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This issue in brief

Estimating the market risk premium on The Johannesburg Stock Exchange using ex post and ex ante models

This paper by Favish and Affleck-Graves examines the possibilities of developing quarterly risk premia forecasts through the use of logical statistical and mathematical procedures. However, it is also concerned with an evaluation of such forecasts in terms of their practical relevance to financial managers. Two main approaches to the calculation of risk premia can be identified: those based on "ex post" returns, and those based on "ex ante" estimated returns. The development by Sharpe of the CAPM had a major impact on the popularising of forward looking approaches to the matter and it is largely with the CAPM that the article deals. In discussing the results of research specifically concerned with South Africa, it provides much that is useful to managers in a local context.

Market timing and the JSE

The timing of investment or disinvestment action can be critical to portfolio management. But is it possible to identify major changes in share or stock price time series in an efficient market? This is an old question which has long been the centre of dispute. To it needs to be added an additional question concerning the identification of turning points even in a market where efficiency is sub-optimal or below average. Both these questions are considered in this article by Professor Colin Firer, Mike Ward and Frank Teeuwisse. Their conclusions will be of interest to academics and professionals alike.

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Anatomy of the financial rand

Controversy continues to surround the financial rand. The De Kock Commission recommended that it be abolished, and for a short while, between 1983 and 1985, it was. But the heavy capital outflows from South Africa prior to August of the latter year and the threat that this outflow would increase as a result of action taken by foreign banks to call in their maturing short-term credits, compelled the authorities to reintroduce the financial rand system. Has its reapplication been to SA's advantage? What are the possibilities of it finally being scrapped? How would its removal affect the flow of new capital to or from SA? These are some of the questions dealt with by Professor Hamblin in this useful analysis of SA's unique financial currency.

Investment basics XXI – Options trading in the gilt-market

Part 1 – A background to the market

This article by David Bullard is the first in a new Investment Basics series on options trading in the gilt-market. It sets the scene and will be followed by two further articles which will deal with the technicalities and arithmetic of such trading in the May and November 1988 issues of the Journal.

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The Investment Analysts Journal

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Last month's dramatic collapse of world stock markets has all the flavour of the crash that occurred fifty-nine years ago on Wall Street. Then, the stock market decline led to a general economic contraction and the concern now is that something similar could happen with grave consequences for South Africa. It is also worth recalling that the October 1929 stock market crash was not followed immediately by the Great Depression. It was necessary to wait for nearly a year for the banking crisis which really marked the depression's beginning. Indeed, as Milton Friedman has noted, had it not been for the banking crisis, the depression, as we recall it, might not have happened at all. And we know enough about the dynamics of modern industrial economics today to avoid falling into the trap policy-makers fell into in the early 1930s. Instead of easing monetary policy immediately to offset the recessionary effects of the share price drop and providing the liquidity the banking system needed to remain stable, the opposite was done with terrible consequences. Not only was a recession converted into a depression, but the ground was laid for the emergence to power of Hitler in Germany and thus, also, for World War II.

Although circumstances today are very different from what they were nearly sixty years ago, it might be too complacent for us to assume that our improved economic understanding is sufficient to ensure that another major world economic contraction will be avoided. Economists in the 1930s thought they were well equipped by the then prevailing theory to deal with practical problems, just as economists today think they too are equipped. It is of the nature of the problem that it is only *ex post facto* that it can become evident that a prevailing theory has lost its practical relevance as a result of structural change in the real world. As Keynes was to point out, the world of classical economic hypothesising had been left behind by the major industrial changes that had occurred as the nineteenth century drew to a close and the twentieth century got underway. By the end of the 1920s, the models of perfect competition on which too much of policy thinking still rested had almost completely lost their relevance. In the place of the competitive economy characterised by small operating units had emerged the economy of the modern industrial state and monopolistic competition.

There can be little doubt that major structural changes have occurred in the world economy since the Bretton Woods agreement of 1944 which set in place the present world financial system. And the system we have is still the system of Bretton Woods despite the scrapping of the dollar's gold convertibility in August 1971 and the eventual abandonment of fixed exchange rates. This is so because the central feature of Bretton Woods was not the gold exchange standard or even the fixing of currency relationships. It was the central role of the US as world banker. This continues and as long as it does, Bretton Woods will be with us.

At Bretton Woods, Keynes had proposed that a world central bank be established to provide the supply of the

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Verlede maand se dramatiese ineenstorting van die wêreld-aandelemarkte het in 'n groot mate ooreengestem met die val wat nege-en-veftig jaar gelede op Wallstraat plaasgevind het. Die aandelemark-afname het toe gelei tot 'n algemene ekonomiese inkrimping, en daar word nou gevrees dat iets soortgelyks met sombere gevolge vir Suid-Afrika kan gebeur. Dit is ook noemenswaardig dat die Groot Depressie nie onmiddellik op die Oktober 1929-aandelemark-ineenstorting gevolg het nie. Bykans 'n jaar het verstryk voordat die bankwesekrisis beleef is wat in werklikheid die begin van die depressie bestem het. Soos Milton Friedman trouens opgemerk het, as dit nie was vir die bankwesekrisis nie, sou die depressie soos ons dit onthou, dalk glad nie plaasgevind het nie. Ons weet ook genoeg van die bewegingsleer van hedendaagse industriële ekonomie om nie in dieselfde strik te beland as die beleidmakers in die vroeë 1930s nie. In plaas daarvan om monetêre beleid onmiddellik te verslap om die resessionalistiese uitwerking van die aandeleprys-daling te neutraliseer, en die likiditeit te verskaf wat die bankwesestelsel nodig gehad het om bestendig te bly, is die teenoorgestelde met vreesaanjaende gevolge gedoen. Die resessie is nie alleen in 'n depressie omskep nie, maar die grondslag is in Duitsland gelê vir Hitler se magsoorname, en derhalwe ook die Tweede Wêreldoorlog.

Alhoewel omstandighede vandag heelwat anders daar uitsien as bykans sestig jaar gelede, is dit dalk oorgerus van ons om te aanvaar dat ons verbeterde ekonomiese begrip toereikend is om nog 'n wêreld ekonomiese inkrimping te vermy. Ekonomie van die 1930s het gemeen dat hulle deur die toe heersende teorie goed toegerus was om praktiese probleme te hanteer, net soos ekonomie tans ook meen dat hulle toegerus is. Weens die aard van die probleem blyk dit slegs van agterna gesien, dat 'n heersende teorie sy praktiese verband verloor het as gevolg van strukturele veranderinge in 'n reële wêreld. Soos Keynes uitgewys het, is die wêreld van klassieke ekonomiese veronderstelling agterweê gelaat deur die grootskaalse nywerheidsveranderinge wat plaasgevind het namate die negentiende eeu ten einde geloop, en die twintigste eeu op dreef gekom het. Teen die einde van die 1920s, het die modelle van volmaakte mededinging waarop té veel van ons beleidsdenke steeds gerus het, bykans geheel en al hulle toepaslikheid verloor. In plaas van die mededingende ekonomie wat deur klein bedryfseenhede gekenmerk word, het die ekonomie van die moderne nywerheidstaat en monopolistiese mededinging verrys.

Daar bestaan min twyfel dat grootskaalse strukturele veranderinge sedert die Bretton Woods-ooreenkoms van 1944 in die wêreld-ekonomie plaasgevind het wat die huidige wêreld-finansiële stelsel geskik het. Die stelsel wat ons het, is steeds die stelsel van Bretton Woods, ongeag die slooping van die dollar se goud-omsetbaarheid in Augustus 1971, en die uiteindelijke afstanddoening van vaste wisselkoerse. Dít is so aangesien die sentrale kenmerk van Bretton Woods nie die standaard van die goud-wisselkoers of selfs die vasstelling van valuta-verhouding was nie. Dít was die sentrale rol van die VSA as wêreldbankier. Dít duur voort, en solank dit die geval is, sal Bretton Woods met ons wees.

world's monetary needs. This idea was rejected in favour of the plan put forward by Harry White, the American chief negotiator. White's plan led to the establishment of the IMF, but the IMF was never intended to be a central bank. The task of providing additional world liquidity was left to the US through the running by that country of a deficit on the current account of its balance of payments.

As long as the dollar was a scarce currency, and it continued to be so until the middle 1950s, all was well. Problems, however, began to emerge as soon as non-resident claims against the US gold reserve rose to equality with the reserve level at a given gold valuation. The problem today is that the gold price would have to be increased to around \$3 500 an ounce merely to equate the US gold reserve with the country's short-term foreign liabilities. Clearly, there can be no going back to the position that existed at the beginning of the post-war period even through the contrivance of a major increase in the official price of gold.

But if there is to be no going back, in what direction are we now headed? That is the critical question. And it is because even the G7 countries seem not to have an answer to it, that the markets cracked last month. It is going to require more than mere reassuring statements by the world's leading industrial nations to prevent another market crack either in 1988 or later. A US BoP adjustment would put off the evil day, but the fundamental problem, associated with the US's central banking role in a vastly changed world economic system, even then, would remain. It is this role which has to be changed if a new more enduring global financial order is to be established.

The editor

By Bretton Woods het Keynes aan die hand gedoen dat 'n wêreld sentrale bank gestig word om in die monetêre behoeftes van die wêreld te voldoen. Hierdie idee is verwerp ten gunste van die plan wat deur Harry White, die Amerikaanse hoofbedinger voorgestel is. White se plan het tot die stigting van die IMF gelei, maar dit was nooit die voornemen dat die IMF 'n sentrale bank moet wees nie. Die taak om bykomende wêreld-likiditeit te voorsien is aan die VSA oorgelaat deur dié land se bedryf van 'n tekort op die lopende rekening van sy betalingsbalans.

Vir solank as wat die dollar 'n skaars geldeenheid was, wat tot die middel van 1950 die geval was, was alles in orde. Probleme het egter begin ontstaan so gou as wat nie-inwonerseise teen die VSA-goudreserwe op voet van gelykheid met 'n gegewe goudwaardasie gestyg het. Die probleem tans, is dat die goudprys na ongeveer 3 500 dollars per ons verhoog moet word om die VSA-goudreserwe bloot met die land se korttermyn buitelandse laste gelyk te stel. Daar kan duidelik nie teruggekeer word na die posisie wat aan die begin van die vooroorlogse tydperk geheers het nie, selfs nie onder die dekmantel van 'n grootskeepse verhoging in die amptelike goudprys nie.

Maar as daar nie teruggekeer kan word nie, waarheen dan? Dit is die deurslaggewende vraag. Dit is juis omdat die G7-lande nie hierop 'n antwoord het nie, dat die markte verlede maand ineengestort het. Dit gaan meer as bloot gerusstellende verklarings deur die wêreld se leidende industriële volke verg om nog 'n mark-ineenstorting in 1988 óf later te verhoed. 'n VSA-betalingsbalansaanpassing sal die oordeelsdag uitstel, maar die grondliggende probleem, gepaard met die VSA se sentrale bankweserol in 'n grootliks veranderde wêreld-ekonomiese stelsel, sal selfs dan steeds bly staan. Dit is hierdie rol wat vernader moet word indien 'n blywender globale finansiële orde tot stand gebring wil word.

Die redakteur

Estimating the market risk premium on The Johannesburg Stock Exchange using ex post and ex ante models

Abstract

This paper examines the risk premium earned by SA investors on equity investments over and above that earned on risk free assets such as Treasury bills. The results presented show that on average the risk premium paid to SA investors has been greater than that paid to US investors on the New York Stock Exchange. In addition, the paper considers a number of models which have been proposed for estimating future market premia. It is shown empirically that these models provide superior estimates of future market premia than those obtained using a purely historical average method. Of the models examined, the double exponential smoothing methodology and the trend line forecasting method produced the best results. Finally, the results clearly indicate that the models provide much better estimates of long term market premia than of short term market premia.

Introduction

Much of modern financial theory and practice is based on the fundamental concepts of portfolio theory as formulated by Markowitz (1952). Central to these applications and concepts is the assumption that rational investors are return seekers and risk avoiders. Thus, it is assumed that rational investors while seeking high returns, also seek to minimise their risk in achieving these returns.

Sharpe (1964) extended the Markowitz work and showed that, under conditions of equilibrium, the return one can expect from an asset is a linear function of the co-variability of the returns on that asset with the returns on the overall market. Mathematically, this can be expressed as:

$$R_j = R_F + \frac{(R_m - R_F)}{\text{Var}(m)} \cdot (\text{Cov}(R_j; R_m))$$

where R_j = the return expected on asset j ;
 R_F = the risk free rate of return;
 R_m = the return expected on the market;
 $\text{Var}(m)$ = the variance of the return on the market; and
 $\text{Cov}(R_j; R_m)$ = the covariance of the return on the market and the return on asset j .

Rearranging the terms in this relationship yields the familiar form of Sharpe's Capital Asset Pricing Model (CAPM):

$$R_j = R_F + (R_m - R_F) B_j \dots (1)$$

where $B_j = \text{Cov}(R_j; R_m) / \text{Var}(m)$

The striking feature of this model is that the return that can be expected from an asset is not a function of the total variability of the asset's return, but rather of the degree to which the asset moves with the market of all other risky assets (B_j). According to the CAPM then, this co-variability with the market is the only relevant risk and is called "systematic" or "market related risk". All other

risks are firm specific risks and are named "unsystematic" or "non-market related" risks. Indeed, Sharpe (1964) showed that these unsystematic risks can be diversified away by careful selection of a portfolio of securities.

Subsequent to Sharpe's pioneering work, the CAPM has been the focus of considerable research activity and the model has found wide acceptance both in academia and in financial and investment management. In addition, much empirical evidence has been presented indicating that the CAPM is an acceptable model for exchanges such as the New York Stock Exchange (eg Fama and MacBeth (1973)).

