

Can the small investor beat the market by 'Dow investing'?

1. Introduction

It is possible for the small investor to 'beat the market', ... which 80% of professional portfolio managers seem incapable of doing. The most amazing thing is that this can be done in only 15 minutes a year" (Bauer and Gardner, 1999:5). This statement sounds too good to be true, but even if only some of it is true, this merits further investigation, because it seems to provide an excellent return on time invested in managing a portfolio.

The investment community has always been interested in ways in which a portfolio manager can achieve satisfactory returns on a portfolio. Some of the existing research has focused on ways in which small investors can achieve a higher than average return on their portfolios, given that small investors do not have access to as large a volume of research as large investment institutions do. It must, however, also be acknowledged that small investors also avoid the high research and portfolio management costs associated with such research.

This study investigates the results of portfolios set up in accordance with a number of strategies which all require only a small number of shares. A comparison is done of strategies based on dividend yield on the one hand and on earnings yield on the other. A small number of shares are also selected from among numbers of large companies (20, 30, 40 or 50). A comparison is made with the returns achieved on the Industrial Index (INDI) and those achieved on the All Shares Index (ALSI) over the same period, before as well as after an adjustment for risk has been made.

2. Literature review

Over the medium to long term, investments in shares tend to perform better than investments in other financial assets, such as government bonds, corporate bonds or treasury bills (Brealey and Myers, 2000:154). Although shares are more risky, on average, they do seem to perform better than investments in other assets such as real estate or endowment policies. An interesting example is that if an investor had invested an equal monthly amount in the shares of a certain large listed South African insurer since its initial public offering, instead of investing in an endowment policy with this insurer, his/her return would have been significantly higher (Milne, 1999: 11).

In nearly efficient markets it can be extremely difficult consistently to beat the market, that is, to perform well enough to overcome transaction costs and the (often high) costs of research (Bodie, Kane and Marcus, 1993:803). It is often true that even the most professionally managed equity funds underperform the market index on both straight return and risk-adjusted measures.

The astute small investor may have considerable advantages over professional portfolio managers at investment institutions (Koch, 1997:27). These include greater liquidity, the possibility of infrequent investment, a long time horizon, avoidance of high research costs, and not having to report to outside shareholders. Some researchers have also found inefficiencies on the Johannesburg Stock Exchange (JSE) which could have enabled shrewd investors to achieve higher than average returns.

De Wit and Van Eyden (1991:87) found evidence that technical analysis could be used to improve a portfolio's return. Bhana (1993:31) proved that knowledge of an increase in the general money supply could have led to higher than average performance. Page and Way (1992/1993:43) found clear evidence of investor over-reaction on the JSE in response to current "dramatic" news during the 1974 to 1989 period. Consequently the market provided arbitrage opportunities from long-run efficiencies, and, on average, over the three years after portfolio formation, a portfolio of prior "losers" could have outperformed a portfolio of prior "winners" by about 15% per annum between 1974 and 1989. Ferri and Min (1996), De Bondt and Thaler (1987) and Muller (1999) also found evidence of over-reaction and subsequent profitable opportunities in stock markets locally and abroad.

Klerck and Maritz (1997:25) demonstrated that a small investor who used Graham's criteria for "value investing" could achieve returns higher than those of the industrial index. Graham's criteria are based on shares which are worth significantly more than they cost and his advice is aimed at individual investors who do not have the time, expertise or temperament for aggressive investment.

The price/earnings (P/E) ratio has been described as the manner in which investors "collectively capitalise profits", and the P/E ratio therefore represents a market consensus of the value of the earnings of a firm (Ward and Stathoulis, 1993:37). The P/E ratio is used by investment analysts for share evaluation (De Villiers, 1995:27) and encapsulates many things, including what the market thinks about a firm's level of earnings per share (EPS), the quality of its EPS and its future prospects (Firer, 1993:47). The P/E ratio is often referred in its inverted form, the earnings yield, and a model

based on this ratio has been used as a market timing indicator (Ward and Stathoulis, 1993:42). Market timing could, correctly used, add value to portfolios (Firer, Sandler and Ward, 1992:7).

