.00% | INL | 0.00% | SAB | 0.00% |
| ADH | 0.00% | INP | 0.00% | SAC | 1.56% |
| ATN | 0.00% | IPL | 0.00% | SBK | 0.00% |
| BCF | 5.00% | ITE | 0.00% | SBL | 0.00% |
| BIL | 0.00% | ITR | 0.99% | SHF | 0.00% |
| BVT | 0.00% | JDG | 0.00% | SHP | 0.00% |
| CAT | 0.00% | JSC | 2.86% | SNB | 0.00% |
| CCL | 2.01% | KGM | 0.00% | SOL | 0.00% |
| CKS | 1.33% | LNF | 2.60% | SPA | 5.00% |
| CLH | 0.00% | LON | 0.00% | SUI | 0.00% |
| CLI | 0.00% | MAS | 0.00% | SYC | 3.03% |
| CLS | 0.00% | MDC | 0.00% | TFG | 0.00% |
| CPL | 5.00% | MMG | 1.15% | TRE | 5.00% |
| CRM | 2.60% | MOB | 1.67% | TRU | 0.00% |
| CSB | 3.45% | MTE | 0.00% | TRW | 0.00% |
| CUL | 1.18% | MTN | 0.00% | TSX | 0.00% |
| CVI | 5.00% | NBS | 3.81% | UCS | 0.00% |
| DAW | 0.00% | NCS | 0.00% | WBO | 2.48% |
| DCT | 1.32% | NCT | 0.00% | WHL | 0.00% |
| DLV | 3.24% | NED | 0.00% | | |
| DST | 2.15% | NHM | 0.00% | | |

| Optimal Value Portfolio 01.01.2006 to 02.07.2006 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.66% | EHS | 2.70% | PGR | 0.00% |
| ADI | 0.00% | EOH | 0.00% | PPR | 0.52% |
| ADR | 4.29% | EXL | 0.00% | RBW | 0.00% |
| AFE | 0.00% | FSR | 0.00% | RLO | 4.44% |
| AMA | 0.00% | GDO | 1.63% | RMH | 0.00% |
| AME | 0.18% | GIJ | 0.96% | RNG | 2.58% |
| AON | 2.43% | GND | 0.00% | RTN | 0.00% |
| AOO | 4.78% | GRT | 0.00% | RTO | 1.16% |
| APK | 2.48% | HAR | 0.00% | SAC | 4.94% |
| ART | 0.00% | HDC | 0.00% | SAL | 0.00% |
| ASA | 0.00% | HWA | 0.00% | SBK | 0.00% |
| ASR | 0.66% | HWN | 2.25% | SBL | 4.50% |
| AWT | 0.00% | ILA | 0.00% | SBV | 5.00% |
| BAT | 0.00% | ITR | 0.00% | SFN | 0.00% |
| BAU | 0.00% | IVT | 0.00% | SHF | 0.00% |
| BCF | 2.03% | JCD | 0.00% | SIM | 0.49% |
| BDM | 0.98% | JDG | 0.00% | SNB | 0.00% |
| BNT | 0.00% | KIR | 0.00% | SNU | 4.59% |
| BSR | 0.34% | MDC | 0.00% | SOL | 0.00% |
| CAC | 3.88% | MFL | 0.00% | SOV | 0.00% |
| CAP | 0.00% | MIM | 0.00% | SVN | 4.24% |
| CLS | 0.00% | MMI | 0.00% | TBX | 0.00% |
| CMH | 4.04% | MOB | 2.58% | TFG | 2.33% |
| CPL | 0.63% | MST | 0.00% | TMT | 0.00% |
| CRG | 4.61% | MTA | 0.00% | TPC | 0.00% |
| CRM | 5.00% | MTE | 1.88% | TRE | 0.00% |
| CRW | 0.00% | MTL | 1.19% | UCS | 0.43% |
| CVI | 3.01% | NBS | 0.00% | VIL | 0.97% |
| DAW | 0.00% | NPN | 0.00% | VLE | 0.76% |
| DCT | 2.26% | NTC | 0.00% | WNH | 0.00% |
| DLV | 0.00% | NWL | 0.00% | WWR | 0.05% |
| DRD | 0.00% | OCT | 4.71% | ZSA | 1.79% |
| DST | 0.00% | OMN | 0.00% | | |
| DTA | 0.00% | PAM | 1.06% | | |

| Optimal Growth Portfolio 01.01.2006 to 02.07.2006 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | DON | 2.68% | NTC | 1.15% |
| ADH | 0.00% | DST | 1.46% | OCE | 0.00% |
| ADR | 0.00% | DTC | 1.11% | OCT | 1.60% |
| AFE | 0.41% | FBR | 0.00% | PAP | 2.15% |
| AFR | 0.00% | FPT | 1.61% | PIK | 0.00% |
| AFX | 0.30% | FSR | 0.00% | PMM | 2.01% |
| AGL | 0.16% | GFI | 0.00% | PMV | 1.44% |
| ALT | 0.61% | GMB | 0.00% | PPC | 1.73% |
| AMS | 1.68% | GRF | 0.00% | PPR | 3.51% |
| ANG | 0.37% | HYP | 3.01% | PWK | 0.33% |
| AON | 3.78% | ILV | 1.58% | RLO | 1.78% |
| AOO | 3.62% | IMP | 1.54% | RMH | 0.00% |
| AOX | 0.33% | INL | 0.52% | SAB | 0.00% |
| APK | 0.55% | INP | 0.65% | SAC | 1.42% |
| ADH | 0.00% | IPL | 0.00% | SBK | 0.00% |
| ATN | 0.00% | ITE | 1.76% | SBO | 1.20% |
| BCF | 2.83% | JSC | 2.99% | SER | 0.00% |
| BEL | 3.35% | KGM | 1.35% | SHF | 0.70% |
| BIL | 0.48% | KIR | 0.77% | SHP | 0.00% |
| BRN | 1.15% | LNF | 2.12% | SNB | 0.00% |
| BRT | 3.03% | LON | 2.96% | SOL | 0.66% |
| BVT | 0.00% | MAS | 0.62% | SPA | 2.87% |
| CAT | 0.00% | MFL | 1.33% | SRN | 0.00% |
| CCL | 0.00% | MMG | 0.06% | SUI | 0.73% |
| CKS | 1.06% | MPC | 0.00% | SYC | 3.19% |
| CLH | 1.56% | MTN | 0.06% | TFG | 1.46% |
| CLI | 3.14% | MUR | 1.26% | TRU | 0.12% |
| CLS | 0.00% | NBS | 0.00% | TRW | 0.00% |
| CPL | 1.23% | NCS | 0.00% | TSX | 0.00% |
| CRM | 1.65% | NCT | 0.01% | UCS | 0.41% |
| CSB | 0.16% | NED | 0.00% | WBO | 2.06% |
| CUL | 0.23% | NHM | 5.00% | WHL | 0.00% |
| DAW | 0.74% | NPK | 0.00% | | |
| DCT | 0.20% | NPN | 0.00% | | |