Of course, like most theories, the CAPM also has its detractors. Thus, for example, Roll (1977) has raised serious questions about the testability of the CAPM. In particular, Roll has pointed out the difficulties inherent in defining exactly what is meant by the market of all risky assets. Other studies have revealed certain anomalies such as the small firm effect (eg Reinganum (1981) and Banz (1981)), the neglected firm effect (Arbel, Carvell and Strebel (1983)) and the liquidity effect (Hsia, Reilly and Wong (1985)).

Despite these criticisms and counter evidence, the CAPM remains a widely used model. For example, services such as Moody's regularly publish beta coefficients for securities quoted on the NYSE while Boshoff (1984) has regularly published such coefficients for companies listed on the JSE. As regards the more traditional areas of financial management, corporate managers need to determine a suitable discount rate for use in evaluating corporate investments when using discounted cash flow (DCF) techniques. A popular method of obtaining such a discount rate is the so-called weighted average cost of capital (the weighted cost of debt, preference and ordinary equity). In using this method, the cost of debt and preference shares can be relatively easily estimated but the cost of ordinary equity capital poses some difficulties. The CAPM, however, provides a fairly simple method of estimating the cost of equity capital and thus the weighted average cost of capital.

It is this later application which is the focus of this paper. In using the CAPM (equation 1) to estimate the expected return on equity for a given company, it is apparent that the financial manager must estimate three different items. Firstly, he must estimate the risk free rate (R_F). Fortunately this does not provide a major problem as many surrogates such as the Treasury bill rate, the Bankers' Acceptance rate or the NCD rate are readily available. Secondly, he must estimate the beta coefficient for his company. This is a more difficult problem but use can be made of a beta service (eg McKie, Van Velden & Hern) if the company is a listed company. If the company is not a listed company then several other fairly simple alternatives are possible (cf Retief, Affleck-Graves and Hamman (1985)). Thus obtaining the beta estimate is not an insurmountable problem. The final parameter to be estimated is the risk premium on the market, namely $R_m - R_F$.

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Two approaches can be adopted to estimating this parameter. The first is to estimate the expected return on the market in the coming year using either econometric modelling, subjective estimation, intuition or some combination of these and other methods. The risk free rate can then be deducted from this estimate to obtain the risk premium. The problem with this approach is that it requires a sound knowledge of the workings of the stock market which is possibly beyond the scope of most financial managers. In addition, if the market is efficient, then the market will already reflect all expectations and hence it will not be possible to forecast the market return *ex ante*. The alternative is to estimate the average premium which the market has paid historically above the risk free rate and to then use this as a "best estimate" of what the premium will be in any one year. It is this approach which is examined further in this paper.

The next section provides a brief literature survey of the main research studies conducted on both the NYSE and the JSE. The third section of the paper discusses the methodology used to estimate the market premium for the JSE while the results of the empirical study are presented in the fourth section of the paper. The paper closes with a section on conclusions in which a procedure for estimating the market premium in the South African context is recommended.

Literature review

Several attempts have been made in the literature to provide a sound and rational basis for calculating the market risk premium. One must keep in mind, however, that the CAPM is an expectational model and that the risk premium estimate is equally expectational. The methodologies used to estimate the market risk premiums can be broken down into two major subgroups (Brigham and Gapenski, 1985: 131):

- (i) those based on "*ex post*", or historic, returns; and
- (ii) those based on "*ex ante*" or forward-looking, returns.

One of the most thorough and widely publicised "*ex post*" risk premium studies (Ibbotson and Sinquefeld, 1982) was performed in the US and examined the Standard and Poor Composite Index (S & P 500) over the years 1926-1981. This study found the average annual rates of return on equity shares, Treasury bills, Treasury bonds and highly rated long term corporate bonds. By subtracting the historic, or realised, returns of the low risk securities from the realised return on equity shares, various historic risk premia were developed. This study showed the average risk premium of equity shares over Treasury bills to be 8,3%. However, the high variability of the actual premia suggested that "*ex post*" risk premium estimates should be used with caution.

The "*ex post*" approach to estimating market risk premia assumes that investors expect future results, on average, to equal past results. This highly questionable assumption has led researchers to a search for "*ex ante*", or forward looking, risk premia estimates. Promising research has been undertaken in the US, most notably by Vandell and Kester (1983), who demonstrated the value of "*ex ante*" risk premia estimates in comparison to "*ex post*" risk premia. Their methodology is based on the Gordon and Shapiro (1956) constant growth model and is discussed in the next section.

The research undertaken in South Africa has, till now, been limited to "*ex post*" studies. One study (Floquet, 1981) examined data from The Johannesburg Stock Exchange (JSE) Actuaries Industrial Index from 1960 to 1980. The arithmetic average annual rates of return were

calculated and compared with the prevailing long-term Government stock yields. The JSE Actuaries Industrial Index was the implied market proxy while the long-term Government stock rate was the implied risk free rate. Although the objective of the study was not to determine a market risk premium but to illustrate the superior returns offered by equity stocks, the implied market risk premium was 12,1% (one year holding period). However, the study took into account capital losses on the fixed interest stocks as a result of rising interest rates over the period examined. This biases the results somewhat as the risk free rate, by definition, should be a rate free of capital loss risk.

In addition to the above study, Boshoff (1984: 22) has suggested a market risk premium based on a ratio of the market proxy to the risk free rate. He suggests the use of three market proxies based on the JSE Actuaries Indices, calculated as follows:

$$\text{Market proxy risk premium} = R_F \cdot (S_{MP}/S_{RF} - 1)$$

where S_{MP} = standard deviation of the market proxy returns;
 S_{RF} = standard deviation of the risk free proxy (Long Term Government Bonds) returns; and
 R_F = risk free rate.

The three risk premia proposed by Boshoff are set out in Table 1 below.

Table 1: Market risk premium estimates

Market proxy	Risk premium
Industrial and financial index	32% multiplied by the risk free rate
All mining index	96% multiplied by the risk free rate
All shares index	54% multiplied by the risk free rate

(Source: Boshoff, 1984)

It is submitted that while of considerable interest, the above method of calculation is inconsistent with the CAPM definition of the risk premium (that is, the excess of the expected market return over the risk free rate). The calculation takes into account the total variability of the sector compared with the total variability of the risk free asset, rather than the systematic variability.

Research methodology

The primary objective of this paper was to examine whether it was possible to develop, by various logical procedures, a time series of quarterly risk premia forecasts covering the period 1965 to 1985. A secondary objective was to evaluate the ability of these forecasts to predict subsequent realisations in the marketplace over periods of six months, 12 months and 48 months. A subsidiary objective was to demonstrate that it is possible to develop a current forecast of the market risk premium, rather than to rely on long term historical averages, when using the CAPM in practice. In seeking to achieve these objectives, the methodology suggested by Vandell and Kester (1983) was employed. This is briefly summarised below.

In forecasting returns for the equity market, the longer term rates of return were considered important. The discounted cash flow (DCF) technique, based on an adaptation of the Gordon and Shapiro dividend discount model (Gordon and Shapiro, 1956), was used to determine expected market rates of return. The risk premia were then derived by deducting the risk free rate.

The adaption of the Gordon and Shapiro model used in this study was as follows:

$$R_M = DY(1 + g) + g$$

where:

- R_M = estimated rate of return on the market;
- DY = historical dividend yield for the market at time of forecast; and
- g = estimated long term fundamental growth of the market.

Since the dividend yield of the market at any point in time is known, the major task in using the methodology is to accurately predict g . Thus, in this study, a number of alternative methods of forecasting g are tried in an attempt to develop accurate forecasts for market risk premia.

In arriving at forecasts of market growth (g) three specific choices have to be made. These are:

(a) *The data set for which g is calculated*

In this study the growth rates in two series were tried as a proxy for g , namely the growth rate in dividends and the growth rate in earnings per share. Thus, the growth rate was estimated as

- where $g_t = (E_t/E_{t-1}) \times 4$
- g_t = the growth in period t (eg first quarter of 1965);
- E_t = the earnings (or dividends) per share for the last four quarters up to the end of quarter t (eg to the end of the first quarter of 1965). This was determined by multiplying the earnings (dividends) yield for the JSE Actuaries Index by the level of the index at time t ; and
- E_{t-1} = the earnings (dividends) per share for the four quarters ending in period $t-1$ (eg up to the end of the last quarter of 1964).

(b) *The specific forecasting methodology used*

In this study four specific forecasting methodologies were tested, namely

- (i) exponential smoothing;
- (ii) double exponential smoothing;
- (iii) linear trend line extrapolation; and
- (iv) historic average.

(c) *The length of history used in the estimation process*

Data on the JSE Actuaries indices was available from the third quarter of 1960 to the first quarter of 1985. It was decided that five years of data were necessary for initial parameter estimation in the various models and hence the fourth quarter of 1965 was the first period for which estimates were obtained. As the forecasting power of the individual models were evaluated for up to 48 months, it was necessary to cease forecasts at the end of the first quarter of 1981. Thus, in all cases forecasts were automatically updated on a quarterly basis from the fourth quarter of 1965 onwards using the most recently available information at each point in time.

As mentioned in (ii) above, four basic forecasting methodologies were used. These are discussed in more detail below.

(i) *Exponential smoothing*

Exponential smoothing is a widely used averaging procedure which gives greater weight to more recent historic inputs. In this study the exponential smoothing

model was based on the time series of annualised quarter to quarter changes in four quarter earnings or dividends per share.

The basic forecasting formula is:

- where $\hat{g}_t = a g_{t-1} + (1-a) (\hat{g}_{t-1})$
- \hat{g}_t = forecast growth rate at time t ;
- g_{t-1} = most recent growth rate measurement;
- \hat{g}_{t-1} = the forecast growth rate prepared at the beginning of the previous period (one quarter ago); and
- a = alpha – a corrective factor with a value between 0 and 1.

The choice of the corrective factor has an important effect on the resulting forecasts. The higher the value of alpha (a) the more heavily recent history is weighted. In this study three different exponential smoothing models were used: a slow adjustment model ($a = 0,05$); a medium term adjustment model ($a = 0,15$) and a rapid adjustment model ($a = 0,35$).

(ii) *Double exponential smoothing*

One important limitation of exponential smoothing is that it is ill suited for data that includes long term upward or downward movements (ie trend) (Stevenson, 1982: 83). An alternative smoothing methodology, double exponential smoothing, has been developed to overcome this problem. In this method the data arising from the exponentially smoothed forecasts are used for a second smoothing operation. The specific formula is:

- where $\hat{\hat{g}}_t = a_D \hat{g}_t + (1 - a_D) \hat{\hat{g}}_{t-1}$
- $\hat{\hat{g}}_t$ = the double smoothed growth rate forecast for period t ;
- \hat{g}_t = the previous single-exponentially smoothed forecast for period t ;
- $\hat{\hat{g}}_{t-1}$ = the double exponentially smoothed forecast for the previous period $t-1$; and
- a_D = double exponential corrective factor, similar to a , with a value between 0 and 1.

As with the exponential smoothing methodology, three values of alpha were used, namely 0,05; 0,15; and 0,35.

(iii) *Linear trend line extrapolative*

Ordinary least squares (OLS) was used to obtain estimates of the parameters a and b in the model

- $Y = a + bt + e$
- where Y = the logarithm of earnings (or dividends) per share at time t ;
- t = the time period;
- a, b = the regression coefficients; and
- e = the error term which is assumed to satisfy the usual OLS condition.

It should be noted that the logarithm of earnings (or dividends) was used because the growth rate is the variable of interest. In order to smooth the data to a certain degree, four quarter moving totals for earnings (dividends) per share were derived from the JSE Actuaries indices. The logarithm of these series served as the Y variable in the above regressions.

The slope coefficient, b , in the above model provides an estimate of the instantaneous (or continuous) growth rate (see Brigham and Gapenski, 1985: 168). As quarterly data was used with a logarithmic dependent variable (Y_t), annual growth was calculated from the trend line as follows:

where $g_t = \text{Antilog}(b_t * 4) - 1$
 $g_t = \text{forecast growth rate in period } t$; and
 $b_t = \text{slope coefficient for forecast period } t$.

Neter, Wasserman and Whitmore (1978: 619-621) discuss this technique in more detail.

In applying the model it is necessary to determine the number of data points to be used in the estimation procedure. This is particularly important in stock market applications as the market passes through distinct bull and bear phases. A trend line from the bottom to the top of a cycle will seriously overstate the fundamental non-cyclical trend. Because cycles tend to last about three to five years (see Vandell and Kester, 1983: 18), two measurement periods were tested, one of five and one of eight years.

(iv) *Historic average*

The forecasting methods above are all "ex ante" models in the sense that they attempt to forecast the return on the market in a future period by using data (the earnings and dividend yield) which is in some sense "forward looking". To contrast the performance of these models with the more traditional "ex post" approach, the realised risk premia from 1960 to the period immediately preceding the forecast period were averaged. This provides a typical ex post risk premium forecast as follows:

$$RP_T = \frac{\sum_{t=1}^{T-1} (RM_t - RF_t)}{(T-1)}$$

where $RM_t = \text{the actual (realised) return on the market in period } t$; and
 $RF_t = \text{the actual risk free rate in period } t$.

Thus, in all, 17 models were used to obtain risk premia for each quarter from 1965 to 1981. These models are summarised in Table 2 below.

Table 2: Forecasting methods – Basis of calculations

Forecasting method	Dividends per share	Earnings per share
Exponential smoothing		
Slow adjustment ($a = 0,05$)	1A	2A
Medium adjustment ($a = 0,15$)	1B	2B
Rapid adjustment ($a = 0,35$)	1C	2C
Double exponential smoothing		
Slow adjustment ($a_D = 0,05$)	3A	4A
Medium adjustment ($a_D = 0,15$)	3B	4B
Rapid adjustment ($a_D = 0,35$)	3C	4C
Trend line forecasting		
Eight years	5A	6A
Five years	5B	6B
Historic average	7	

To evaluate the predictive power of these risk premia forecasts, the forecast was compared with the actual premia on the market. This was done for forecast periods of six, 12 and 48 months. The six month period was chosen to demonstrate the power of the models in predicting short term movements. Conversely, the four year period

was chosen to test the long term trend forecasting capabilities of the models.