Paying dividends is the most common way in which firms distribute cash to their shareholders (Lease, Kalay, Loewenstein and Sarig, 1999:19). The price of a share is nothing more than the discounted value of its expected future dividends. The well-known Gordon growth model for share evaluation captures this dependence by relating share price to future dividends (Brealey and Myers, 2000:67). This model can also be used to relate return on owners' equity to prospective dividend yield, and signifies the importance of dividend yield.

A trading system is a set of procedures and techniques to support profitable trading (Joubert and Mason, 1993:52). The trading system for any small investor should be designed to match the needs, skills, ability and personality of the investor, and should give sell signals as well as buy signals.

If the "market" is the benchmark against which performance is measured, and the market is the average performance of large companies which represent about 80% of market capitalisation on the stock exchange, and if the best performers in any specific year can be identified, it should be possible to beat the market. This article compares a number of portfolio management strategies which are based on the assumption that the market overreacts to some extent. These strategies aim to identify the best performers in the following year, based either on the dividend yield or on the earnings yield of large companies, and to give definite buy and sell signals. These strategies could all be called value strategies, defined by Fraser and Page (2000:25) as strategies where shares which are perceived to be undervalued are purchased in order to realise superior returns. All these strategies require shares of large companies only to be included in the portfolio. The Dow Jones Industrial Average (DJIA) is based on 30 large companies only, but these companies are also the best analysed companies in America (Bauer and Gardner, 1999).

3. Various Dow investing strategies

The principles underlying "Dow Investing" strategies have recently been explained in *Smart Investor* (1999: 52) and by Carr (2000:50). Individual strategies have been briefly described by Coleman (1998) and in more detail by The Motley Fool (1999a). The general strategy involves the choice of large companies on the basis of their historic dividend yield. As the name indicates, "Dow Investing" focuses on the 30 companies included in the DJIA. Most of these companies are large multinational conglomerates and represent the cream of American business (Bauer and Gardner, 1999:30). The portfolio is reviewed and updated only once a year, deliberately ignoring events between updates. Dividends received during any given year are only invested at the next portfolio revision. No capital gains tax is paid and transaction costs are low due to the use of discount brokers.

O'Higgins and Downes (1992:188) proposed the High Yield 10 (HY10), the Beat the Dow 5 (BTD5) and the Penultimate Profit Prospect (PPP) strategies. Knowles and Petty (1995:11) prefer the High Yield 5 (HY5) strategy, while Gardner and Gardner (1996) found that the Old Foolish Four (OFF) produced better results. Bauer and Gardner (1999:23) introduced the Foolish Four (F4.1) and the Reverse Procedure 4 (RP4) strategies. The other strategies listed below are based on similar principles. A concise description of all 12 strategies is provided by Coleman (1998). The different portfolio strategies are set out in Table 1.

Table 1: A short description of portfolio strategies, each consisting of some of the 30 shares included in the Dow Jones Industrial Average (DJIA).

Portfolio strategy	A short description
High Yield 10 (HY10)	The first 10 shares when ranked by yield. Also known as the Dogs of the Dow.

High Yield 5 (HY5)	The first five shares when ranked by yield.
Beating the Dow 5 (BTD5)	The first five when the High Yield 10 are ranked by price.
Penultimate Profit Prospect (PPP)	The second share of the Beat the Dow 5 (BTD5).
Old Foolish Four (OFF)	Shares 2,3,4 and 5 of the BTD5. Take double number 2.
Foolish Four (F4)	Drop share number one of the BTD5 only if it has both the highest yield and the lowest price. Take the first four shares of the remaining list.
Foolish Two (UV2)	Take shares one and two on the list of the Foolish Four.
Foolish Four plus (F4+)	Combine the Foolish Four and the Foolish Two. Also known as the 1,1,2,2,3,4 strategy, with the Foolish Four as base.
RP4	Take shares 2,3,4,5 on the list ranked by RP-ratio.
RP2	Take shares 2 and 3 on the list ranked by RP-ratio.
RP4 Plus (RP4+)	Combine the RP4 and the RP2. Also known as the 2,2,3,3,4,5 strategy, on the list ranked by RP-ratio.
RP5	Take shares 2 to 6 on the list ranked by RP-ratio.