| Optimal Value Portfolio 02.07.2006 to 07.01.2007 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | DTA | 0.18% | PAM | 1.07% |
| ADI | 0.00% | EHS | 0.00% | PGR | 0.00% |
| ADR | 0.00% | EOH | 0.00% | PMV | 0.03% |
| AFE | 5.00% | EXL | 0.00% | PPR | 5.00% |
| AMA | 0.00% | FBR | 0.00% | RBW | 0.00% |
| AME | 4.31% | FPT | 0.00% | RMH | 0.00% |
| ANG | 0.00% | FSR | 0.00% | RNG | 0.28% |
| AON | 0.00% | GDO | 1.94% | SAC | 3.16% |
| AOO | 0.00% | GIJ | 0.00% | SAL | 0.00% |
| APK | 0.00% | GND | 0.00% | SBK | 0.00% |
| ART | 0.00% | GRT | 0.87% | SBL | 5.00% |
| ASA | 0.00% | HAR | 1.30% | SBV | 4.76% |
| ASR | 1.64% | HDC | 0.00% | SFN | 0.00% |
| AWT | 0.00% | HWA | 0.00% | SIM | 1.59% |
| BAT | 0.00% | HYP | 2.29% | SNB | 0.00% |
| BAU | 0.00% | ILA | 0.00% | SNU | 5.00% |
| BCF | 1.91% | IPL | 0.00% | SOL | 0.00% |
| BEL | 5.00% | ITR | 0.00% | SOV | 0.00% |
| BNT | 0.00% | IVT | 0.00% | SVN | 5.00% |
| BRN | 0.31% | JCD | 0.00% | SYC | 5.00% |
| BRT | 3.00% | JDG | 0.00% | TBX | 0.48% |
| CAP | 0.29% | MAS | 1.02% | TFG | 0.00% |
| CLS | 0.00% | MFL | 3.58% | TMT | 0.00% |
| CMH | 0.00% | MIM | 0.00% | TPC | 0.00% |
| CPL | 1.37% | MMI | 0.00% | TRE | 4.50% |
| CRG | 5.00% | MOB | 4.48% | TRU | 0.00% |
| CRM | 0.00% | MPC | 0.00% | UCS | 3.75% |
| CRW | 0.00% | MST | 0.79% | VIL | 1.54% |
| CSB | 0.00% | MTA | 0.00% | VLE | 0.00% |
| DAW | 1.98% | MTN | 0.00% | WNH | 0.00% |
| DCT | 0.00% | NCS | 0.00% | WWR | 0.00% |
| DLV | 0.00% | NCT | 0.00% | ZSA | 3.04% |
| DON | 1.11% | NWL | 0.00% | | |
| DRD | 0.00% | OCT | 3.45% | | |

| Optimal Growth Portfolio 02.07.2006 to 07.01.2007 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | FBR | 0.00% | OMN | 0.00% |
| ADH | 0.00% | FPT | 0.00% | PAP | 0.00% |
| ADR | 0.00% | GFI | 0.00% | PIK | 0.00% |
| AFE | 0.00% | GMB | 0.00% | PMM | 4.00% |
| AFR | 0.00% | GRF | 0.00% | PPC | 3.82% |
| AFX | 0.83% | HWN | 5.00% | PPR | 1.28% |
| AGL | 0.00% | HYP | 0.00% | PWK | 0.00% |
| ALT | 0.00% | ILV | 5.00% | RLO | 0.00% |
| AMS | 1.46% | IMP | 0.00% | RTN | 5.00% |
| AOX | 0.00% | INL | 0.00% | RTO | 0.36% |
| APN | 0.00% | INP | 0.00% | SAB | 0.00% |
| ATN | 0.00% | IPL | 0.00% | SAC | 0.00% |
| BCF | 3.31% | ITE | 5.00% | SBK | 0.00% |
| BDM | 2.28% | JSC | 0.00% | SBO | 1.66% |
| ADH | 0.00% | KGM | 0.00% | SER | 1.70% |
| BSR | 3.55% | KIR | 3.96% | SHF | 0.00% |
| BVT | 0.00% | LNF | 0.00% | SHP | 3.78% |
| CAC | 4.42% | LON | 0.22% | SNB | 0.00% |
| CAT | 0.00% | MDC | 0.00% | SNU | 2.69% |
| CCL | 0.00% | MFL | 3.25% | SOL | 0.00% |
| CKS | 5.00% | MMG | 0.00% | SPA | 2.12% |
| CLH | 0.00% | MPC | 0.00% | SRN | 2.65% |
| CLI | 5.00% | MST | 0.00% | SUI | 0.00% |
| CLS | 0.00% | MTE | 3.98% | SYC | 0.00% |
| CPL | 0.00% | MTL | 0.00% | TMT | 0.00% |
| CRM | 0.00% | MUR | 2.15% | TRE | 0.00% |
| CSB | 0.00% | NBS | 0.00% | TRU | 0.00% |
| CUL | 0.00% | NED | 0.00% | TRW | 0.00% |
| CVI | 0.00% | NHM | 4.63% | TSX | 0.00% |
| DAW | 0.00% | NPK | 0.00% | UCS | 3.87% |
| DST | 0.00% | NPN | 0.00% | WBO | 5.00% |
| DTA | 0.00% | NTC | 0.08% | WHL | 0.00% |
| DTC | 2.95% | OCE | 0.00% | | |
| EOH | 0.00% | OCT | 0.00% | | |

| Optimal Value Portfolio 07.01.2007 to 01.07.2007 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | EHS | 0.00% | PGR | 0.98% |
| ADI | 0.00% | EOH | 1.57% | PPR | 2.27% |
| ADR | 0.00% | FSR | 0.00% | RBW | 0.00% |
| AFE | 5.00% | GDO | 0.00% | RMH | 0.00% |
| AMA | 0.00% | GMB | 0.00% | RNG | 0.66% |
| AME | 5.00% | GND | 1.20% | RTN | 0.00% |
| ANG | 0.00% | GRT | 0.05% | SAC | 0.09% |
| APK | 0.00% | HAR | 0.00% | SAL | 0.00% |
| ART | 0.00% | HDC | 2.88% | SBK | 0.00% |
| ASA | 0.00% | HWA | 0.00% | SBL | 5.00% |
| ASR | 5.00% | HYP | 1.38% | SBO | 0.66% |
| AWT | 0.00% | ILA | 0.00% | SBV | 3.67% |
| BAT | 0.00% | ILV | 5.00% | SER | 2.41% |
| BAU | 0.00% | IPL | 0.00% | SFN | 0.00% |
| BCF | 0.00% | ITR | 0.00% | SHF | 1.66% |
| BDM | 0.00% | IVT | 3.35% | SIM | 3.82% |
| BIL | 0.00% | JCD | 0.66% | SNB | 0.00% |
| BNT | 0.90% | JDG | 0.00% | SOL | 0.00% |
| BRN | 5.00% | JSC | 0.00% | SOV | 3.09% |
| BRT | 3.33% | MAS | 4.79% | SPA | 1.96% |
| CAP | 0.45% | MFL | 0.00% | SRN | 1.41% |
| CAT | 0.06% | MIM | 0.00% | SVN | 2.91% |
| CCL | 0.31% | MMG | 1.59% | SYC | 0.18% |
| CMH | 0.00% | MMI | 0.00% | TBX | 0.43% |
| CPL | 0.00% | MOB | 4.02% | TFG | 0.00% |
| CRG | 2.17% | MPC | 0.00% | TPC | 0.00% |
| CRM | 0.00% | MTA | 0.44% | TSX | 0.00% |
| CRW | 0.66% | NBS | 4.44% | VIL | 0.88% |
| CSB | 0.00% | NED | 0.00% | VLE | 0.00% |
| CVI | 0.00% | NPK | 1.74% | WNH | 0.00% |
| DCT | 3.52% | NWL | 0.00% | WWR | 0.00% |
| DON | 1.37% | OCE | 0.00% | ZSA | 1.25% |
| DRD | 0.00% | OCT | 0.75% | | |
| DTA | 0.00% | PAM | 0.00% | | |