To determine the predictive power of the models, two approaches were adopted. In the first approach, the correlation between the actual market premium and the predicted market premium was calculated for each model examined. For example, for model 1A, starting in the third quarter of 1965, an estimate of the market premium over the next six months (ie Quarter 4 of 1965 and Quarter 1 of 1986) was obtained. This was then compared with the actual market premium in those two quarters. Then, using the data up to the fourth quarter of 1965, an estimate of the market premium in the next six months (ie Quarters 1 and 2 of 1966) was obtained. This was again contrasted with the actual market premium in Quarters 1 and 2. This procedure was continued until data up to the first quarter of 1981 was used to provide an estimate of the market premium in Quarters 2 and 3 of 1981. This resulted in a sequence of 62 estimated and 62 actual risk premia. The correlation between these two series was calculated to give an indication of the degree to which the estimated risk premia corresponded to the actual risk premia.

The second approach adopted was to use the same two sequences of risk premia (one estimated and one actual) to estimate the mean absolute deviation. This was done as follows:

$$MAD = \frac{\sum_{i=1}^n | \text{Actual premium}_i - \text{Forecast} |}{n}$$

$n = \text{the number of forecast periods}$.

Note that the actual market return was calculated as follows:

$$HPR_t = 4((I_t + DY_t * I_t / 4) / I_{t-1} - 1)$$

where $HPR_t = \text{the annualised quarterly holding period return for the market proxy in period } t$;

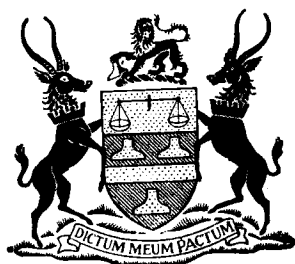
$I_t = \text{the value of the market proxy index at the end of period } t$; and

$DY_t = \text{the historical dividend yield for the market proxy at the end of period } t$.

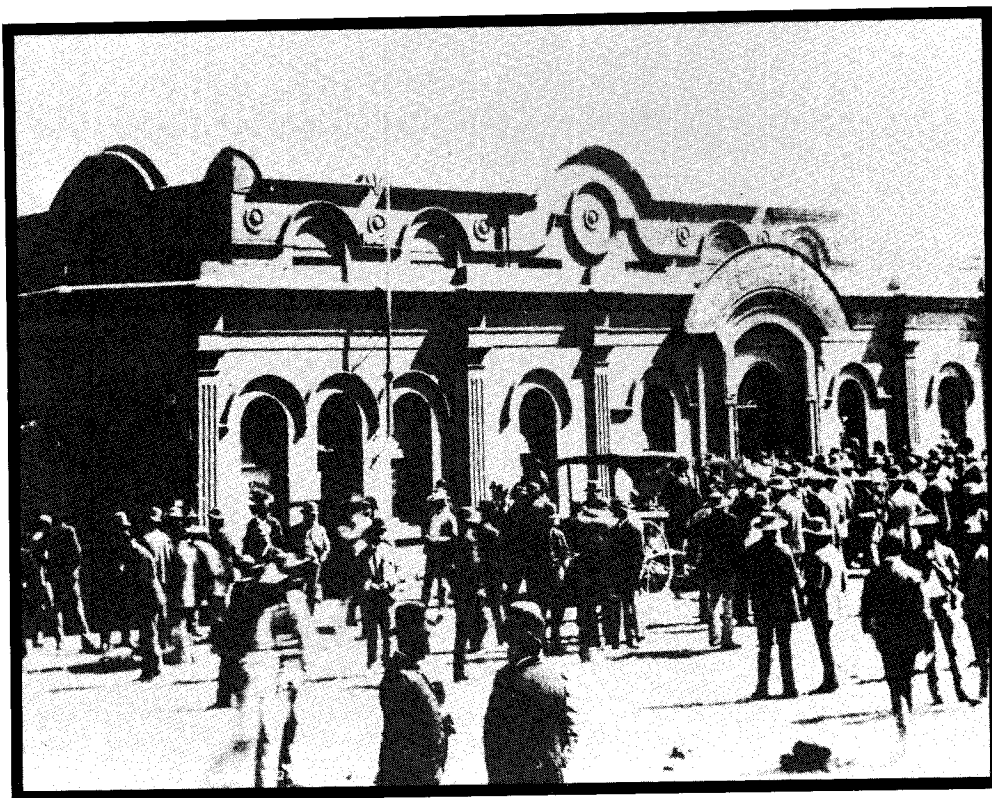
The actual risk premium was determined by deducting the average Treasury bill rate for the particular period concerned from the holding period return. Although there are a number of theoretical and practical problems in using the Treasury bill rate as a proxy (Harrington, 1983: 98-106), it has been the most widely used of the potential risk free proxies and was considered appropriate for the purpose of this research. It is not believed that choice of an alternative proxy such as the BA rate would alter the overall conclusions of this study.

Results

Using the methodology described in the previous section, risk premia forecasts were obtained for each of the 17 models for each quarter from the fourth quarter of 1965 to the first quarter of 1981. These results are summarised in Table 3 overleaf which shows the arithmetic average of the forecasts over all 62 quarters for each model.



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Table 3: Summary of risk premia estimates

Forecasting method	Model number	Mean forecast	Standard deviation	Coefficient of variation
Exponential smoothing				
Rapid adjustment (a = 0,35)				
DPS	1C	12,0%	15,2%	1,27
EPS	2C	13,3%	12,7%	0,95
Medium adjustment (a = 0,15)				
DPS	1B	10,5%	10,1%	0,96
EPS	2B	12,2%	9,3%	0,76
Slow adjustment (a = 0,05)				
DPS	1A	8,4%	5,3%	0,63
EPS	2A	9,5%	5,7%	0,60
Double smoothing				
Rapid adjustment (a = 0,35)				
DPS	3C	10,9%	12,3%	1,13
EPS	4C	12,6%	10,9%	0,87
Medium adjustment (a = 0,15)				
DPS	3B	9,0%	6,3%	0,70
EPS	4B	10,7%	6,8%	0,64
Slow adjustment (a = 0,05)				
DPS	3A	6,6%	2,7%	0,41
EPS	4A	6,7%	3,4%	0,51
Trend line forecasting				
Five years				
DPS	5B	9,3%	7,7%	0,83
EPS	6B	11,5%	8,5%	0,74
Eight years				
DPS	5A	12,9%	5,1%	0,40
EPS	6A	16,1%	6,1%	0,38
Historic average				
	7	9,1%	2,9%	0,32
Overall average				
		10,7%		
High - Low spread				
		9,5%		

An examination of Table 3 reveals several interesting results. Firstly, there is a wide spread between the highest average (16,1%) and the lowest average (6,6%). This was primarily caused by the increasing trend in interest rates (and market returns) over the period. As a result, forecasting methods using slow adjustment procedures tended to have averages substantially below those using quicker adjustment procedures.

Secondly, the averages based on earnings per share are consistently higher than the forecasts based on divi-

dends per share. The trend of South African companies towards lower dividend payout policies over the period (perhaps because of rising inflation) is probably the major reason for this occurrence.

Finally, as expected, the faster adjusting models displayed greater absolute and relative variability than did the slower adjusting methods.

To provide an overall perspective of the risk premia over time, the average of all 17 estimated risk premia is plotted over time in Figure 1. This plot is done from the last quarter of 1965 to the third quarter of 1985.

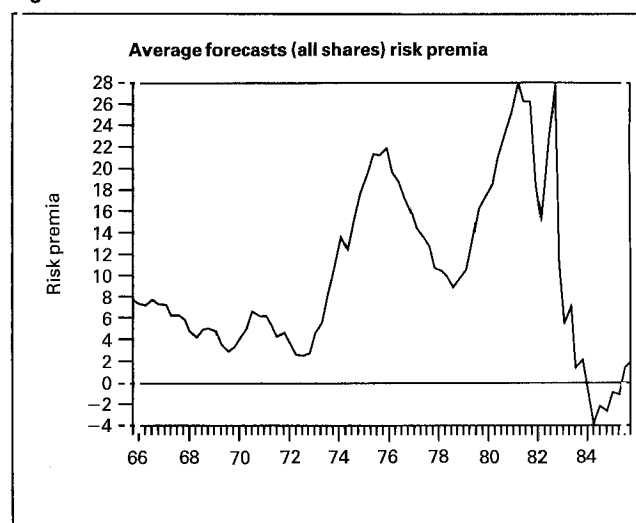
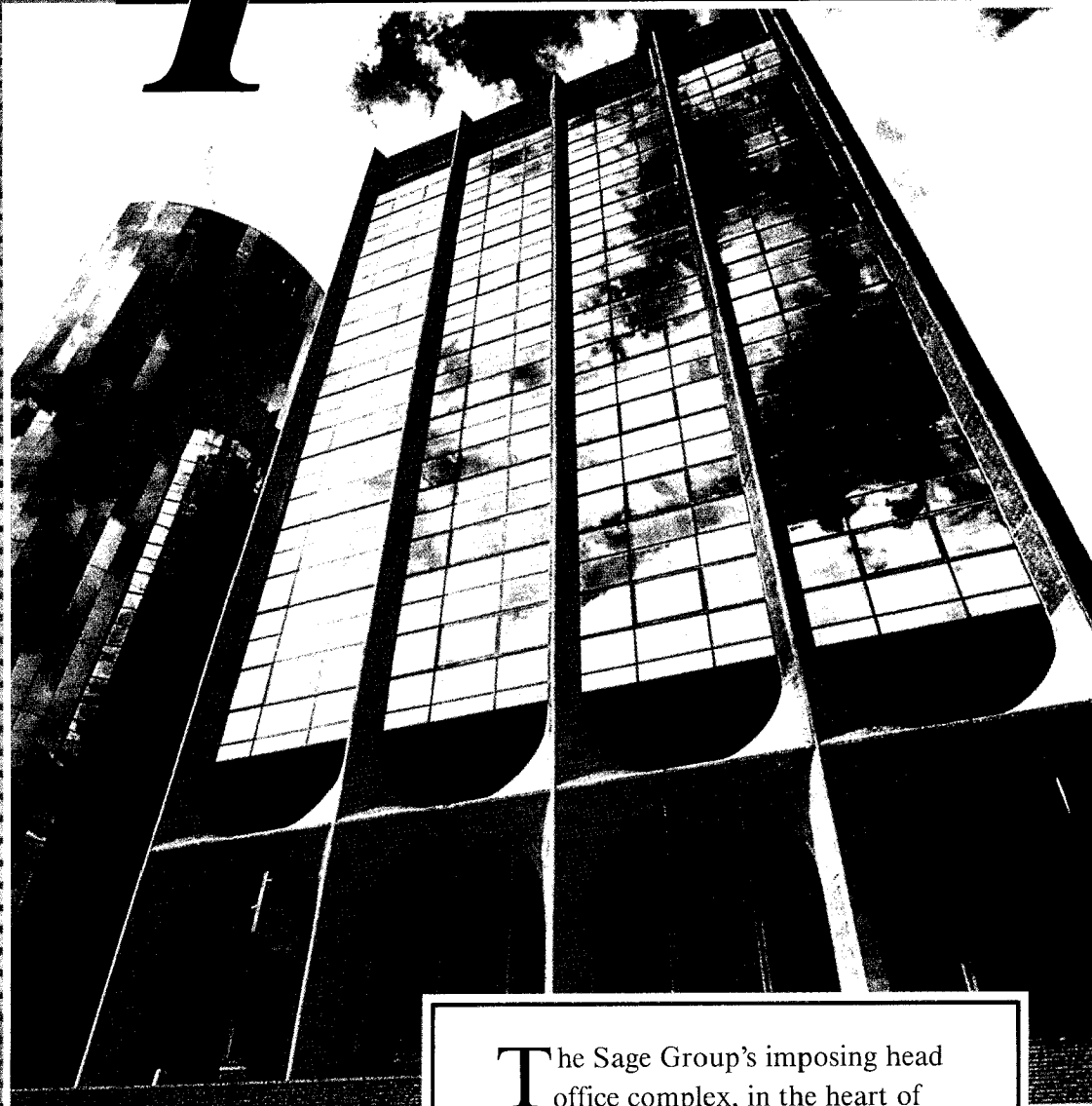
Figure 1


Figure 1 clearly indicates that the risk premia are not consistent over time. The peaks and troughs of the series coincide with economic and political events that clearly affected investor expectations. For example, the cycle troughs reflect the infamous 1969 Hollard Street crash, the 1973 energy crisis, the 1978 mini recession and the 1983 economic recession which fuelled the political unrest of 1984 and 1985. The cycle peaks, on the other hand, reflect the economic boom of 1974 to 1976, which was spurred on by the surge in the gold price, and the buoyant economy of 1980. It should be noted that the series showed a dubious average negative risk premium in 1984-1985. This was probably due to the very high interest rates experienced during this period. The question remains whether these unstable risk premia can be predicted "ex ante".

In order to determine whether the forecasting models can be used to accurately predict the risk premium, the actual risk premium in each quarter was correlated with the forecast premium using each of the models. The results are summarised in the middle three columns of Table 4 for the six month, 12 month and 48 month periods. (Note that risk premia have been annualised in all cases.) In addition, Table 4 summarises the results for the mean absolute deviation analysis (last three columns).