O'Higgins and Downes (1992:180) also suggested starting with a minimum investment of \$5000 when buying five shares, in order to keep the annual transaction cost at 3% or less. With an investment amount below \$5000, the commissions and security taxes could be so high percentage-wise as to affect the return on the portfolio negatively. Dealing only through discount brokers is advised where quotes are given and orders executed, but no investment advice is offered. Bauer and Gardner (1999:34) suggest that no adjustment to a portfolio should be made if the transaction cost of the adjustment is more than 2%.

The High Yield 10 (HY10) strategy is also known as the "Dogs of the Dow" strategy. The idea is to sort the 30 companies of the DJIA by dividend yield and buy only the 10 highest yielding shares (O'Higgins and Downes, 1992:188). Knowles and Petty (1995:26) call this the Top Ten strategy and note that not only did the strategy return a superior return (16,7% per annum) versus the DJIA (14,7%) between 1973 and 1990, but this strategy also had a lower risk than the DJIA, as measured by its standard deviation.

The High Yield 5 strategy, also known as the HY5 – Bauer and Gardner (1999:24) call this the Flying Five – prescribes buying only the five highest yielding shares of the HY10. From 1973 to 1990, this strategy gave an average of 17,8% per year.

Beating the Dow 5 (BTD5) of O'Higgins and Downes (1992:188) entails ranking the 10 shares of the HY10 strategy by price and buying only the five cheapest. The rationale for this is that the cheapest shares could have the best upside potential. The reason to sort by price is explained by Bauer and Gardner (1999:20) as the tendency of lower priced shares to experience greater price volatility. Since the assumption is made that ten good candidates for appreciation have been identified (the HY10), an attempt is made to court future volatility because of its upside potential. The Penultimate Profit Prospect (PPP) is not, strictly speaking, a portfolio, but rather a single share, the second lowest priced share of the BTD5. Between 1973 and 1991, the average return on the DJIA (14,4%) was lower than that of the HY10 (16,6%), the BTD5 (19,4%) and the PPP (24,4%) (O'Higgins and Downes, 1992:194).

The "Foolish Four"-strategies were first proposed by Gardner and Gardner (1996), elaborated on by Bauer and Gardner (1999:viii), and its development is fully described by The Motley Fool (2000). In this context, "Foolish" is used as a complimentary adjective. In Elizabethan drama, the fool is usually the one who can tell the king the truth without (literally) losing his head. The logic behind this approach is to zero in on those companies in the Dow whose shares are among the most beaten-down, pointing out which of those shares an investor should buy and hold for a specific period of time (Bauer and Gardner, 1999:6).

The Old Foolish Four (OFF) was an improvement suggested for the BTD5: the strategy means dropping the lowest priced BTD5 share and doubling the investment in the next lowest priced share (Gardner and Gardner, 1996). The rationale for leaving out the first share is that, sometimes, being the first is not a good thing and that, if the lowest priced share also has the highest yield, one is often dealing with a company with financial problems that are not short-term. The OFF is also known as the Foolish 4.0 (F4.0) or the "2,2,3,4,5" strategy, and the BTD5 is its base.

The Foolish Four (F4, also known as Foolish 4.1 or F4.1) strategy was proposed by Bauer and Gardner (1999) and entails starting with the BTD5 and dropping the lowest priced share only if it is also provides the highest historic yield. The investor buys shares 1,2,3,4 or 2,3,4,5, depending on whether the number one share is dropped. This change eliminates the double weighting in the second-lowest priced share, which reduces the risk of the portfolio. The Foolish Two strategy also is known as the Unemotional Value (or UV2) strategy. It involves buying only the two lowest priced Foolish Four shares. This could be called a "1,1,2,2" or a "2,2,3,3" strategy, taking the BTD5 as base and depending on whether the number one share is dropped or not.

The Foolish Four Plus (F4+) strategy combines the F4 and the UV2 strategies by doubling the amounts invested in the two lowest priced Foolish Four shares. This strategy could be called a "1,1,2,2,3,4" or a "2,2,3,3,4,5" strategy, taking the BTD5 as base and depending on whether the number one share is dropped or not.