| Optimal Growth Portfolio 07.01.2007 to 01.07.2007 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ADH | 1.07% | FBR | 0.00% | NTC | 5.00% |
| ADI | 0.00% | FPT | 0.00% | OCE | 0.00% |
| ADR | 0.00% | FSR | 0.00% | OCT | 0.00% |
| AFR | 1.46% | GFI | 0.00% | OMN | 5.00% |
| AFX | 0.00% | GIJ | 0.00% | PAP | 0.00% |
| AGL | 0.00% | GRF | 0.00% | PIK | 0.00% |
| ALT | 0.00% | HDC | 4.92% | PMM | 0.14% |
| AMS | 0.00% | HWN | 1.53% | PMV | 0.00% |
| AON | 0.00% | HYP | 0.00% | PPC | 0.00% |
| AOO | 0.00% | ILV | 5.00% | PWK | 0.00% |
| AOX | 5.00% | IMP | 0.00% | RLO | 0.00% |
| APN | 0.00% | INL | 0.00% | RMH | 0.00% |
| ASR | 2.84% | INP | 0.00% | RTN | 0.00% |
| ATN | 0.00% | IPL | 0.00% | RTO | 1.62% |
| ADI | 0.00% | ITE | 5.00% | SAB | 0.00% |
| BDM | 0.00% | IVT | 5.00% | SAC | 0.00% |
| BEL | 5.00% | KGM | 0.00% | SBK | 0.00% |
| BSR | 0.68% | KIR | 2.33% | SHF | 0.00% |
| BVT | 0.00% | LNF | 4.66% | SHP | 2.08% |
| CAC | 0.00% | LON | 0.00% | SNB | 0.00% |
| CCL | 1.36% | MDC | 0.00% | SNU | 0.00% |
| CKS | 5.00% | MMG | 0.59% | SPA | 1.08% |
| CLH | 1.72% | MPC | 0.00% | SUI | 0.91% |
| CLI | 5.00% | MST | 0.00% | SYC | 0.00% |
| CLS | 0.00% | MTE | 4.33% | TMT | 0.00% |
| CRM | 0.00% | MTL | 0.00% | TPC | 2.93% |
| CSB | 0.00% | MTN | 0.00% | TRE | 1.59% |
| CUL | 0.00% | MUR | 2.09% | TRU | 0.00% |
| CVI | 0.00% | NCS | 0.00% | TRW | 0.00% |
| DAW | 0.38% | NCT | 2.63% | UCS | 5.00% |
| DLV | 1.45% | NED | 0.00% | WBO | 2.33% |
| DST | 0.00% | NHM | 0.00% | WHL | 0.00% |
| DTC | 0.00% | NPK | 0.00% | | |
| EXL | 0.00% | NPN | 0.00% | | |

| Optimal Value Portfolio 01.07.2007 to 06.01.2008 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | FSR | 0.00% | OMN | 5.00% |
| ADI | 0.00% | GDO | 0.00% | PAM | 0.00% |
| AFE | 5.00% | GMB | 0.00% | PGR | 0.33% |
| AFR | 4.63% | GND | 5.00% | PPR | 4.77% |
| AMA | 0.00% | GRT | 0.00% | RBW | 0.00% |
| AME | 2.71% | HDC | 0.00% | RMH | 0.00% |
| AON | 1.89% | HWA | 0.00% | RNG | 1.52% |
| AOO | 0.00% | HYP | 0.00% | RTN | 0.00% |
| APK | 2.34% | ILA | 2.59% | RTO | 5.00% |
| ART | 0.56% | INL | 0.00% | SAC | 0.00% |
| ASA | 0.00% | INP | 0.00% | SAL | 0.00% |
| AWT | 0.36% | IPL | 0.00% | SBK | 0.00% |
| BAT | 0.00% | ITR | 0.00% | SBL | 5.00% |
| BAU | 0.46% | IVT | 0.00% | SBO | 1.50% |
| BCF | 0.00% | JCD | 1.47% | SBV | 5.00% |
| BDM | 1.41% | JDG | 0.00% | SER | 0.00% |
| BIL | 0.00% | JSC | 0.00% | SFN | 0.00% |
| BNT | 0.57% | KGM | 0.00% | SHF | 0.00% |
| BRN | 0.00% | LNF | 2.75% | SIM | 5.00% |
| BRT | 0.00% | MAS | 1.35% | SNB | 0.00% |
| CAP | 0.00% | MFL | 0.00% | SOL | 0.00% |
| CAT | 0.00% | MIM | 0.00% | SOV | 0.00% |
| CMH | 0.00% | MMG | 0.52% | SRN | 0.00% |
| CPL | 0.00% | MMI | 0.00% | SVN | 0.00% |
| CRW | 1.55% | MOB | 4.76% | SYC | 0.00% |
| CSB | 0.00% | MPC | 0.00% | TBX | 1.83% |
| CVI | 2.02% | MTA | 0.00% | TFG | 0.00% |
| DCT | 2.64% | MTL | 0.00% | TPC | 3.22% |
| DRD | 0.00% | NBS | 5.00% | VIL | 1.32% |
| DST | 0.00% | NED | 0.00% | WNH | 0.00% |
| DTA | 0.00% | NHM | 0.00% | WWR | 0.00% |
| DTC | 1.72% | NPK | 0.00% | ZSA | 5.00% |
| EHS | 0.00% | NWL | 0.00% | | |
| EOH | 3.30% | OCE | 0.92% | | |