It reflects well



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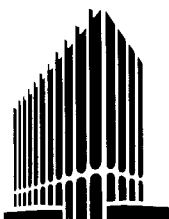


Table 4: Accuracy of risk premia estimates

Forecasting method	Model number	Correlation coefficients Actuals regressed on forecasts			Mean absolute deviation Actuals vs Forecast		
		Six months	12 months	48 months	Six months	12 months	48 months
Exponential smoothing							
Rapid adjustment (a = 0,35)							
DPS	1C	-0,08	-0,15	-0,13	34,3	28,9	16,0
EPS	2C	-0,08	-0,18	-0,01	33,0	27,9	14,0
Medium adjustment (a = 0,15)							
DPS	1B	-0,13	-0,20	0,06	33,3	26,9	12,4
EPS	2B	-0,11	-0,17	0,23	32,6	25,9	11,0
Slow adjustment (a = 0,05)							
DPS	1A	-0,04	-0,06	0,37	31,5	24,7	9,8
EPS	2A	0,01	0,00	0,49	31,2	24,2	9,2
Double smoothing							
Rapid adjustment (a = 0,35)							
DPS	3C	-0,16	-0,24	-0,01	34,4	28,2	13,8
EPS	4C	-0,16	-0,24	0,14	33,5	27,2	12,1
Medium adjustment (a = 0,15)							
DPS	3B	-0,10	-0,10	0,49	32,0	24,9	9,2
EPS	4B	-0,02	0,00	0,59	31,5	24,3	8,5
Slow adjustment (a = 0,05)							
DPS	3A	0,17*	0,20*	0,65	30,6	23,8	9,4
EPS	4A	0,19*	0,23*	0,64	30,5	23,7	9,2
Trend line forecasting							
Five years							
DPS	5B	-0,15	-0,13	0,60	32,6	25,3	8,6
EPS	6B	-0,04	0,01	0,69*	31,9	24,5	7,6
Eight years							
DPS	5A	0,08	0,10	0,70*	30,7	23,1	8,1
EPS	6A	0,09*	0,11*	0,68*	30,6	23,2	8,3
Historic average	7	-0,19	-0,38	-0,71	30,6	24,5	12,2

*Indicates one of best three methods (cor. coeff.)

An analysis of the results presented in Table 4 reveals several interesting conclusions.

- (i) In general, the models are better at predicting the premiums over a 4 year period than over shorter terms.
This is clearly evident in both the correlation and MAD analyses. Indeed, the correlations are extremely small in the case of the six month forecast period indicating that the models are not very useful for predictive purposes. This is confirmed by the high MADs. On the other hand, the results are much better for the 48-month period with several models producing correlations above 0,6 and MADs below 10%.
- (ii) Generally, the slower adjusting forecast methods tend to produce better results both in terms of correlation and MAD.
- (iii) The models based on EPS tend to have higher correlations and lower MADs than the models based on DPS.
- (iv) The double exponential smoothing and trend line methods appear superior to either the exponential smoothing or historic average methods.
- (v) The historic average method is the worst when evaluated on the basis of the correlation with the actual risk premium but performs somewhat better when evaluated on the basis of the mean absolute deviation.

On balance, therefore, it would therefore appear that the double exponential smoothing method with a = 0,05 or

the trend line forecasting method over an eight-year period are the most appropriate of the models for use in practice.

Conclusion

Over the period examined, the average of the historic market risk premium on the JSE was 12,3%. This was obtained by calculating the average quarterly premium of the JSE Actuaries All Share Index over the Treasury bill rate from the first quarter of 1960 till the third quarter of 1985. This indicates that on average, an equity investment on the JSE has earned 12,3% more per annum than an investment in an SA Treasury bill. However, the variability of the returns on the equity investment were extremely high. Nevertheless, a figure of approximately 12% should provide financial managers with a reasonable estimate of the term $(R_m - R_f)$ in the CAPM.

In addition, the results presented in this study show clearly that the market risk premium is not constant over time. Thus, the results indicate that an "ex ante" forecast using either the double exponential smoothing or the trend line forecasting method over 8 years is likely to provide superior estimates of future market risk premia than that obtained by using the historical average market risk premium. Consequently, managers requiring a more accurate estimate should use one of the more sophisticated models. However, it is also apparent that none of the models are particularly successful at predicting short-term changes in the market premium and thus the techniques recommended above should not be seen as opportunities to forecast short-term market movements.

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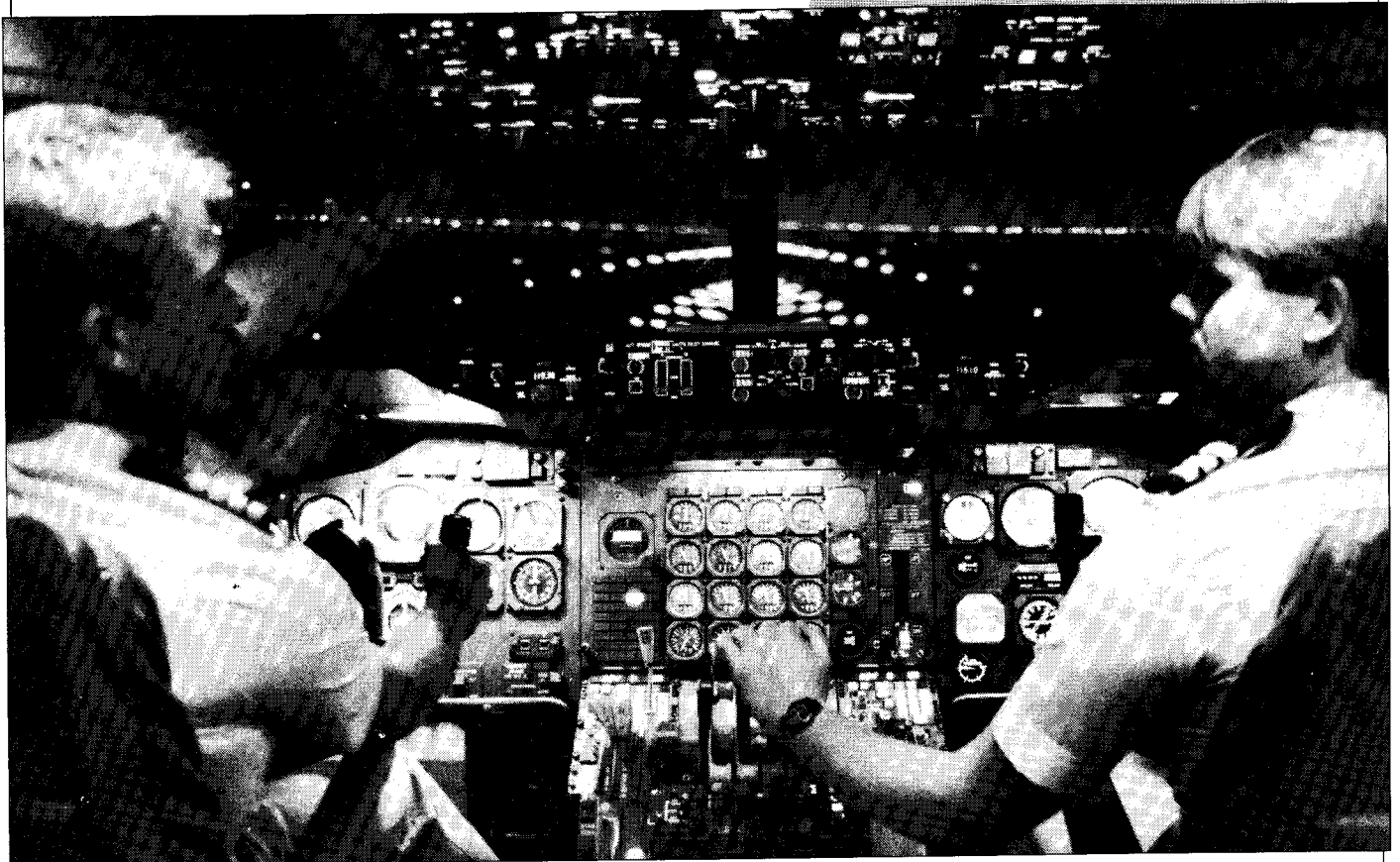
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It is also of interest to contrast these results with those obtained in the US study of Vandell and Kester (1983). Table 5 below provides a brief summary of the main results from the US and SA studies.

Table 5: Market risk premia: Correlation coefficients: Comparison with US study

	Model number	Actuals regressed on forecasts		
		6 months	12 months	48 months
Double exponential smoothing				
- US study	4A	0,41	0,55	0,87
- SA study	4A	0,19	0,23	0,64
Trend line forecasting				
- US study	6A	0,28	0,39	0,75
- SA study	6A	0,09	0,11	0,68
Average of all the forecasts:				
	US	7,1%		
	SA	9,1%		

The actual risk premia for the period 1944 to 1978 were not reported in the US study, although the average of all the forecasts was 7,1% (Vandell and Kester, 1983: 46). This was somewhat lower than the corresponding figure of 9,1% found in this study. It could be argued, however, that risk premia in South Africa should, in fact, be higher than in the US, given the riskier South African political environment.

The correlation coefficients produced by the US study were generally higher than those obtained in the SA study. In addition, the double exponential smoothing method using a correction factor of 0,05 proved successful in both studies as did the trend line forecasting model.

Finally, it must be pointed out that the forecasting procedures were simple in construction, because the research undertaken was merely exploratory in nature. The error patterns indicated that these forecasts could possibly be improved using more sophisticated forecasting methodologies. In particular, it appears that the risk premium in any period is dependent, in part, on the risk premium in the previous period. Future work on this subject should utilise autoregressive forecasting techniques to make use of this information and provide forecasts of greater quality.

References

- Arbel, A, Carvell, S and Strebel, P (1983). Giraffes, Institutions and Neglected Firms. *Financial Analysts Journal*, May-June, 57-63.
- Banz, W (1981). The Relationship Between Return and Market Value of Common Stock. *Journal of Financial Economics*, vol. 9, 3-18.
- Boshoff, H (1984). Portfolios Risk Management. 2nd Quarter, 1984. Johannesburg: *McKie Bros, Van Velden, Channing and R S Mennie Inc.*
- Brigham, E F and Gapsenski, L C (1985). *Intermediate Financial Management*, New York, The Dryden Press.
- Fama, E and MacBeth, J (1973). Risk Return and Equilibrium: Empirical Tests. *Journal of Political Economy*, vol. 81, 607-636.
- Floquet, W T (1981). The Case for Equities. *Investment Analysts Journal*, vol. 17, 9-22.
- Gordon, M J and Shapiro, E (1956). Capital Equipment Analysis: The Required Rate of Profit. *Management Science*, October 1956, 53-61.
- Harrington, D R (1983). *Modern Portfolio Theory and The Capital Asset Pricing Model A User's Guide*. Englewood Cliffs, New Jersey, Prentice-Hall Inc.
- Ibbotson, R G and Sinquefeld, R A (1982). *Stocks, Bonds, Bills, and Inflation: The Past and The Future*. Charlottesville, Virginia, The Financial Analysts' Research Foundation.
- Markowitz, H M (1952). Portfolio Selection. *Journal of Finance*, vol. 7, 77-91.
- Neter, J, Wasserman, W and Whitmore, G A (1978). *Applied Statistics*. Boston, Massachusetts, Allyn and Bacon, Inc.
- Reinganum, M R (1981). Misspecification of Capital Asset Pricing: Empirical Anomalies Based on Earnings Yields and Market Values. *Journal of Financial Economics*, vol. 9, 19-46.
- Retief, J, Affleck-Graves, J and Hamman, W (1986). The Association between Market Determined and Accounting Determined Risk Measures in the South African Context. Forthcoming in *South African Journal of Business Management*.
- Roll, R (1977). A Critique of the Asset Pricing Theory's Tests; Part 1: On Past and Potential Testability of the Theory. *Journal of Financial Economics*, vol. 4, 129-176.
- Sharpe, W F (1964). Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk. *Journal of Finance*, vol. 19, 425-442.
- Stevenson, W J (1982). *Production/Operations Management*. Homewood, Illinois, Richard D Irwin, Inc.
- Vandell, R F and Kester, G W (1983). *A History of Risk-Premia Estimates for Equities: 1944 to 1978*. Charlottesville Virginia, The Financial Analysts' Research Foundation.

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Market timing and the JSE

Introduction

*Up and down the market moves
In and out the people
That's the way the money goes
Pop goes the weasel*

Goldman, 1979

Modern portfolio theory suggests that investors ought to keep the equity portion of their portfolios invested in a "market portfolio", which can then be mixed with borrowing or lending to satisfy their risk objectives. Black and Scholes (1974) suggest two reasons why this is seldom observed in practice: Some investors actually enjoy the act of investing. They derive a measure of utility from buying and selling, seeking information, making decisions and following the movement of the shares they have bought. Others believe that they can make money by trading on information which they have sought out in the marketplace.

Active portfolio trading implies either that the investor is able to identify individual securities which appear to be underpriced or else that the investor is able to predict major turns in the market. In an environment where a large number of skilled analysts are following share prices closely, and where the shares are well traded, it is unlikely that prices would diverge from their "intrinsic values" by much, or for very long. Therefore many analysts devote their time to identifying in advance major turning points in the market. Investment services lure investors with the promise of being able to predict "when to buy, and when to sell".

However, the concept of an efficient market implies that predicting market turns should be at least as difficult as identifying shares that will provide an abnormal performance.

In an editorial to the *Financial Analysts Journal* in 1980, Treynor (1980) observed: "Clearly any investor who bought and sold the market at its turning points would out-perform (by a vast margin) anyone who based his decisions on the analysis of individual securities . . . unfortunately, nobody can call market turning points with anything approaching certainty."

Sharpe (1975), confirms this, commenting that ". . . the top or bottom is only obvious after the fact . . . different analysts will identify different points as "major" peaks and troughs . . . even in retrospect."