The "Reverse Procedure" or RP strategies do away with the somewhat cumbersome "sort by yield – sort by price" procedure of the BTD5 and related strategies, and does not necessarily include only the 10 shares of the DJIA with the highest yield. This strategy entails dividing the yield of a share by the square root of its price, and ranking the 30 shares according to this ratio. The rationale for this ratio is that beta, a measure of volatility relative to the market, is related to the price of a share, but more strongly to the square root of the price (Bauer and Gardner, 1999). By dividing dividend yield by the square root of the price, the RP ratio thus enables an investor to identify low priced shares with high yields that have the most upside potential. Ranking DJIA shares in terms of this measure gives the "best buys" at

the top of the list. All RP strategies ignore the number one share.

For the Reverse Procedure 2 (RP2) strategy, the shares with the second and third highest RP ratio are bought. This strategy has outperformed all others over the last 25 years (see Table 2). For the Reverse Procedure 4 (RP4) strategy, shares ranked 2,3,4 and 5 by the RP ratio are bought. The Reverse Procedure 4 Plus (RP4+) combines the RP2 and the RP4 strategies by doubling the amounts invested in the second and third ranked shares. The result is the same as a "2,2,3,3,4,5" - strategy with the RP ranking as its base. The Reverse Procedure 5 (RP5) strategy could be called the "2,3,4,5,6" strategy, and entails buying the shares ranked second to sixth on the RP ranking.

Data provided by The Motley Fool (1999b) was used to calculate the compound annual growth rate (CAGR), the average return, the standard deviation and Sharpe's ratio for twelve different portfolio strategies for the 25 years up to 1998 (Table 2).

Table 2: A comparison of the performance and risk-adjusted performance of different portfolio strategies on the NYSE for the 25 years up to 1998

Portfolio strategy	CAGR	Average	SD	Sharpe
Dow Jones Industrial Average	16,68%	17,60%	14,34%	0,748
Standard & Poor's 500 Index	17,25	18,03	13,32	0,838
Dogs of the Dow (High Yield 10)	18,02	18,91	15,10	0,797
High Yield 5 (HY5)	19,26	20,64	19,05	0,723
Beating the Dow 5 (BTD5)	19,36	20,85	19,43	0,720
Penultimate Profit Prospect (PPP)	27,86	31,87	45,54	0,549
Old Foolish Four (OFF)	22,36	24,81	25,83	0,695
Foolish Four (F4)	20,55	22,47	22,54	0,692
Foolish Four plus (F4+)	22,83	24,06	23,28	0,738
Foolish Two (UV2)	23,67	26,40	28,36	0,689
Reverse Procedure 4 (RP4)	24,54	25,97	18,79	1,016
Reverse Procedure 4 Plus (RP4+)	22,17	23,37	16,99	0,971
Reverse Procedure 2 (RP2)	27,52	29,64	23,53	0,968
Reverse Procedure 5 (RP5)	21,98	23,21	17,66	0,925

As is clear from Table 2, all the proposed strategies have outperformed the DJIA and the S&P500 index, but only the last four strategies seem to have performed better based on Sharpe's risk-adjusted measure. Furthermore, although the RP2 had a better compound average return (27,52%) than the RP4 (24,54%), the latter had a higher Sharpe ratio (1,016) than the former (0,968). From Table 2, it is also clear that several strategies could have been followed to beat the DJIA.

4. Research questions

All the strategies described above take dividend yield into account when ranking shares to determine those most likely to perform best over a 12-month period. Can the earnings yield not also be used for the same purpose? Arguments that support the use of the earnings yield maintain that, although the size of the dividend is determined by the board of directors of a company, a company generally aims to achieve earnings as high as possible (within bounds) in creating wealth for the shareholders. That is why the earnings yield (reciprocal of the price/earnings ratio) could perhaps be seen as a more objective measure of a company's performance.

A number of questions arise from the literature survey, including the following:

- Is it possible for an individual investor to achieve a higher return than that of the market if any of the strategies mentioned above is followed for the JSE over a number of years?
- Would any of the proposed strategies lead to significantly higher average returns than other strategies?
- The proposed strategies are based on the use of the dividend yield to select shares for any year. Would similar selections based on the earnings yield not perhaps lead to higher returns?
- The Dow Jones Industrial Average is based on the shares of only 30 large industrial companies from which a few shares are chosen for any of these strategies. Would a choice from among 20, 30, 40 or 50 large South African industrial companies yield significantly different results?

These questions were tested using JSE data for the period 1985 to 1998.

Several assumptions were made in this study to facilitate initial calculations and comparisons among strategies and with the market.