| Optimal Growth Portfolio 01.07.2007 to 06.01.2008 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | DST | 2.52% | NHM | 0.00% |
| ADH | 0.00% | DTC | 0.00% | NPK | 0.00% |
| ADR | 0.00% | EOH | 0.00% | NPN | 0.00% |
| AFX | 0.00% | EXL | 0.00% | NTC | 2.48% |
| AGL | 0.00% | FBR | 0.00% | OCE | 0.00% |
| ALT | 0.00% | FPT | 0.00% | OCT | 0.00% |
| AMS | 0.00% | FSR | 0.00% | OMN | 5.00% |
| ANG | 0.00% | GFI | 0.00% | PAP | 0.00% |
| AOX | 0.00% | GIJ | 1.88% | PIK | 0.00% |
| APK | 2.71% | GRF | 0.00% | PMM | 0.00% |
| APN | 0.00% | HAR | 0.00% | PMV | 4.55% |
| ASR | 5.00% | HDC | 1.00% | PPC | 0.00% |
| ATN | 0.00% | HWN | 1.94% | PWK | 0.00% |
| BCF | 0.00% | ILA | 0.00% | RLO | 0.00% |
| ADH | 0.00% | ILV | 3.38% | RMH | 0.00% |
| BIL | 0.00% | IMP | 0.00% | SAB | 0.23% |
| BSR | 0.00% | INL | 0.00% | SAC | 0.00% |
| BVT | 0.00% | INP | 0.00% | SHP | 0.00% |
| CAC | 0.00% | ITE | 5.00% | SNU | 4.01% |
| CAT | 0.00% | JSC | 0.00% | SPA | 0.74% |
| CCL | 0.00% | KGM | 0.00% | SUI | 3.38% |
| CKS | 5.00% | KIR | 0.44% | SYC | 0.00% |
| CLH | 0.00% | LNF | 5.00% | TMT | 5.00% |
| CLI | 5.00% | LON | 0.00% | TPC | 5.00% |
| CLS | 0.00% | MAS | 2.21% | TRE | 0.22% |
| CPL | 0.00% | MDC | 0.00% | TRU | 0.00% |
| CRG | 3.79% | MPC | 0.00% | TRW | 0.00% |
| CRM | 0.00% | MST | 0.00% | TSX | 0.00% |
| CSB | 1.80% | MTE | 2.60% | UCS | 5.00% |
| CUL | 0.50% | MTL | 0.00% | VLE | 0.00% |
| CVI | 0.00% | MTN | 0.00% | WBO | 1.59% |
| DAW | 0.00% | MUR | 1.05% | WHL | 0.00% |
| DLV | 0.00% | NCS | 0.33% | | |
| DON | 3.25% | NCT | 3.41% | | |

| Optimal Value Portfolio 06.01.2008 to 06.07.2008 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | HAR | 0.00% | PMV | 5.00% |
| ADI | 0.24% | HWA | 1.45% | PPR | 0.00% |
| AFE | 2.46% | HYP | 2.01% | RBW | 4.76% |
| AFR | 0.00% | ILA | 0.00% | RMH | 0.00% |
| AMA | 0.00% | INL | 0.00% | RNG | 0.95% |
| ANG | 0.00% | INP | 0.00% | RTN | 0.00% |
| AON | 2.93% | IPL | 0.00% | RTO | 5.00% |
| AOO | 5.00% | ITR | 0.00% | SAL | 0.00% |
| APK | 0.00% | IVT | 2.33% | SBK | 0.00% |
| ART | 0.00% | JCD | 0.95% | SBL | 0.59% |
| ASA | 0.00% | JDG | 0.00% | SBO | 0.95% |
| BAT | 0.00% | JSC | 0.00% | SBV | 3.38% |
| BAU | 0.54% | LNF | 0.00% | SFN | 5.00% |
| BCF | 0.00% | MAS | 1.85% | SHF | 0.00% |
| BIL | 0.00% | MFL | 0.00% | SIM | 0.00% |
| BNT | 1.66% | MIM | 3.45% | SNB | 0.00% |
| BRN | 5.00% | MMG | 0.00% | SOV | 0.00% |
| BRT | 0.00% | MMI | 0.00% | SPA | 2.30% |
| BVT | 0.00% | MOB | 0.00% | SVN | 1.30% |
| CAP | 0.00% | MPC | 0.00% | SYC | 0.00% |
| CMH | 0.00% | MST | 0.00% | TBX | 0.00% |
| CRM | 0.00% | MTA | 0.00% | TFG | 0.00% |
| CRW | 0.95% | MTL | 0.00% | TPC | 1.81% |
| CSB | 0.00% | NBS | 5.00% | TRU | 0.00% |
| DCT | 0.00% | NCS | 5.00% | TRW | 0.00% |
| DLV | 0.00% | NCT | 5.00% | TSX | 0.00% |
| DRD | 0.00% | NED | 0.00% | UCS | 1.01% |
| DTA | 0.00% | NHM | 0.00% | VIL | 0.00% |
| DTC | 0.00% | NPK | 0.00% | WHL | 0.00% |
| EHS | 2.26% | NWL | 0.00% | WNH | 0.00% |
| FSR | 0.00% | OCE | 0.00% | WWR | 0.00% |
| GDO | 0.00% | OMN | 0.00% | ZSA | 5.00% |
| GND | 2.65% | PAM | 4.05% | | |
| GRT | 3.16% | PGR | 5.00% | | |

| Optimal Growth Portfolio 06.01.2008 to 06.07.2008 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | DTC | 0.00% | PAP | 0.32% |
| ADH | 5.00% | EOH | 1.26% | PIK | 0.33% |
| ADR | 5.00% | EXL | 0.00% | PMM | 1.52% |
| AFR | 0.00% | FBR | 0.72% | PMV | 4.95% |
| AFX | 0.00% | FPT | 0.04% | PPC | 0.00% |
| AGL | 0.00% | GFI | 0.00% | PWK | 0.00% |
| ALT | 0.00% | GIJ | 0.21% | RBW | 1.35% |
| AME | 5.00% | GMB | 0.00% | RLO | 0.00% |
| AMS | 0.00% | GRF | 0.00% | RTN | 0.00% |
| AOX | 0.00% | HDC | 0.57% | RTO | 5.00% |
| APN | 0.00% | HWN | 5.00% | SAB | 0.88% |
| ASR | 5.00% | HYP | 0.10% | SAC | 0.89% |
| ATN | 0.00% | ILV | 0.80% | SBK | 0.00% |
| AWT | 0.46% | IMP | 0.00% | SBL | 1.05% |
| ADH | 5.00% | ITE | 0.00% | SER | 0.00% |
| BEL | 4.64% | JSC | 0.73% | SFN | 1.35% |
| BIL | 0.00% | KGM | 0.00% | SHP | 0.81% |
| BSR | 3.42% | KIR | 0.00% | SNB | 0.00% |
| BVT | 0.00% | LON | 0.00% | SNU | 1.26% |
| CAC | 1.41% | MAS | 4.16% | SOL | 0.32% |
| CAT | 0.00% | MDC | 0.00% | SPA | 0.27% |
| CCL | 1.00% | MOB | 0.28% | SRN | 0.31% |
| CKS | 0.52% | MPC | 0.00% | SUI | 0.75% |
| CLH | 0.24% | MST | 0.00% | SYC | 0.13% |
| CLI | 4.55% | MTE | 0.00% | TMT | 5.00% |
| CLS | 0.00% | MTL | 0.00% | TRE | 0.01% |
| CPL | 0.68% | MTN | 0.57% | TRU | 0.00% |
| CRG | 2.85% | MUR | 3.36% | TRW | 0.00% |
| CRM | 0.00% | NPK | 0.00% | UCS | 1.13% |
| CUL | 0.00% | NPN | 0.00% | VLE | 0.00% |
| CVI | 4.31% | NTC | 0.00% | WBO | 1.60% |
| DAW | 0.48% | OCE | 0.00% | WHL | 0.00% |
| DON | 1.45% | OCT | 1.49% | | |
| DST | 1.62% | OMN | 0.49% | | |