It is of interest therefore, to investigate the predictive ability that an analyst would require in order to profit from a market timing strategy.

Christy and Clendenin (1978), Sharpe (1981), Jeffrey (1984), and Reilly (1986), have defined market timing in terms of portfolio strategy. Thus, the beta of the portfolio would be increased when the stock market was expected to become bullish, and decreased when the stock market was expected to change from bullish into bearish.

A narrower definition of market timing (also called "pure

market timing" – Webman (1982a), would concern movement between the extremes of 100% ordinary share holding during bull markets, and the holding of 100% of cash or cash equivalents during bear markets.

In this research the broader definition (adjusting portfolio systematic risk in anticipation of major market movements) is used.

Prior research

Two early studies by Treynor and Mazuy (1966), and Jensen (1968) looked at the market timing strategies of mutual funds in the USA. They found that there appeared to be little risk associated with attempting to forecast the market, since the funds on average neither significantly beat the market nor suffered extraordinary losses. Treynor and Mazuy concluded that an investor in mutual funds is completely dependent on fluctuations in the general market. Although individual funds could well provide the investor with above market average returns, they suggest that this will be due to the fund manager's ability to identify underpriced securities rather than an ability to outguess turns in the level of the market as a whole.

Sharpe (1975) studied the potential returns from a portfolio of average shares, bought at the low point of the market each year, and subsequently sold at the high point for that year, as compared to the returns generated by a passive buy and hold strategy over the three periods starting in 1929, 1934 and 1946 and ending in 1972.

The active strategies provided returns of 16.1%, 10.7% and 8.6% respectively above the passive strategies. Turning only to the post war era (in order to eliminate the effects of the Great Depression), and accepting that no analyst could have forecast market turns with such precision, Sharpe extended the analysis by presuming that an analyst will only be correct a proportion of the time.

Given transaction costs of 2% for each switch, he analysed a strategy of switching between the Standard and Poor's Composite Index and Treasury bills such that the portfolio consisted solely of the asset showing the highest return for the period on an ex-post basis. With a 100% predictive ability this active switching policy resulted in a return of the order of 3% above the market buy and hold strategy. Unless the manager had been more than 83% accurate in his timing he could not have matched the market.

Sharpe concluded that attempts to time the market should be avoided altogether.

Ward and Stansfield (1980) carried out a similar study on the London Stock Exchange. Using a methodology similar to that of Sharpe, and using the *Financial Times Ordinary Share Index* to represent the market, they came to the conclusion that "timing decisions . . . have to be correct seven times out of ten" for speculation to be profitable in the UK via the FT index.

Jeffrey (1984) noted that large numbers of funds (pension, endowment, trust, etc.) appear to under-perform the market, as measured by a market index. He hypothesised that an inability to beat the market by means of appropriate timing strategies might be a reason for this failure. He defined market timing as the propensity of managers to move assets back and forth between equi-

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ties and cash equivalents, and attempted to quantify the risks associated with a strategy of market timing. Quarterly timing decisions over the period 1975 to 1982, using the S & P 500 index as an equity portfolio proxy, and 90-day Treasury bills as the alternative investment, were compared to a passive "buy and hold the index" policy.

Jeffrey found that a maximum incremental real return of 10,2% above the return of a passive strategy could be achieved if "correct", ie optimal, switching took place each quarter. A negative return, 17,6% below the buy and hold return, resulted from a strategy which always produced the "wrong" switch.

The upside potential gains from adopting a switching strategy appeared to be almost half the potential downside losses. Jeffrey also observed that the entire gain from the active strategy could be lost if the three quarters which provided the highest differential returns between the two assets were missed. He observed that these quarters closely followed periods in which equities had provided substantial negative performances, and surmised that, as a consequence, many managers had probably missed out on these periods of highest return since their switching decisions would probably have been influenced by events of the previous period.

Jeffrey was able to describe graphically an area which represented the returns which could be achieved for all possible combinations of timing decisions. In this way he side-stepped the extremely complex problem of having to formulate a decision rule for selecting those quarters in which to make a switch, given that the manager does not have perfect foresight.

An analysis of the resulting oval-shaped space showed that the area above the line representing returns from the market index was much smaller than the area below the return line. This suggested that the rewards obtainable from successful market timing were much smaller than the incremental risks which buying or selling necessarily involved.

The results of the studies discussed above lead to the conclusion that, given the presence of an efficient market, successful market timing is not easy to achieve. Indeed, is far more difficult to achieve than is generally realised or acknowledged especially in professional circles.

The timing decision is, however, critical to fund managers and other institutional investors, who make up the bulk of the participants (by value) on The Johannesburg Stock Exchange.

Recent research (eg Gilbertson and Roux, 1977 and 1978; Strebel, 1977 and 1978; Knight and Affleck-Graves, 1983 and 1985) into the relative efficiency of the JSE has produced some mixed results, but the general indication seems to be that the JSE is a less efficient market than the New York Stock Exchange. Were this to be the case, the SA market could provide timing opportunities not available elsewhere.

Objectives of the research

In view of this possibility, it was decided to repeat and expand Jeffrey's study using data from SA capital markets.

In particular, answers to the following two questions were sought: What level of accuracy would be required for successful timing decisions in South Africa? and, How important would transaction costs, asset choice and timing frequency be to the overall performance of a timed portfolio on the JSE?

It was envisaged that the study would highlight potential timing opportunities on the South African market, not to be found in the USA or in Great Britain, where the odds against market timing require market timers to have extraordinary predictive ability. The study was also designed to contribute to the discussion about the level of efficiency of The Johannesburg Stock Exchange, especially in relation to the American and British security markets.

Methodology

(a) Variables

In order to examine the effects of market timing, a number of variables need to be considered. These are:

- transaction costs
- portfolio review period
- the assets forming the portfolio
- the time span under review

Since one cannot examine every possible combination of choice available to the portfolio manager, it was necessary to make some assumptions. These are discussed below:

(i) *Transaction costs*

Transaction costs are composed of two separate elements. Firstly, there is always a difference between the bid price for a security and the asked price. No attempt has been made to measure this cost.

The second component of transaction costs is made up of the compensation required by agents (brokers etc) for effecting the transaction and for Marketable Securities Tax (MST).

In South Africa MST is levied on purchases only, at a rate of 1,5% of traded capital. Brokerage costs are on a sliding scale, from 1,2% for purchases and sales of less than R5 000 down to 0,2% for transactions in excess of R1,5 million.

For calculation purposes a transaction of value R500 000 was used. Sales costs and purchase costs (including MST) would total R10 652,50 or 2,13% of the value. The average cost per equity transaction of 1,38%, was therefore used in the calculations. Transaction costs for the purchase and sale of Treasury bills and BAs were assumed to be negligible.

(ii) *Portfolio review period*

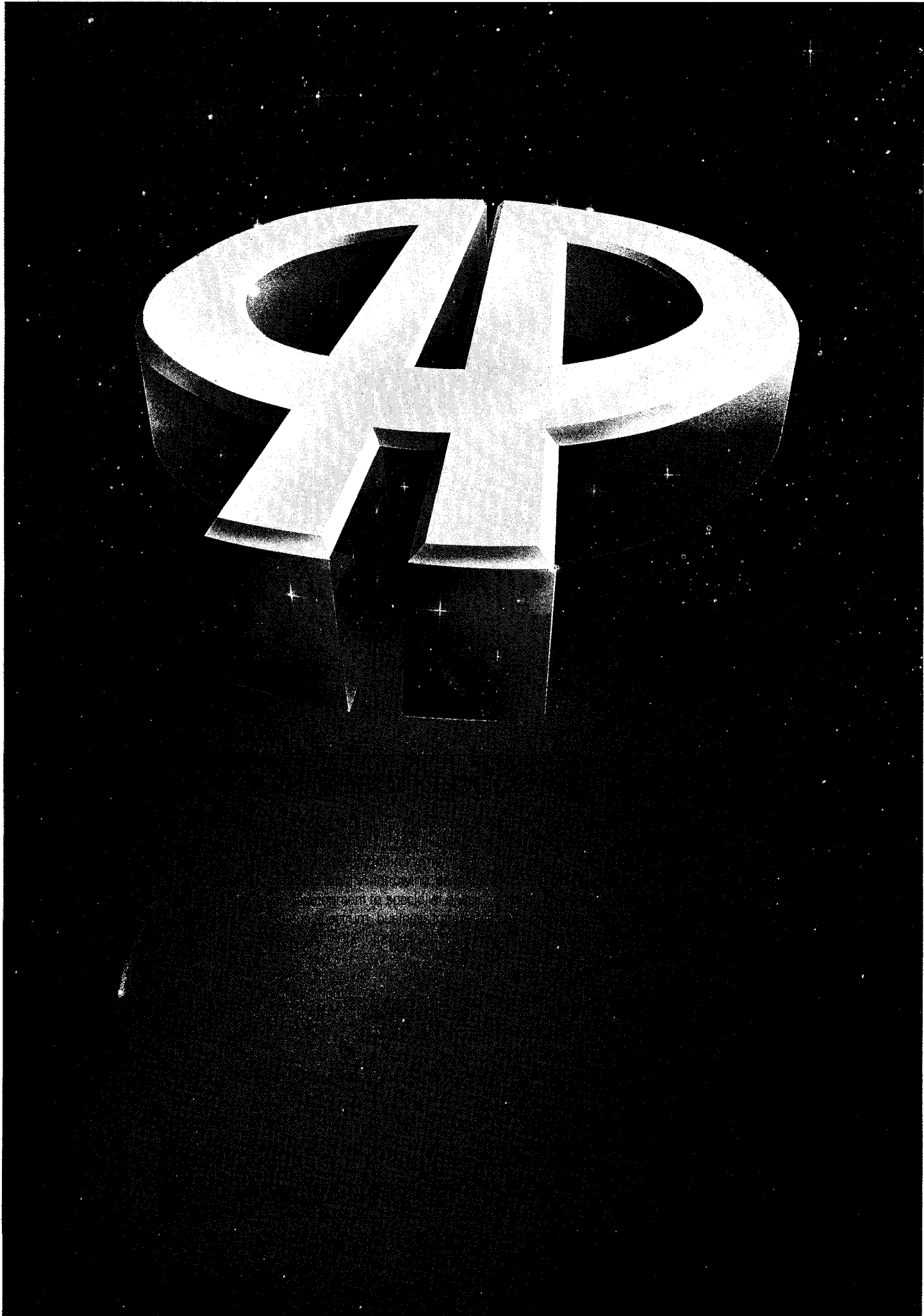
A portfolio review period is defined as the length of time during which the composition of a portfolio is not altered.

Reilly (1986, p202) claims that in studying market behaviour when time intervals exceeding three months are used, there are patterns in stock price movements which make forecasting possible. Sharpe (1975) observed that review periods exceeding one year are not reasonable, because portfolio managers generally do not look further ahead than that.

Based upon these observations it was decided that monthly, quarterly, semi-annual and annual review periods should be investigated.

(iii) *Choice of assets*

At the end of every portfolio review period the portfolio manager has the option of exchanging the assets in the portfolio for others. The expectation of a bull period would warrant an increase in the beta (β) of the portfolio, whereas the expectation of a bear period would call for a decrease in β . At any time, therefore, a portfolio should



consist of either relatively low- β assets or relatively high- β assets.

The investment instruments used in this study consisted of three different stock indexes and two different cash-equivalents. The table below shows the combinations used. The indexes were used as proxies for well-diversified portfolios.

Table 1: Combinations of assets available for investment

Good periods (relatively high- β assets)	Bad periods (relatively low- β assets)
All Shares Index	Bankers' Acceptances
All Shares Index	Treasury bill
Industrial Holdings Index	Treasury bill
Banks and Financial Services Index	Treasury bill
Industrial Holdings Index	All Shares Index
Industrial Holdings Index	Banks & Financial Services Index
All Shares Index	Banks & Financial Services Index

The JSE All Shares Index (AS) (with a β value by definition equal to one) was chosen because it is the broadest based index available. According to Korajczyk (1986), it is easier to forecast market-wide events than sector specific events.

The Industrial Holdings Index (IH) ($\beta=1,185$) was selected because it is relatively more risky. The Banks and Financial Services Index (BFS) ($\beta=0,530$) was chosen for less risky strategies. Both the Financial Services Index and the Industrial Holdings Index have relatively large numbers of constituents and high market capitalisations, which make them suitable as proxies for diversified portfolios.

Bankers' Acceptances (BA) and Treasury bills (TBs) are both very common liquid cash equivalents. These instruments were used as low risk assets. TBs are considered to be risk free assets with little or no correlation with the stock market. BAs are slightly more risky because they are issued by the private sector and not by the government.

In all calculations, it was assumed that all funds invested during any period, plus the earnings during that period, would be reinvested in the next period. Thus, whenever averages had to be calculated, the geometric mean return was used (Francis, 1976, p683ff).

(iv) *Time span under review*

In the calculations of the minimal required rate of forecasting precision, monthly index data, dividends and discount rates for the period from 1967 to 1986 were used. It should be noted that this 20-year period is considerably shorter than the 44 and 57 years respectively used in comparable research in America by Sharpe (1975) and Jeffrey (1984). However, both authors observe that results with these long review periods are probably not fully representative as stock markets appear to have become more efficient over time.

(b) **Analytical technique**

The single most important determinant of eventual success in timing the market is the ability to predict market turns accurately. Jeffrey (1984) devised a methodology for establishing the probabilities associated with different switching strategies.

If an investor has a choice between two assets and the asset with the highest return in every holding period is

chosen, then 100% perfect timing is achieved. Should he be incorrectly positioned only once, a variety of possible outcomes emerge, depending upon whether in the missed period the marginal difference between the returns of the two assets was greatest, least, or somewhere in between. As the success rate decreases, all possible outcomes will lie within two boundaries – the best case line and the worst case line (see Figure 1).