- No broker commissions and no tax on transactions were taken into account.
- Buying odd lots is possible. This was definitely not true for the small investor during the period covered, but the limitations of this restriction would decrease with an increase in the size of the portfolio.
- No tax is levied on capital gains. Although the typical strategy only requires about eight transactions per year, shares are usually only kept for one year before they are sold. This could, however, raise questions from the receiver of revenue on the taxing of possible capital gains.
- In this study the Industrial Index (INDI) was used as a benchmark for comparison purposes. Although the All Shares Index (ALSI) is more representative of the general market, the INDI beat the ALSI decisively over the period, as is indicated in the next section. Any portfolio beating the ALSI, but not the INDI, would thus possibly have been underperforming a unit trust investing in industrial shares only.

5. Methodology

For the Johannesburg Stock Exchange (JSE), there is no exact replica of the DJIA. In other words, there is no index which consists of (for example) only 30 companies which mirror the movement of the general market. The Industrial Index was chosen as the closest approximation of the DJIA on the JSE. A sample of "large and representative" companies then had to be chosen in order to determine whether strategies for "Dow investing" would have enabled investors to obtain a higher return than the Industrial Index over a period of time..

The top 50 companies, ranked by assets and listed on both December 1985 and December 1998, as identified by the Bureau of Financial Analysis (BFA), University of Pretoria (*Financial Mail*, 1986; 1999), were used in this study. In 1985 these 50 companies accounted for 71,0% of the total value of assets of the top 100 companies, while 42 of the 50 companies gave a comparable figure of 69,3% for 1998 (the other 8 were amongst the top 200).

For these 50 companies, information pertaining to price, earnings yield and dividend yield was obtained from the BFA for 31 December for each year from 1985 to 1998. Because the prices of the BFA are adjusted for share splits, the actual prices at which investors could invest at the time were obtained from the *Financial Mail* for each year end. The effects of share splits were incorporated when the return on each share for each year was calculated. The reason for working with real prices is mainly that rankings for the RP strategies are based on yield divided by square root of price, which would have been affected if the real prices had not been used.

6. Results

The return on an investment in each of the 50 companies for each of the 13 years was calculated in a spreadsheet which also allowed the companies to be ranked on dividend yield (DY), earnings yield (EY), the reverse procedure (RP) based on DY, and the RP based on EY. For the BTD5 and related strategies, for example, this made provision for ranking the 50 shares by dividend yield, and then ranking the top 10 shares by price, to determine which five shares would have been included in the portfolio. This then allowed the calculation of the yield on the strategy for that year, and a different combination of ranked shares each constituted of the 12 portfolios set up for that year. This process was done for decisions based on the DY and the EY of the shares of the 50 largest companies, and then repeated for the 40, the 30 and the 20 largest companies as ranked by assets in December 1985. The averages per strategy, per method and per group of companies are set out in Table 3.

Over the same period of 13 years, the Industrial Index (INDI) gave an average annual return of 16,1%, while the All Share Index (ALSI) gave an average annual return of 13,2%. An investment of R1 000 would have accumulated to R3 880 over the period if it had been invested in the ALSI, and to R5 869 if invested in the INDI. If the 30 largest companies were chosen and the earnings yield (EY) as method, the HY5 strategy would have resulted in a terminal wealth of R55 834, the PPP strategy R99 269, and the RP2 strategy R86 612 respectively. The logarithms of these values are given in Figure 1.

An analysis of variance (ANOVA) was performed to determine whether the method, the number of companies chosen, or the strategies contributed significantly to any differences in return. The results are summarised in Table 4.

From Table 3 it is also clear that the average return for some strategies (for instance PPP, RP2 and UV2) was more than the average return of others (for instance HY10, RP4 and RP5). These differences were, however, not found to be significant (see Table 4). The number of companies chosen did make a difference, but this was only just significant ($p=0,049$). The most surprising result shown in Tables 3 and 4 is that the method on which strategies were based did have a significant impact ($p=0,040$). The average returns for strategies based on the earnings yield and the dividend yield methods were 33,0 percent and 28,1 percent respectively.