| Optimal Value Portfolio 06.07.2008 to 04.01.2009 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 5.00% | GMB | 0.61% | PPR | 0.54% |
| ADI | 0.00% | GND | 1.68% | RBW | 0.84% |
| AFR | 5.00% | GRT | 0.93% | RLO | 0.90% |
| AMA | 0.16% | HAR | 1.27% | RMH | 1.12% |
| AME | 0.78% | HWA | 4.03% | RNG | 0.92% |
| ANG | 1.10% | HYP | 0.84% | RTN | 1.18% |
| AON | 0.99% | ILA | 0.71% | RTO | 1.30% |
| AOO | 1.03% | INL | 0.73% | SAL | 0.85% |
| ART | 1.08% | INP | 0.67% | SBK | 1.21% |
| ASA | 0.90% | IPL | 0.57% | SBO | 0.92% |
| BAT | 0.90% | ITE | 0.49% | SER | 0.14% |
| BAU | 2.99% | IVT | 1.20% | SFN | 0.77% |
| BCF | 0.51% | JCD | 0.92% | SHF | 1.12% |
| BDM | 1.24% | JDG | 0.58% | SIM | 0.90% |
| BEL | 1.16% | JSC | 1.21% | SNB | 1.16% |
| BNT | 0.61% | MAS | 1.23% | SNU | 1.19% |
| BRN | 1.02% | MFL | 0.81% | SOV | 1.23% |
| BRT | 0.50% | MIM | 1.03% | SPA | 1.06% |
| CAC | 1.47% | MMG | 0.71% | SRN | 0.17% |
| CAP | 0.10% | MMI | 1.08% | SVN | 0.86% |
| CAT | 0.82% | MPC | 0.66% | TBX | 0.30% |
| CMH | 0.00% | MST | 0.00% | TFG | 0.47% |
| CPL | 0.85% | MTA | 0.82% | TPC | 1.08% |
| CRM | 0.17% | MTL | 0.78% | TRU | 0.78% |
| CRW | 0.92% | NBS | 1.38% | TRW | 0.81% |
| CSB | 0.93% | NCS | 1.38% | TSX | 0.89% |
| DCT | 1.14% | NCT | 1.38% | UCS | 0.47% |
| DLV | 0.26% | NED | 1.04% | VIL | 1.65% |
| DRD | 1.09% | NPK | 0.88% | VLE | 1.10% |
| DTA | 0.87% | NWL | 0.22% | WHL | 0.40% |
| DTC | 0.70% | OCT | 0.82% | WNH | 0.78% |
| EOH | 1.06% | PAM | 2.35% | WWR | 0.64% |
| FSR | 1.02% | PGR | 1.07% | | |
| GDO | 0.94% | PMV | 0.86% | | |

| Optimal Growth Portfolio 06.07.2008 to 04.01.2009 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | CVI | 0.67% | NPN | 0.00% |
| ADH | 0.00% | DAW | 0.00% | NTC | 0.00% |
| ADR | 0.00% | DON | 0.00% | OCE | 1.63% |
| AFE | 0.00% | DST | 0.00% | OCT | 0.00% |
| AFR | 5.00% | DTC | 0.00% | OMN | 1.80% |
| AFX | 0.00% | EHS | 5.00% | PAM | 5.00% |
| AGL | 0.00% | EOH | 0.00% | PAP | 0.00% |
| ALT | 0.00% | EXL | 0.00% | PIK | 0.00% |
| AME | 5.00% | FBR | 0.00% | PMM | 0.00% |
| AMS | 0.00% | FPT | 0.00% | PPC | 0.00% |
| AON | 5.00% | GFI | 0.00% | PWK | 0.00% |
| AOO | 5.00% | GIJ | 3.14% | RLO | 0.00% |
| AOX | 0.00% | GND | 1.25% | SAB | 0.81% |
| APK | 0.00% | GRF | 0.00% | SAC | 0.00% |
| ADH | 0.00% | HDC | 0.00% | SBK | 0.00% |
| ASR | 5.00% | HWN | 5.00% | SBL | 0.00% |
| ATN | 0.00% | HYP | 0.00% | SBV | 5.00% |
| AWT | 0.00% | ILV | 4.24% | SHP | 1.98% |
| BCF | 0.00% | IMP | 1.64% | SNB | 0.00% |
| BDM | 0.00% | ITE | 0.00% | SOL | 5.00% |
| BEL | 0.00% | ITR | 2.00% | SPA | 4.96% |
| BIL | 5.00% | KGM | 0.00% | SUI | 0.00% |
| BSR | 0.89% | KIR | 0.00% | SYC | 0.00% |
| BVT | 0.00% | LNF | 0.00% | TMT | 0.93% |
| CAT | 0.00% | LON | 0.00% | TPC | 0.85% |
| CCL | 0.00% | MDC | 0.00% | TRE | 0.00% |
| CKS | 5.00% | MFL | 0.00% | TRU | 0.00% |
| CLH | 0.00% | MOB | 0.00% | TRW | 0.00% |
| CLI | 0.74% | MST | 0.00% | VLE | 0.00% |
| CLS | 0.00% | MTA | 0.00% | WBO | 1.78% |
| CPL | 0.00% | MTE | 0.00% | WHL | 0.00% |
| CRG | 0.00% | MTN | 2.66% | ZSA | 5.00% |
| CSB | 0.00% | MUR | 3.02% | | |
| CUL | 0.00% | NHM | 0.00% | | |