For every holding period there are two available returns – that for the high- β asset and that for the low- β asset. If forecasting is less than 100% accurate, the maximum possible wealth at the end of the investment horizon will be diminished by the difference in available returns. This reduction in wealth is calculated with a multiplier:

$$m = \frac{1 + R_l/100}{1 + R_h/100}$$

m = multiplier

R_l = lowest available return in a holding period;

R_h = highest available return in a holding period.

For every holding period a multiplier may be calculated.

The equation for the best case and the worst case lines is given by:

$$W_n = W_{100\%} * M_1 * \dots * M_z$$

w_n = ending wealth after n periods with $(z/n)\%$ forecasting precision;

$W_{100\%}$ = ending wealth after n periods with 100% forecasting precision;

m_z = multiplier with magnitudinal rank z ;

z = number of periods for which an incorrect forecast was made.

For the best case line, multipliers are ranked in ascending order.

For the worst case line, multipliers are ranked in descending order.

The wealth at the end of the investment horizon can be expressed in rand terms or it can be expressed in terms of average annual return:

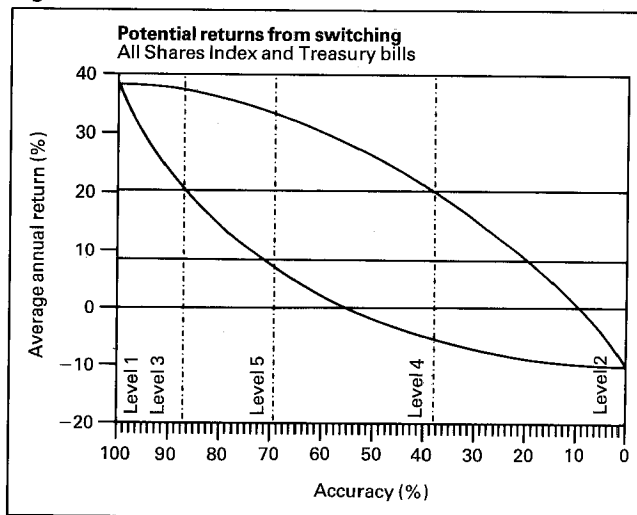
$$R_{pa} = (W_n^{1/20} - 1) * 100\%$$

R_{pa} = average return per annum

W_n = ending wealth achieved after n holding periods or 20 years, with an original investment of $R1$.

The values calculated for R_{pa} may be plotted graphically

Figure 1





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against the percentage forecasting accuracy. On the same graph, lines can be drawn representing the average return achieved with the buy-and-hold policy for the best asset and for the worst asset.

To be *certain* of achieving a return greater than that of simply holding the All Shares Index, it can be seen from Figure 1 that an investor would need to be more than 87% accurate in his switching. In fact, unless at least a 38% accuracy is achieved, he is *certain* to obtain a return lower than a buy and hold strategy.

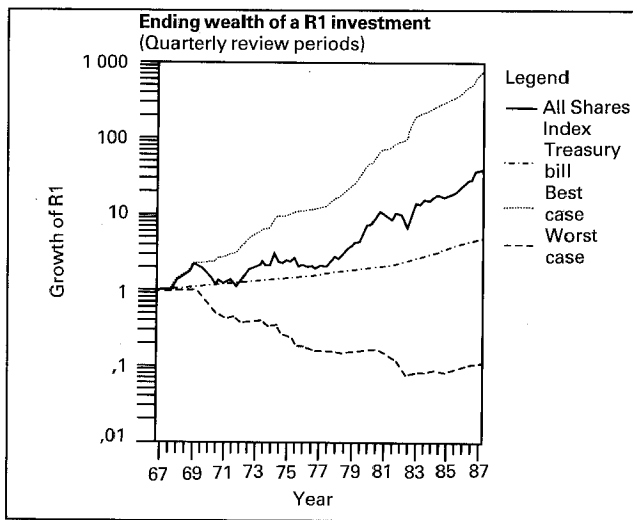
Results

An important aspect of modern financial theory deals with the relationship between risk and return. In this section, the returns which can be achieved by a strategy of market timing before attempting to quantify the risks involved are evaluated.

1. Return

Figure 2 shows the growth of a R1 investment in the JSE All Shares Index over the years 1967–1986. Over this period, a R1 investment grew to R45. The graph also shows the growth of an investment in Treasury bills – from R1 to R5. An investor with perfect knowledge could, by switching at quarterly intervals between these two assets, have increased his wealth from R1 to a staggering R665. Alternatively, had he been in the “wrong asset” all the time, he would have seen his R1 dwindle to R0,13.

Figure 2



It is clear that a range of ending wealth positions is possible between the best and worst cases shown above. To

simplify matters, the discussion begins with a consideration of the calculated average annual “returns” and not with an “end wealth” position. The following assumptions are made:

- (a) Only two assets are available for switching – the All Shares Index and Treasury bills.
- (b) The portfolio is reviewed quarterly.
- (c) Transaction costs are set at 1,38%.

Based on these assumptions, the “football” in Figure 1 describes the set of possible returns.

Of particular interest is the measurement of the required *accuracy* for successful market timing. To this end, 5 levels of forecasting ability can be defined. The first two, 100% and 0% *accuracy*, require no further discussion.

The third level of accuracy is the level above which market timing *always* yields a higher return than buying and holding the asset with the higher return. In the above example this level is 86,9%.

The fourth level is the level below which market timing will always result in a lower return than simply buying and holding the asset with the highest return (37,9% in the above example).

Between levels 3 and 4 a fifth level, the level at which there is an equal probability of gain or loss relative to buying and holding the better asset (69,4% in the above example), can be defined.

Once the parameters of the problem have been set, the first assumption can be relaxed. Table 2 below shows the returns and required accuracy rates for various combinations of assets.

The following points should be noted:

- On average it was possible to improve returns by 18% when a perfect timing strategy was achieved.
- To be *certain* of achieving a higher return than that of holding the best asset, an investor would have had to be in the correct asset at least 85% of the time (on average).
- An investor who was in the wrong asset for more than 34% of the holding periods (on average) *could not* have achieved a return higher than that of buying and holding the best asset.
- An investor who, on average, had a forecasting accuracy of 65% and was equally likely to miss good as well as bad periods, would, through market timing, have had an equal probability of gain and loss relative to buying and holding the best asset.

The indications from the table are that the systematic risk

Table 2: Annual average returns (% pa) for quarterly holding periods for different asset combinations at different accuracy levels

Asset combination	Best return Level 1	Worst return Level 2	Best asset return (% pa)	Required accuracy Level 3	Required accuracy Level 4	Required accuracy Level 5
All Shares Treasury bill	38,5	-10,3	20,2	86,9	37,9	69,4
Industrial Holdings Treasury bill	37,2	-14,3	14,6	82,1	34,1	61,0
Banks Financial Treasury bill	42,0	-16,3	15,2	83,2	30,4	59,3
Average	39,0	-13,6	16,7	84,1	34,1	63,2
Industrial Holdings All Shares	29,7	0,4	20,2	87,4	40,8	73,0
Industrial Holdings Banks Financial	28,2	-2,1	15,2	85,0	27,4	62,1
All Shares Banks Financial	38,6	-4,3	20,2	83,1	33,4	61,8
Average	32,2	-2,0	18,5	85,2	33,9	65,6

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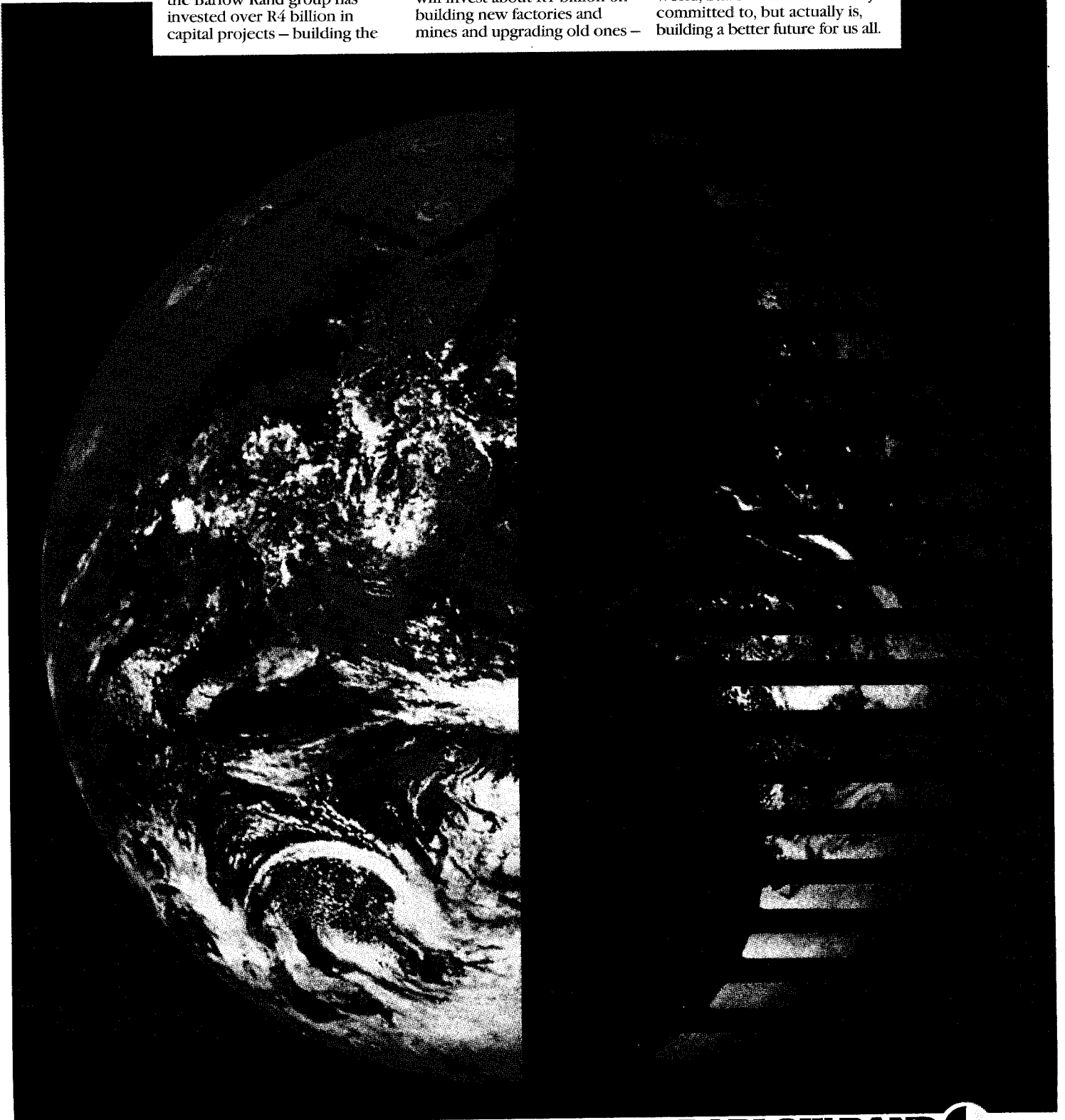
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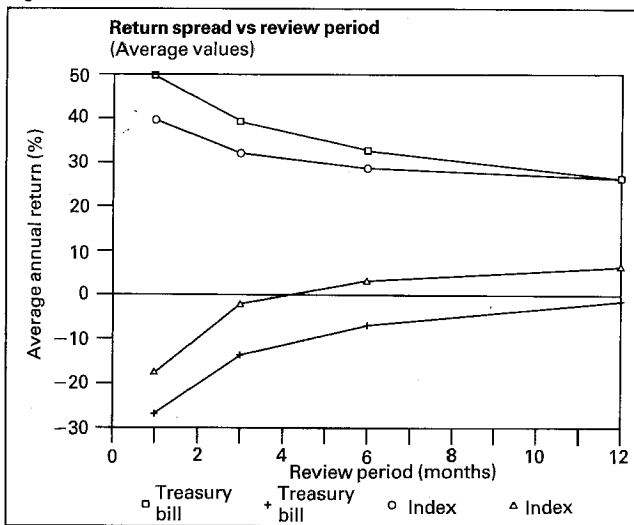
of the portfolio appears to be a poor guideline for selection of assets when timing strategies are undertaken.

The purpose in selecting high-beta assets was to boost upside performance. However, from the table it can be seen that for the high beta "portfolio" tested, the desired results were not achieved. In fact, relative to TBs, the low beta portfolio (Banks and Financial Services Index) offered the highest potential rewards for a perfect strategy. This idea needs further testing before any definite conclusions can be drawn.

It is now necessary to relax the second assumption and to consider review periods of one month, one quarter, six months and one year.

Table 3 makes it clear that shortening the review period increases the range of potential returns. This is shown graphically in Figure 3.

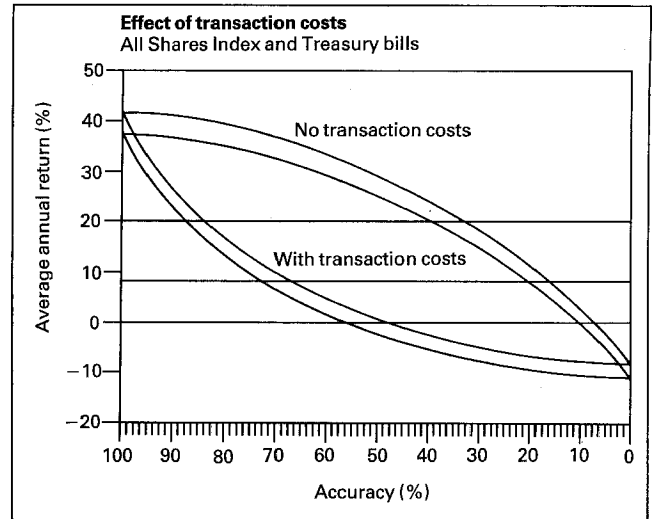
Figure 3



To achieve these higher returns it is of course necessary to switch more often. This involves additional transaction costs, now the third assumption can be relaxed and the level of transaction costs varied.