Table 3 : Average annual percentage returns for 12 strategies based on four target populations for dividend yield (DY) and earnings yield (EY) on the JSE, for the period from 1985 to 1998

	50 shares	40 shares	30 shares	20 shares	Ave
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Strategy	DY	EY	DY	EY	DY	EY	DY	EY	
HY10	23,3%	33,5%	25,9%	29,7%	26,1%	30,0%	21,6%	22,9%	26,6%
HY5	29,6	33,5	32,7	37,3	29,0	39,1	22,5	30,4	31,8
BTD5	27,8	29,1	30,8	36,2	31,7	35,1	27,0	26,0	30,5
PPP	28,3	43,2	27,3	22,8	38,1	54,8	32,8	35,5	35,4
OFF	21,9	29,2	24,6	34,7	31,2	36,0	27,4	27,6	29,1
F4	35,9	31,5	24,2	38,1	31,9	36,1	24,1	24,8	30,8
F4+	35,5	33,9	26,0	35,3	30,6	38,1	24,0	26,7	31,3
UV2	34,6	39,4	29,4	29,7	28,0	42,1	23,8	29,1	32,0
RP4	28,9	28,4	26,2	30,8	30,0	38,0	23,0	25,4	28,8
RP4+	28,2	29,9	24,7	30,9	33,5	41,0	24,8	26,7	30,0
RP2	26,8	32,7	21,9	31,3	40,5	47,0	29,2	29,2	32,3
RP5	27,5	31,7	23,8	32,7	30,0	34,5	23,5	22,5	28,3
Average	29,0	33,0	26,5	32,4	31,7	39,3	25,3	27,2	
Ave/pop	31,0		29,5		35,5		26,3		

Table 4: The source of possible variance, degrees of freedom, F-value and p-value derived from an ANOVA to determine the impact on return

Source	Degrees of freedom	F-value	p-value
Method (DY or EY)	1	4,22	0,040
Population size	3	2,63	0,049
Strategy	11	0,31	0,985
Error	1232		
Corrected total	1247		

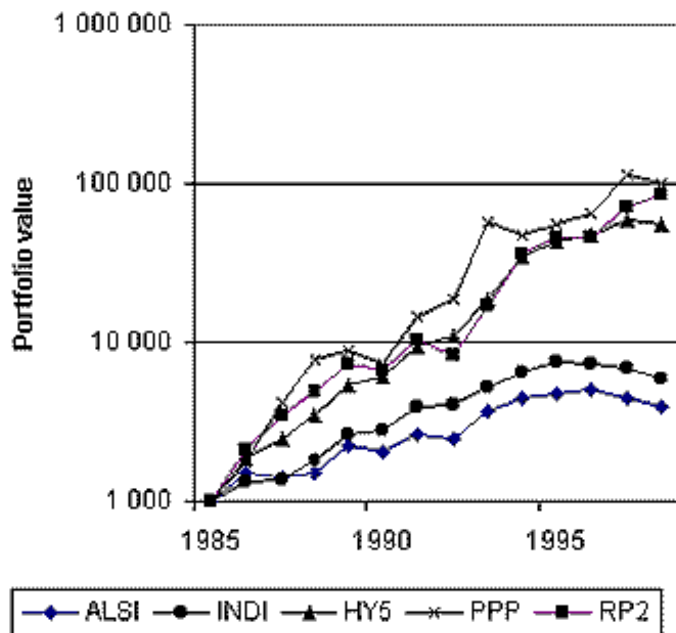


Figure 1: the performance of three strategies and two indices

Based on data provided by the Reserve Bank (*Quarterly Bulletin*, 1987-1999), the average yield on Eskom bonds for the period 1985-1998 was 15,3%. The average return, standard deviation, and Sharpe's measure of risk-adjusted return of the different strategies, based on the dividend yield and the earnings yield of the 30 largest companies, are set out in Table 5.

From Table 5 it seems that strategies based on earnings yield outperformed those based on dividend yield when performance is adjusted for risk. Both sets of strategies also performed better than the market.

6. Discussion

The most important conclusion which can be drawn from this study is that strategies based on earnings yield significantly outperformed those based on dividend yield. One possible reason for this is that dividends are often used in managing the relationship between a company and its shareholders, but, on average, companies try to achieve high earnings within the restrictions of the market. Although differences were observed between the average returns of strategies, none of these were significant. All strategies outperformed the market, before and after an adjustment for risk was made.