| Optimal Value Portfolio 04.01.2009 to 05.07.2009 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ADI | 5.00% | EXL | 0.61% | PAP | 1.17% |
| AGL | 0.00% | GDO | 0.00% | PGR | 0.40% |
| AMA | 0.00% | GIJ | 0.23% | PMV | 0.90% |
| AME | 0.00% | GMB | 1.16% | PPR | 0.71% |
| ANG | 4.97% | GND | 0.98% | RLO | 1.27% |
| AON | 5.00% | HWA | 1.04% | RMH | 1.17% |
| AOO | 1.75% | HWN | 0.47% | RNG | 0.99% |
| ART | 0.12% | ILA | 0.00% | RTN | 1.10% |
| ASA | 1.19% | IMP | 0.95% | RTO | 1.54% |
| ASR | 5.00% | INL | 0.85% | SAL | 0.87% |
| ATN | 0.61% | INP | 0.77% | SBK | 1.26% |
| BAT | 0.00% | IVT | 0.84% | SBL | 0.00% |
| BAU | 5.00% | JCD | 0.99% | SBO | 0.99% |
| BCF | 0.31% | JSC | 0.21% | SER | 0.00% |
| BDM | 0.00% | KIR | 0.22% | SFN | 0.23% |
| BEL | 0.00% | LON | 0.10% | SHF | 1.06% |
| BNT | 0.99% | MAS | 0.10% | SIM | 0.05% |
| BRN | 0.53% | MFL | 0.30% | SNB | 1.25% |
| BRT | 0.00% | MIM | 0.96% | SNU | 0.00% |
| BSR | 0.70% | MMG | 0.00% | SOL | 4.98% |
| CAC | 1.26% | MMI | 1.03% | SOV | 0.00% |
| CAP | 0.00% | MOB | 0.73% | SPA | 0.24% |
| CCL | 0.25% | MST | 0.00% | SRN | 0.00% |
| CMH | 0.00% | MTA | 0.00% | TBX | 0.00% |
| CRM | 0.00% | MTL | 0.98% | TPC | 0.28% |
| CRW | 0.99% | NBS | 1.52% | TRE | 0.76% |
| CSB | 1.24% | NCS | 3.88% | TSX | 0.00% |
| DAW | 0.00% | NCT | 3.56% | UCS | 0.00% |
| DCT | 0.24% | NED | 0.91% | VIL | 5.00% |
| DLV | 0.99% | NHM | 0.74% | VLE | 4.56% |
| DTA | 0.57% | NPK | 0.65% | WNH | 0.79% |
| DTC | 0.59% | NWL | 0.14% | WWR | 0.48% |
| EHS | 1.43% | OMN | 0.77% | | |
| EOH | 0.30% | PAM | 3.24% | | |

| Optimal Growth Portfolio 04.01.2009 to 05.07.2009 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 5.00% | DRD | 0.53% | NWL | 0.00% |
| ADH | 5.00% | DST | 0.37% | OCE | 0.80% |
| ADR | 0.00% | EOH | 0.00% | OCT | 0.40% |
| AFE | 0.00% | FBR | 0.85% | PAP | 0.77% |
| AFR | 5.00% | FPT | 0.83% | PGR | 0.00% |
| AFX | 0.00% | FSR | 0.73% | PIK | 1.10% |
| ALT | 0.00% | GFI | 0.84% | PMM | 0.41% |
| AMS | 0.00% | GRF | 0.53% | PPC | 0.64% |
| AOX | 0.32% | GRT | 1.00% | PWK | 1.13% |
| APK | 0.00% | HAR | 4.68% | RBW | 1.00% |
| APN | 0.83% | HDC | 0.43% | RLO | 0.63% |
| ASA | 0.96% | HWN | 0.16% | RMH | 0.74% |
| ATN | 0.00% | HYP | 0.86% | SAB | 1.05% |
| AWT | 0.00% | ILV | 1.02% | SAC | 0.38% |
| ADH | 5.00% | IMP | 0.30% | SBK | 0.81% |
| BCF | 0.00% | IPL | 0.31% | SBL | 0.00% |
| BIL | 1.24% | ITE | 0.00% | SBV | 0.60% |
| BSR | 0.00% | ITR | 0.54% | SHP | 5.00% |
| BVT | 0.77% | JDG | 0.54% | SNB | 0.83% |
| CAP | 0.00% | KGM | 0.47% | SOL | 1.23% |
| CAT | 0.30% | LNF | 0.00% | SUI | 0.54% |
| CCL | 0.00% | MDC | 0.76% | SVN | 0.01% |
| CKS | 0.82% | MIM | 0.56% | SYC | 0.76% |
| CLH | 0.92% | MMI | 0.60% | TFG | 1.32% |
| CLI | 0.09% | MPC | 5.00% | TMT | 0.00% |
| CLS | 1.13% | MTE | 0.00% | TRE | 0.23% |
| CMH | 0.00% | MTN | 5.00% | TRU | 4.64% |
| CPL | 1.01% | MUR | 0.57% | TRW | 5.00% |
| CRG | 0.00% | NBS | 1.16% | VLE | 2.77% |
| CRM | 0.00% | NCS | 5.00% | WBO | 0.96% |
| CSB | 0.65% | NCT | 3.85% | WHL | 0.70% |
| CUL | 0.74% | NPK | 0.34% | ZSA | 0.61% |
| CVI | 0.44% | NPN | 0.91% | | |
| DON | 0.36% | NTC | 0.65% | | |

| Optimal Value Portfolio 05.07.2009 to 03.01.2010 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ADI | 0.00% | FSR | 0.98% | OCE | 3.89% |
| AFR | 0.00% | GDO | 2.90% | OMN | 0.00% |
| AGL | 0.00% | GIJ | 0.00% | PAM | 0.00% |
| AMA | 0.00% | GMB | 0.56% | PMV | 0.00% |
| AME | 0.01% | GND | 0.00% | PPR | 5.00% |
| ANG | 0.03% | GRF | 0.00% | RLO | 0.00% |
| AON | 5.00% | HDC | 0.00% | RNG | 1.63% |
| AOO | 5.00% | HWA | 0.00% | RTN | 1.55% |
| ART | 0.00% | ILA | 0.00% | RTO | 1.78% |
| ASA | 5.00% | IMP | 0.00% | SAL | 0.00% |
| ASR | 0.00% | INL | 0.00% | SBL | 0.02% |
| AWT | 0.00% | INP | 0.00% | SBO | 1.63% |
| BAU | 2.86% | ITE | 0.00% | SBV | 0.01% |
| BCF | 2.99% | ITR | 0.00% | SER | 0.00% |
| BDM | 0.00% | IVT | 0.00% | SFN | 0.00% |
| BEL | 0.00% | JCD | 1.63% | SHF | 0.00% |
| BIL | 0.00% | JSC | 0.00% | SIM | 0.00% |
| BNT | 1.63% | KIR | 0.00% | SNU | 0.00% |
| BRN | 2.27% | LNF | 0.00% | SOL | 0.00% |
| BRT | 0.47% | MAS | 0.85% | SPA | 5.00% |
| BSR | 0.00% | MFL | 0.87% | SRN | 0.00% |
| CAP | 0.00% | MIM | 0.21% | SVN | 0.68% |
| CRM | 0.13% | MMG | 0.01% | TBX | 4.51% |
| CRW | 1.63% | MMI | 0.13% | TPC | 1.38% |
| CSB | 3.91% | MOB | 0.00% | TRE | 0.00% |
| CUL | 4.36% | MST | 0.00% | TSX | 0.00% |
| DAW | 0.00% | MTA | 0.00% | UCS | 0.00% |
| DCT | 0.01% | MTL | 0.00% | VIL | 5.00% |
| DLV | 0.00% | MUR | 0.00% | VLE | 4.69% |
| DTA | 0.00% | NBS | 3.53% | WBO | 0.51% |
| DTC | 0.00% | NCS | 5.00% | WNH | 2.08% |
| EHS | 0.00% | NCT | 5.00% | WWR | 3.63% |
| EOH | 0.01% | NED | 0.05% | | |
| EXL | 0.00% | NHM | 0.00% | | |