The "footballs" in Figure 4 below show the set of possible returns for switching between the All Shares Index and TBs, for monthly review periods, both with and without transaction costs.

Figure 4



Transaction costs have two effects. Firstly, their introduction reduces the potential average annual return by approximately 5% – this explains the displacement of the "football". Secondly, the required forecasting accuracy for levels 3, 4 and 5 increases by approximately 6% because investors must now make more correct switches to cover the cost of a switching policy.

Table 3: Annual average returns (% pa) for different asset combinations at different accuracy levels

Asset combination	Holding period	Best return Level 1	Worst return Level 2	Best asset return (% pa)	Required accuracy Level 3	Required accuracy Level 4	Required accuracy Level 5
All Shares TB	Monthly	49,0	-23,8	20,2	87,1	37,6	68,3
	Quarterly	38,5	-10,3	20,2	86,9	37,9	69,4
	6 months	32,0	- 3,6	20,2	90,3	38,8	74,7
	Annual	25,7	2,5	20,2	91,5	50,1	81,0
Industrial Holdings TB	Monthly	49,2	-28,7	14,6	84,8	35,4	63,6
	Quarterly	37,2	-14,3	14,6	82,1	34,1	61,0
	6 months	29,6	- 6,5	14,6	85,0	30,7	63,4
	Annual	24,4	- 1,6	14,6	84,6	37,8	67,6
Banks and Financial Services TB	Monthly	51,0	-28,2	15,2	87,1	30,7	63,0
	Quarterly	42,0	-16,3	15,2	83,2	30,4	59,3
	6 months	36,5	-10,3	15,2	82,5	32,9	59,8
	Annual	29,5	- 5,1	15,2	83,1	38,3	62,5
Industrial Holdings All Shares	Monthly	37,5	-15,5	20,21	90,7	39,8	75,6
	Quarterly	29,2	0,4	20,21	87,4	40,8	73,0
	6 months	25,1	6,7	20,21	91,3	42,3	79,7
	Annual	24,6	8,7	20,21	88,6	43,0	77,3
Industrial Holdings Banks and Financial Services	Monthly	33,8	-16,9	15,2	89,0	36,1	71,4
	Quarterly	28,2	- 2,1	15,2	85,0	27,4	62,1
	6 months	27,6	1,0	15,2	79,6	28,3	55,7
	Annual	23,9	5,5	15,2	79,4	27,6	54,5
All Shares Banks and Financial Services	Monthly	47,4	-20,9	20,2	88,6	33,7	68,6
	Quarterly	38,6	- 4,3	20,2	83,1	33,4	61,8
	6 months	33,3	1,5	20,2	83,1	30,8	64,1
	Annual	30,3	5,0	20,2	83,1	32,1	62,5



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Shorter review periods than the one illustrated above permit more switching and consequently higher returns. However, the introduction of transaction costs inhibits switching when the difference in returns between the two assets is less than the cost of the switch.

2. Risk

Financial theory suggests that the standard deviation of portfolio returns is a good indicator of risk. It is easy enough to measure the standard deviation of returns from a "buy and hold" strategy, but a switching strategy introduces another element of risk – choosing the right asset. Were we to simply measure the standard deviation of returns for the perfect timing strategy, we would find it lower than that of the "buy and hold" strategy! This is a result of the fact that switching (correctly) smooths out the troughs.

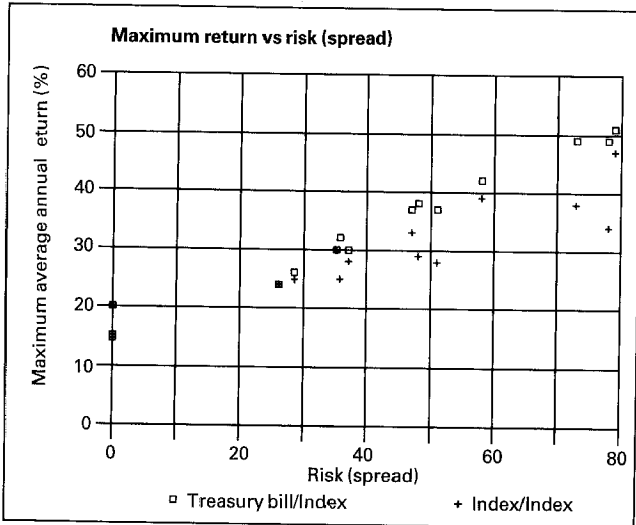
Consequently, measuring the standard deviation of returns ignores part of the total risk faced by an investor who engages in market timing.

There are, however, three other ways to measure risk:

(a) *The range of potential returns*

Measuring the range of potential returns provides a more useful measurement of risk. It was shown earlier that as the review period decreases, the potential return increases, but so does the potential loss. The range (best possible return – worst possible return), is a simple, yet effective measure of risk. Figure 5 below shows the various return/risk (range) characteristics for different asset combinations and different review periods:

Figure 5



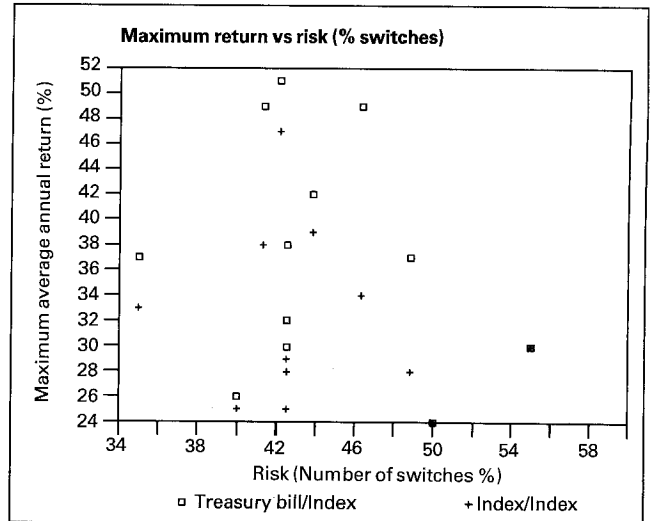
For TB/Index switching strategies there is a near linear relationship between risk and return as measured in the above diagram. Index/Index strategies achieve lower returns for the same levels of risk. This is a result of the high correlation between the different equity sectors. When the market declines, all sectors decline, and investors who do not switch into more stable assets (eg TBs) achieve lower returns and higher levels of risk. A "buy and hold" strategy (risk = 0 by definition) yields a return between 15% and 20% and lies approximately at the intercept of the risk/return line.

(b) *Number of switches*

The more switches between assets that have to be made to achieve a 100% perfect timing return, the higher the risk of not achieving that return. On average, a switch

was necessary 50% of the time, irrespective of the review period, in order to maximise returns. Figure 6 shows returns against the percentage of switches needed to achieve the best possible return.

Figure 6



There is clearly no relationship between the percentage of switches and the annual average return, and this method of measuring risk can be rejected.

(c) *Compression ratio*

The compression ratio is defined as the ratio between the number of review periods contributing the highest positive effect on the best result to the total number of review periods. If only these few best periods are missed then the overall return will be less than the buy and hold return of the best asset. On average, were an investor to be in the wrong asset for the 14% best periods, he would not have been able to better a buy and hold strategy. This percentage is somewhat higher than that reported by Jeffrey (1984) – namely 9%, but in common with his observations, the quarters with the highest returns generally followed periods of low returns, and investors who made the switch into equities in these crucial periods often had to "buck" the prevailing trend. The table below shows the compression ratios for the various asset combinations.

Table 4: Compression ratios

Asset combination	Monthly	Quarterly	6 months	Annual
All Shares				
TB	12,9%	16,8%	17,5%	16,9%
Ind Holdings				
TB	15,2%	17,9%	15,0%	15,4%
Banks and Fin Ser				
TB	12,9%	16,8%	17,5%	16,9%
Ind Holdings				
All Shares	9,3%	12,6%	8,7%	11,4%
Ind Holdings				
Banks and Fin Ser	11,0%	16,0%	20,4%	20,5%
All Shares				
Banks and Fin Ser	11,4%	17,0%	17,0%	16,9%

Conclusions

This study sought to establish what level of predictive accuracy was necessary for a market timing strategy to

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be more effective on the JSE than a naïve buy and hold strategy.

At a level of transaction costs equivalent to deals of R500 000 in size, it was shown that accuracies of the order of 80% to 90% were necessary to ensure that a switching strategy, whether between "the market" and TBs, or between subsets of the market and/or TBs, would always beat the buy-and-hold approach.

Where the need to be 100% certain of beating the index was lowered to the more modest requirement of merely having an equal chance of being above or below the return on the index, and the switching choice was limited to the All Market Index and TBs with monthly review periods, a forecasting ability of at least 69% was revealed.

Under different review assumptions, and assets of different systematic risk, this figure ranged from 59% to 81%.

The removal of transaction costs increased potential returns by about 6%.

Although prior research on the JSE has indicated that it is not as efficient a market as is the New York Stock Exchange, the study described here indicates that the level of predictive ability required to "beat the index" on both markets is not very different. This has some implications for making a judgement about the level of JSE efficiency.

In general, it can be concluded that the achievement of superior returns requires a forecasting ability well above that which would be obtained from a random switching process. Real skill is thus demanded from portfolio managers who hope to "beat the market" by utilising their timing abilities.

Also, very real risks are taken, in view of the large number of decision periods (50%) which require a switch for a perfect strategy to prevail, while only a small number of periods (about 14%) contain those returns without which an investor could not beat the market. Missing these few periods would nullify the impact of any timing strategy!

References

- Black, F and Scholes, M (1974). From theory to a new financial product. *Journal of Finance*, 29, 2, pp 399-412.
- Christy, G A and Clendenin, J C (1978). *Introduction to Investments*. 7th ed. New York: McGraw Hill.
- Francis, J C (1976). *Investments: Analysis and Management*. 2nd ed., New York, McGraw-Hill.
- Gilbertson, B P and Roux, F J P (1977). The Johannesburg Stock Exchange as an efficient market. *Investment Analysts Journal*, 9, March, pp 21-27.
- Gilbertson, B P and Roux, F J P (1978). Some further comments on The Johannesburg Stock Exchange as an efficient market. *Investment Analysts Journal*, 11, April, pp 21-31.
- Goldman, M B (1979). On contingent claims that ensure ex-post optimal stock market timing. *Journal of Finance*, 34, May, pp 401-413.
- Jeffrey, R H (1984). The folly of stock market timing. *Harvard Business Review*, 62, July-August, pp 102-110.
- Jensen, M C (1968). The performance of mutual funds in the period 1945-1964. *Journal of Finance*, 23, 2 May, pp 389-416.
- Knight, R F and Affleck-Graves, J F (1983). The efficient market hypothesis and a change to LIFO: an empirical study on the JSE. *Investment Analysts Journal*, 21, June, pp 21-31.
- Knight, R F and Affleck-Graves, J F (1985). An empirical evaluation of the effectiveness of South African investment analysts. *South African Journal of Business Management*, 16, pp 157-160.
- Reilly, F K (1986). *Investment*. 2nd ed. Tokyo, The Dryden Press/CBS.
- Sharpe, W F (1975). Likely gains from market timing. *Financial Analysts Journal*, 31, March, pp 60-69.
- Sharpe, W F (1981). *Investments*. 2nd ed., Englewood Cliffs N. J., Prentice Hall.
- Strebel, P J (1977). The limited efficiency of The Johannesburg Stock Exchange. *Investment Analysts Journal*, 10, August, pp 15-20.
- Strebel, P J (1978). Thin trading, market efficiency tests and the Johannesburg Stock Exchange: a rejoinder. *Investment Analysts Journal*, 12, August, pp 29-30.
- Treynor, J L (1980). If you can forecast the market, you don't need anything else. *Financial Analysts Journal*, 36, 1, p 2.
- Treynor, J L and Mazuy, K K (1966). Can mutual funds outguess the market? *Harvard Business Review*, July-August, pp 131-136.
- Ward, C W R and Stansfield, M J (1980). Market timing and high risk speculation on the FT index. *Investment Analyst*, 58, October, pp 18-21.
- Webman, N (1982a). Active strategy aids market timers. *Pensions and Investment Age*, 10, December 20, pp 3ff.

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Anatomy of the financial rand

1. Introduction

Financial rand trade regularly in London, New York, Zurich and Johannesburg with price updates appearing in many daily newspapers around the world. Stock exchanges outside South Africa relate their prices of listed South African shares to rand prices in Johannesburg via the financial rand. Despite all this activity, however, there are few who really appreciate the exact nature of financial rand. Such an appreciation is vital if the factors influencing the demand for and the supply of financial rand (and hence its price) are to be understood.

It is not sufficient to regard financial rand simply as South Africa's "investment currency" or to glibly assert that the country has a dual rate of exchange. This may in a sense be true, but it is a superficial approach which does not facilitate any objective evaluation of the relative pricing structure, nor indeed, does it provide any insight into financial rand as a major defence mechanism against the much publicised South African disinvestment campaign.

2. Financial rand narrowly defined

To understand the exact nature of the financial rand, it is first necessary to realise that it is a child of South African exchange control.

South African exchange control is based on the old British model and the legal machinery finds expression in the Exchange Control Regulations, Orders and Rules of 1961, as amended. These regulations were promulgated in terms of the South African Currency and Exchanges Act No 9 of 1933.

In the regulations, a *blocked account* is defined as an account opened with a bank for the purpose of receiving payment from a person in the Republic who is under a legal obligation to make payment to a person outside the Republic. This definition must be considered in conjunction with Section 4(7) of the regulations, which read:

"No sum standing to the credit of a blocked account shall be dealt with in any way except with permission granted by the Treasury."