A group of 30 large companies provided higher returns than groups of 20, 40 or 50 companies. Strategies based on a selection of 30 companies thus seem to offer the best return for investors on the JSE. If the earnings yield method is used with 30 shares, conservative investors may wish to follow the HY5 strategy (average return = 39,1%) with the highest risk-adjusted return (0,804), while adventurous investors may choose the PPP (highest return at 54,8%) or the RP2 (second highest return at 47,0%). Various strategies that lie between these extremes may be followed by other investors.

Table 5 : The average percentage returns and standard deviations of portfolio strategies based on the earnings yield of 30 large companies on the JSE for the period from 1985 to 1998

Benchmark	Average	SD	Sharpe
ALSI	13,2%	18,9%	-0,111
INDI	16,1	23,8	0,034

Strategies	Dividend yield (DY)			Earnings yield (EY)		
	Average	SD	Sharpe	Average	SD	Sharpe
HY10	26,1%	34,2%	0,316	30,0%	31,6%	0,465
HY5	29,0	39,4	0,348	39,1	29,6	0,804
BTD5	31,7	36,2	0,453	35,1	33,5	0,591
PPP	38,1	53,5	0,426	54,8	67,9	0,582
OFF	31,2	38,2	0,416	36,0	31,4	0,659
F4	31,9	35,1	0,473	36,1	32,1	0,648
F4+	30,6	35,6	0,430	38,1	37,4	0,610
UV2	28,0	42,0	0,302	42,1	50,7	0,529
RP4	30,0	34,1	0,431	38,0	31,9	0,712
RP4+	33,5	38,3	0,475	41,0	34,7	0,741
RP2	40,5	50,1	0,503	47,0	43,5	0,729
RP5	30,0	32,5	0,452	34,5	28,7	0,669
Average	31,7		0,419	39,3		0,645

This study has a number of limitations. The assumption that broker commissions can be ignored is perhaps the most important of these. Taking the fixed cost of performing a single transaction into account, the cost of buying 10 different shares (for the HY10 strategy) would represent more of the value of the portfolio than the comparable cost of buying only two different shares (for the UV2 or the RP2 strategies). For high-value portfolios, the effect of these cost differences may be negligible, but for small investors the effect may be important.

Naturally, the structure of transaction costs changed over the 13 years covered in this study, and the cost of any single transaction would depend on its value. If the costs were 3% on average when buying and 2% when selling, this would mean that a low-value portfolio would have had to have increased roughly 5% in value just to cover transaction costs.

The introduction of Secondary Tax on Companies (STC) during the period under consideration may have had a damping effect on dividends. This may be one of the reasons why better results were obtained using the earnings yield.

The benchmark for performance was the Industrial Index (INDI), but the dividend yield of the index was ignored. It can be argued that, if dividends are taken into account for the performance of the strategies, the same must be done for the index, adding perhaps an average of 2,5% to the average return on the index. In spite of the limitations outlined above, this study may assist small investors in choosing between some of the investment strategy options available to them.

7. Areas for further research

A number of topics emerge for further research. Firstly, the dividend yield is calculated as dividend/price. The reverse procedure (RP) is

calculated as dividend yield/(square root of price) = dividend/(price to the power 1,5). A range of other powers of price (say from 0,5 to 2) could be investigated.

Secondly, good results have been obtained by using large companies. Would the same strategies give superior performances if they were applied to medium-sized companies?

Thirdly, a portfolio revision only once a year, specifically in December, has been proposed. Would an annual revision at a different time of the year, or a revision every 6, 18 or 24 months lead to different results?

Fourthly, no allowance for capital gains tax has been made. Would this tax, if it had been in force at the time, have led to significantly different relative results in comparison to a "buy and hold" strategy for a portfolio mirroring the Industrial Index?

This study explored the performance of some strategies based on the BTD5 and RP methods of portfolio selection. Would other similar strategies, for instance RP3 or RP6, not perhaps perform better?

The shares that make up the ALSI40, FINDI30 or INDI25 could have been taken and the principles used to form these indices backtracked to form the portfolios.

Finally, most of the years considered were in a bull market, with only the last few years in a bear market. Do some strategies perform better during bull markets while others perform better during bear markets? Can an optimal balance, or "portfolio" of strategies, be determined for overall performance if the nature of the market during the following year is uncertain?

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