| Optimal Growth Portfolio 05.07.2009 to 03.01.2010 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | DON | 0.00% | NWL | 0.00% |
| ADH | 0.00% | DRD | 3.57% | OCE | 5.00% |
| ADR | 0.00% | DST | 5.00% | OCT | 0.00% |
| AFE | 0.00% | EOH | 0.00% | PAP | 0.00% |
| AFR | 0.00% | FBR | 5.00% | PGR | 0.00% |
| AFX | 0.00% | FPT | 0.00% | PIK | 0.00% |
| AGL | 0.00% | FSR | 0.00% | PMM | 0.00% |
| ALT | 0.00% | GFI | 0.00% | PPC | 0.00% |
| AME | 0.00% | GRF | 0.00% | PPR | 5.00% |
| AMS | 0.00% | GRT | 0.00% | PWK | 0.67% |
| AOX | 0.00% | HAR | 0.00% | RBW | 0.00% |
| APK | 5.00% | HDC | 0.00% | RLO | 0.00% |
| APN | 5.00% | HWN | 0.00% | RMH | 0.00% |
| ASA | 1.35% | HYP | 0.00% | SAB | 0.00% |
| ADH | 0.00% | ILV | 0.00% | SAC | 0.00% |
| AWT | 0.00% | IMP | 0.00% | SBK | 0.00% |
| BAT | 0.00% | INL | 0.00% | SBV | 0.00% |
| BCF | 5.00% | INP | 0.00% | SHP | 5.00% |
| BIL | 0.00% | IPL | 0.00% | SNB | 0.00% |
| BVT | 0.00% | ITE | 0.00% | SOL | 0.00% |
| CAC | 0.27% | JDG | 0.00% | SOV | 0.00% |
| CAT | 0.00% | KGM | 2.40% | SUI | 0.00% |
| CCL | 5.00% | LON | 0.00% | SVN | 1.73% |
| CKS | 0.00% | MDC | 0.00% | SYC | 0.00% |
| CLH | 0.00% | MFL | 0.00% | TFG | 5.00% |
| CLI | 0.00% | MPC | 5.00% | TMT | 0.00% |
| CLS | 5.00% | MTE | 0.00% | TRU | 5.00% |
| CMH | 0.00% | MTN | 0.00% | TRW | 5.00% |
| CPL | 5.00% | MUR | 0.00% | UCS | 0.00% |
| CRG | 0.00% | NBS | 5.00% | WBO | 0.00% |
| CRM | 0.00% | NED | 0.00% | WHL | 0.00% |
| CSB | 5.00% | NPK | 0.00% | ZSA | 0.00% |
| CVI | 0.00% | NPN | 5.00% | | |
| DCT | 0.00% | NTC | 0.00% | | |

| Optimal Value Portfolio 03.01.2010 to 04.07.2010 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ADI | 0.00% | GMB | 0.00% | OCE | 5.00% |
| ADR | 0.00% | GND | 0.00% | OCT | 0.00% |
| AFR | 0.00% | GRF | 0.00% | PMV | 0.00% |
| AMA | 0.01% | HDC | 1.27% | PPR | 1.91% |
| AME | 5.00% | HWA | 0.00% | RLO | 0.00% |
| ANG | 4.43% | HWN | 2.31% | RNG | 1.15% |
| AON | 4.06% | HYP | 1.98% | RTN | 0.20% |
| AOO | 0.00% | ILA | 0.00% | RTO | 0.00% |
| APK | 5.00% | ILV | 4.74% | SAC | 0.58% |
| ASA | 0.00% | INL | 0.00% | SAL | 0.00% |
| ASR | 1.28% | INP | 0.00% | SBL | 2.25% |
| AWT | 0.00% | ITE | 2.04% | SBO | 1.10% |
| BAU | 0.00% | ITR | 0.98% | SBV | 0.00% |
| BCF | 5.00% | IVT | 0.00% | SER | 0.00% |
| BDM | 0.00% | JCD | 1.23% | SFN | 0.00% |
| BEL | 0.00% | JSC | 0.00% | SHF | 0.11% |
| BNT | 0.00% | KGM | 3.89% | SIM | 0.00% |
| BSR | 0.00% | KIR | 0.00% | SNU | 0.00% |
| CAP | 0.00% | LNF | 0.00% | SOL | 0.00% |
| CRW | 1.16% | LON | 0.00% | SOV | 3.07% |
| CSB | 1.87% | MAS | 2.02% | SPA | 0.00% |
| CVI | 2.81% | MFL | 5.00% | SRN | 0.00% |
| DAW | 0.00% | MIM | 0.00% | SVN | 0.00% |
| DCT | 5.00% | MMG | 1.04% | TBX | 0.00% |
| DLV | 0.00% | MMI | 0.00% | TFG | 0.00% |
| DON | 0.00% | MST | 0.00% | TPC | 5.00% |
| DTA | 0.10% | MTE | 0.00% | TSX | 0.00% |
| DTC | 0.00% | MTL | 0.00% | VIL | 0.00% |
| EHS | 0.00% | MUR | 0.00% | VLE | 5.00% |
| EOH | 2.58% | NBS | 5.00% | WBO | 0.00% |
| EXL | 0.00% | NCS | 0.01% | WNH | 0.00% |
| FPT | 0.00% | NCT | 0.01% | WWR | 0.73% |
| GDO | 0.97% | NED | 0.00% | | |
| GIJ | 0.00% | NWL | 3.12% | | |

| Optimal Growth Portfolio 03.01.2010 to 04.07.2010 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | CSB | 0.89% | NPN | 1.15% |
| ADH | 5.00% | CUL | 1.03% | NTC | 1.13% |
| ADR | 0.00% | CVI | 0.87% | NWL | 0.85% |
| AFE | 0.00% | DAW | 0.59% | OCE | 5.00% |
| AFX | 0.00% | DRD | 0.94% | OCT | 0.73% |
| AGL | 0.06% | DST | 0.89% | OMN | 0.52% |
| ALT | 1.02% | DTC | 0.87% | PAM | 0.85% |
| AME | 0.94% | EHS | 0.65% | PAP | 0.92% |
| AMS | 0.91% | EOH | 0.98% | PGR | 0.85% |
| AOX | 0.53% | FBR | 1.02% | PIK | 0.89% |
| APK | 0.97% | FPT | 0.78% | PMM | 0.81% |
| APN | 4.98% | FSR | 0.65% | PPC | 0.75% |
| ART | 0.85% | GFI | 0.92% | PWK | 0.79% |
| ASA | 0.80% | GMB | 0.70% | RBW | 0.90% |
| ADH | 5.00% | GRT | 0.69% | RLO | 0.56% |
| AWT | 0.57% | HAR | 0.73% | RMH | 0.66% |
| BAT | 0.95% | ILV | 1.03% | SAB | 0.89% |
| BCF | 1.14% | IMP | 0.88% | SBK | 0.76% |
| BDM | 0.29% | INL | 0.49% | SHP | 0.95% |
| BIL | 0.58% | INP | 0.47% | SNB | 0.81% |
| BRN | 1.15% | IPL | 1.00% | SOL | 0.50% |
| BRT | 5.00% | ITE | 1.04% | SPA | 0.83% |
| BVT | 0.73% | JDG | 0.95% | SUI | 0.75% |
| CAC | 4.97% | KGM | 0.84% | SYC | 0.81% |
| CAT | 0.96% | MDC | 1.02% | TFG | 0.87% |
| CCL | 0.90% | MFL | 1.10% | TMT | 0.65% |
| CKS | 0.89% | MOB | 0.74% | TRE | 0.95% |
| CLH | 0.72% | MPC | 0.91% | TRU | 0.84% |
| CLI | 0.93% | MTA | 0.68% | TRW | 0.83% |
| CLS | 1.12% | MTE | 0.74% | UCS | 0.75% |
| CMH | 1.12% | MTN | 0.55% | WHL | 0.85% |
| CPL | 0.98% | NED | 0.85% | ZSA | 0.78% |
| CRG | 0.92% | NHM | 0.71% | | |
| CRM | 1.14% | NPK | 0.89% | | |

| Optimal Value Portfolio 04.07.2010 to 26.12.2010 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ADI | 0.00% | GDO | 1.18% | OCE | 1.01% |
| AFR | 0.00% | GIJ | 0.34% | OCT | 1.18% |
| ALT | 0.15% | GND | 0.00% | PAP | 1.65% |
| AME | 2.84% | GRF | 0.00% | PGR | 1.84% |
| ANG | 1.05% | GRT | 0.95% | PMV | 0.00% |
| AON | 2.37% | HAR | 0.54% | PPC | 0.00% |
| AOO | 0.68% | HDC | 2.03% | PPR | 1.40% |
| APK | 0.00% | HWN | 3.03% | RLO | 1.28% |
| ASA | 0.64% | INL | 0.00% | RNG | 2.59% |
| ATN | 0.58% | INP | 0.00% | RTN | 1.10% |
| AWT | 0.12% | IPL | 1.83% | RTO | 0.13% |
| BAU | 0.00% | ITE | 0.97% | SAC | 1.13% |
| BCF | 2.27% | ITR | 1.39% | SAL | 0.00% |
| BDM | 0.00% | IVT | 2.42% | SBL | 0.00% |
| BEL | 0.00% | JCD | 1.03% | SBO | 1.03% |
| BNT | 0.00% | JSC | 0.00% | SBV | 0.46% |
| BRN | 3.96% | KGM | 2.32% | SER | 1.78% |
| BRT | 4.42% | KIR | 0.00% | SFN | 1.35% |
| BSR | 0.00% | LNF | 0.98% | SHF | 1.16% |
| CAC | 1.03% | LON | 0.00% | SIM | 0.00% |
| CAP | 0.12% | MAS | 2.19% | SRN | 0.74% |
| CPL | 1.24% | MFL | 1.16% | SVN | 0.53% |
| CRG | 1.95% | MIM | 1.29% | TBX | 0.00% |
| CRW | 1.03% | MMG | 0.00% | TFG | 0.65% |
| CSB | 0.36% | MMI | 1.34% | TMT | 1.54% |
| CVI | 0.88% | MST | 2.60% | TPC | 2.15% |
| DCT | 0.53% | MTE | 0.00% | VIL | 0.41% |
| DLV | 2.16% | MTL | 0.00% | VLE | 1.95% |
| DON | 0.00% | MUR | 0.00% | WBO | 0.00% |
| DRD | 0.00% | NBS | 2.00% | WNH | 2.02% |
| DTA | 2.02% | NCS | 0.49% | WWR | 1.13% |
| EOH | 2.74% | NCT | 0.49% | ZSA | 1.33% |
| EXL | 0.00% | NED | 1.34% | | |
| FPT | 0.89% | NWL | 2.53% | | |

| Optimal Growth Portfolio 04.07.2010 to 26.12.2010 | | | | | |
|---|---|---|---|---|---|
| Share Code | Weight | Share Code | Weight | Share Code | Weight |
| ABL | 0.00% | DAW | 0.89% | NTC | 1.15% |
| ADH | 5.00% | DCT | 1.03% | NWL | 1.13% |
| ADR | 0.00% | DST | 0.87% | OCE | 0.85% |
| AFE | 0.00% | DTC | 0.59% | OCT | 5.00% |
| AFR | 0.00% | EHS | 0.94% | OMN | 0.73% |
| AFX | 0.06% | EOH | 0.89% | PAM | 0.52% |
| AGL | 1.02% | FBR | 0.87% | PIK | 0.85% |
| ALT | 0.94% | FPT | 0.65% | PMM | 0.92% |
| AMA | 0.91% | FSR | 0.98% | PPC | 0.85% |
| AME | 0.53% | GFI | 1.02% | PWK | 0.89% |
| AMS | 0.97% | GMB | 0.78% | RBW | 0.81% |
| AON | 4.98% | GRT | 0.65% | RLO | 0.75% |
| AOX | 0.85% | HDC | 0.92% | RMH | 0.79% |
| APK | 0.80% | HWA | 0.70% | RNG | 0.90% |
| ADH | 5.00% | HYP | 0.69% | SAB | 0.56% |
| ART | 0.57% | ILA | 0.73% | SAC | 0.66% |
| ASA | 0.95% | ILV | 1.03% | SBK | 0.89% |
| ASR | 1.14% | IMP | 0.88% | SHP | 0.76% |
| ATN | 0.29% | INL | 0.49% | SNB | 0.95% |
| BAT | 0.58% | INP | 0.47% | SNU | 0.81% |
| BIL | 1.15% | IPL | 1.00% | SOL | 0.50% |
| BVT | 5.00% | ITE | 1.04% | SOV | 0.83% |
| CAT | 0.73% | JDG | 0.95% | SPA | 0.75% |
| CCL | 4.97% | KGM | 0.84% | SUI | 0.81% |
| CKS | 0.96% | MDC | 1.02% | SYC | 0.87% |
| CLH | 0.90% | MFL | 1.10% | TFG | 0.65% |
| CLI | 0.89% | MOB | 0.74% | TRE | 0.95% |
| CLS | 0.72% | MPC | 0.91% | TRU | 0.84% |
| CMH | 0.93% | MTA | 0.68% | TRW | 0.83% |
| CPL | 1.12% | MTN | 0.74% | TSX | 0.75% |
| CRM | 1.12% | NED | 0.55% | UCS | 0.85% |
| CSB | 0.98% | NHM | 0.85% | WHL | 0.78% |
| CUL | 0.92% | NPK | 0.71% | | |
| CVI | 1.14% | NPN | 0.89% | | |