Given this provision, the Treasury is in a position to prescribe the fate of any funds paid into blocked accounts. Different rules can be applied to different accounts and historically, the South African exchange control authorities have in fact applied different rules to different classes of blocked accounts, differentiated according to the identity of the owners of the funds concerned and/or according to the nature of the transactions giving rise to the payment. Three categories of blocked accounts will now be examined.

- (a) It should be noted that blocked accounts can be owned only by persons resident outside the Rand Monetary Area. Monetary agreements extend the Rand Monetary Area from the Republic of South Africa to South West Africa (Namibia), Lesotho and Swaziland. Self governing states within the Republic, namely Transkei, Ciskei, Bophuthatswana and Venda also fall within the Rand Monetary Area. By definition, therefore, a resident of any territory within the Rand Monetary Area cannot own a blocked account.

An *emigrant* from this region can however, own a blocked account, but only after permanent departure. Indeed, it is a requirement that the sale proceeds of any assets held within the region at the time of departure, be paid to the credit of a blocked account, which may be interest bearing. Large sums of money have accumulated in these blocked accounts since 1961 and Treasury, acting through the South African Reserve Bank, will authorise the release of portion of such funds only under very exceptional circumstances.

- (b) In terms of the regulations, South African residents might legitimately accept a loan from a non-resident only if approval has been secured. Approvals generally contain no assurance that the borrower will be permitted to purchase foreign currency to effect repayment on maturity. Should such permission not be forthcoming on maturity, repayment would need to be made to the credit of a blocked account.

This category includes foreign loans to South African banks. Until August 1985, the South African exchange control authorities followed a fairly liberal policy as regards the repayment of such loans in foreign currency. However, a dramatic loss of confidence in the rand caused by adverse political perceptions resulted in a massive decline in South Africa's foreign currency reserves as many banks took foreign currency repayment without renewal of credit lines. A swing in the leads and lags of foreign payments for current account transactions exacerbated the position and at the end of August 1985, the well documented debt "standstill" came into operation.

Since September 1985, therefore, the funds contained in these blocked accounts have swollen enormously as foreign bank loans have matured. In terms of the "standstill" arrangements, only a relatively small portion of these funds may be converted into foreign currency each year.

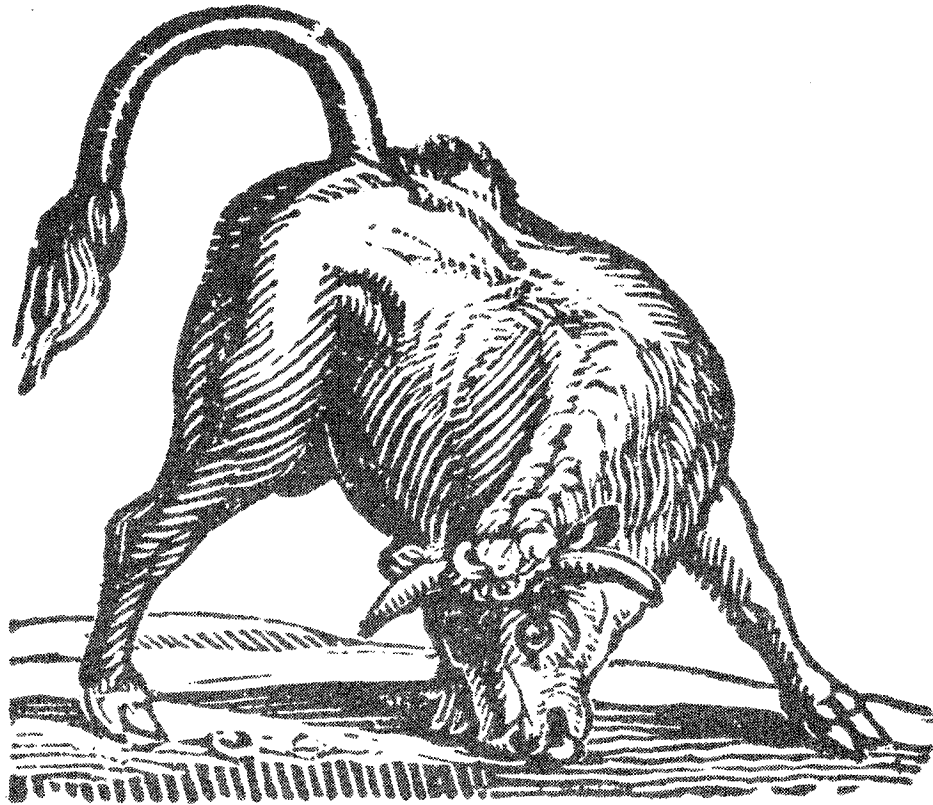
- (c) Non-residents who have sold securities through The Johannesburg Stock Exchange (JSE) would have the proceeds credited to a blocked account to which a very specific set of rules apply. These accounts were originally known as "blocked rand accounts" but in order to more clearly distinguish them from other forms of blocked accounts, the designation was changed to "securities rand accounts" and in more recent times to "financial rand accounts". Such accounts thus contain the proceeds of securities sold through the JSE. The funds concerned may then only be used for the purchase of securities through the JSE.

For a relatively brief period prior to September 1985, the non-resident sellers of securities on the JSE could automatically convert their proceeds into foreign currency at the going exchange rate (known as the commercial rand rate of exchange). However, net foreign disinvestment via the JSE escalated sharply in 1985 and the strains on the foreign currency reserves of South Africa became intolerable. The financial rand account was accordingly restored simultaneously with the "standstill" announcements and once again the sale proceeds of JSE listed scrip was blocked.

*Head of the Department of Business Economics, University of Durban-Westville

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Non-resident holders of balances on financial rand accounts are, however, able to transfer all or part of such funds to a financial rand account in the name of another non-resident. If it is a current account, transfer can be effected simply by way of a cheque. This facility allows trade in financial rand account balances to take place between non-residents. A US dollar price will be negotiated between the parties, acting either as principals or through stockbrokers or banks. Some non-resident banks purchase financial rand which they will keep in "stock" and sell to customers at the prevailing stock exchange quoted price. South African banks may not take such a position, as they are, by definition, not able to own any form of blocked account. They may, however, act as intermediaries between non-resident buyers and sellers.

The narrow definition of financial rand might now be stated as follows:

"Credit balances on non-resident owned blocked bank accounts designated financial rand, which contain the sale proceeds of securities sold through the JSE".

At the beginning of September 1985, the amount standing to the credit of such accounts was zero. Accordingly, in terms of the narrow definition, there were no financial rand in existence.

There could be no trade in financial rand account balances until such account balances were established as a result of net sales of securities by non-residents to South African residents.

3. An expanded perspective

If financial rand account balances can be "created" by non-residents merely by, on balance, selling securities through the JSE to South African residents, it is clear that the sum of financial rand account balances can continue to grow for so long as there are any JSE listed securities in non-resident hands. Similarly, the sum of financial rand account balances would shrink if non-residents were net buyers of JSE listed scrip and if payment therefore was made by drawing on financial accounts.¹

In view of this free exchange or convertibility between financial rand account balances and JSE listed scrip, a non-resident holder of the latter, for all intents and purposes, effectively holds financial rand, albeit in slightly less liquid form. Any study of the financial rand market must accordingly take account of both financial rand account balances as well as non-resident owned securities listed on the JSE: they in fact represent nothing less than latent financial rand.

Non-resident owned securities can easily be identified physically as they have the words "non-resident" stamped thereon. This rubber stamping is undertaken by those South African banks which are permitted to open financial rand accounts, stockbrokers and transfer offices. Their activities in this regard are governed by and inspected in terms of the exchange control regulations. Regulation 14 in particular, is devoted to the administrative treatment of non-resident owned South African securities, which are referred to as "controlled securities". However, not all controlled securities are listed on the JSE. There are many unlisted, ordinary and

preference shares as well as loan stock in public or private companies, owned by non-residents. Even though they fall within the definition of "controlled security" and bear the "non-resident" endorsement, the sale proceeds thereof do not automatically qualify for addition to financial rand accounts. Such proceeds may only be credited to an ordinary blocked account which does not permit drawings for any purpose without the specific approval of the Control.

An expanded definition of financial rand can now be stated:

"Financial rand account balances plus the rand market value of all scrip endorsed 'non-resident' and eligible for sale through the JSE."

In terms of this definition the total effective quantity of financial rand in existence at any time is some finite number of rand and would normally fluctuate only as a function of variations in the market value of the affected scrip.

It is important to note that the "creation" of financial rand account balances referred to previously is no "creation" at all: it is simply a *conversion* from one form of financial rand to another.

4. Demand and supply

Financial rand has value for non-residents by virtue of the fact that related interest and dividend earnings are eligible for immediate foreign transfer at the normal exchange rate. Freedom to transfer such current income is a principle vigorously upheld by the International Monetary Fund and South Africa would be most unlikely to ever deviate from such principle.

In applying discounted cash flow (DCF) techniques to an investment decision, the international investor would take account of his initial outlay of cash in whichever currency he seeks to maximise his returns. When considering a possible JSE listed investment, this will be determined by the rand price of the security, the prevailing financial rand price in dollars and the dollar exchange rate to the selected currency. The expected returns on the investment in that currency will then be projected, together with the ultimate sale proceeds. This projected cash flow will be used in the discount calculations. However, a number of matters need to be considered before the projection can be finalised.

First, the expected earnings in rand needs to be expressed. If a fixed interest stock or preference share is contemplated, the matter is a simple one. If, however, ordinary shares are involved, future company earnings and dividends in rand are more difficult to assess and some form of risk weighting will need to be applied. Exchange rate fluctuations between the rand (commercial) and the selected currency must also be anticipated, again with some form of risk adjustment. A risk adjusted expected stream of future returns expressed in the chosen currency should emerge from this exercise.

The next step is to estimate the rand sale proceeds of the securities at a certain future date. If this should be the maturity date of a stock, the operation is simple. Otherwise, market price will have to be forecast, adjusted for perceived risk. On the assumption that current South African exchange control provisions will still apply at that stage, the proceeds will not be eligible for foreign transfer but only for transfer to a financial rand account, which can be sold to another non-resident at the price

¹Non-resident buyers can, of course, purchase securities through the JSE and pay with the rand proceeds of foreign currency introduced through normal banking channels. However, the normal, or "commercial" rate of exchange will call for a greater dollar outlay.



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ruling for financial rand. That price too, must be predicted.

The international investor will now be in a position to execute discount cash flow calculations and to compare the result against the corresponding results of parallel exercises undertaken in respect of alternative investments elsewhere. Should the comparison favour the South African alternative, he will enter the financial rand market as a buyer.

For the existing non-resident investor in South African listed securities, the procedure outlined above should be applied continually and if there comes a time when, in his perception and given his risk preference, he can do better elsewhere with the dollar proceeds of financial rand, he will enter the financial rand market as a seller.

As with any market for limited resources, the interaction of demand and supply will determine price. The fact that many financial rand transactions take place each day attests to the interest shown in this market.

5. Interaction between financial rand and JSE prices

The *immediate* result of a higher financial rand price would be an increased dollar outlay for a given investment and a corresponding decline in the discounted returns. This would trigger buying order cancellations on stocks and shares, and those prices will tend downwards.

Should the financial rand price edge downward, buying interest will revive as DCF results come back into range.

There, thus, tends to be a short term opposing price relationship between the financial rand and the JSE prices.

However, should the increase or decrease in financial rand price be understood to reflect changed fundamentals, the DCF inputs will need to be updated. A sustained higher gold price will, for example, tend to improve the rand's value on foreign exchange markets and to stimulate domestic economic activity, which should yield higher company profits, higher rand dividends and higher future rand share prices. On the other hand, should political perceptions deteriorate, the risk adjustment factor for cash flow returns and sale proceeds would require amendment. In these circumstances, JSE share prices can move in the same direction as the financial rand.

6. The financial rand discount

Some commentators choose to focus on the financial rand discount rather than the financial rand price *per se*. This discount is calculated by expressing the difference between the financial rand price and the normal exchange rate (the commercial rand price) as a percentage of the latter.

To use the financial rand discount as an indication of price is rather confusing in a situation of fluctuating exchange rates and is really not necessary.

However, the financial rand discount is, in fact, an excellent barometer of foreign investment sentiment toward South Africa. The greater the perceived risk that expected future returns will not materialise, the greater will be the selling pressure on financial rand. In the case of South Africa, it is normally political perceptions which predominate.

The point to remember, however, is that the same financial rand "pool" will continue to circulate between non-residents and "disinvestors" merely pass their

financial rand on to other non-residents. There is no impact on South Africa's foreign exchange reserves.

7. Real creation and destruction

Price fluctuations for the financial rand, we have noted, are due to changes in demand and supply, as for any scarce resource. The total "pool" of financial rand in existence, we have also noted, will normally fluctuate only as a function of the market value of "non-resident" endorsed JSE listed scrip.

Market conditions can, however, be seriously disturbed by administrative decisions. Financial rand can be created or destroyed with a wave of an administrative pen.

The "pool" of financial rand is, for example, increased when an emigrating South African resident is permitted to "transfer a settling-in allowance through financial rand". Settling-in allowances usually amount to R100 000 per family. This R100 000 which would otherwise be destined to lie in an *ordinary* blocked account indefinitely, is allowed to be credited to an account headed "financial rand". Usually the emigrant will need cash in his new country and he will accordingly immediately enter the financial rand market as a seller of his R100 000 brand new financial rand.

Foreign beneficiaries of South African deceased estates might similarly be permitted to have an ordinary blocked account redesignated as financial rand. In fact, whenever the holder of ordinary blocked funds is, on application, permitted to have blocked funds redesignated financial rand, the "pool" is enlarged and the holders will usually become immediate sellers. Market supply intensifies.

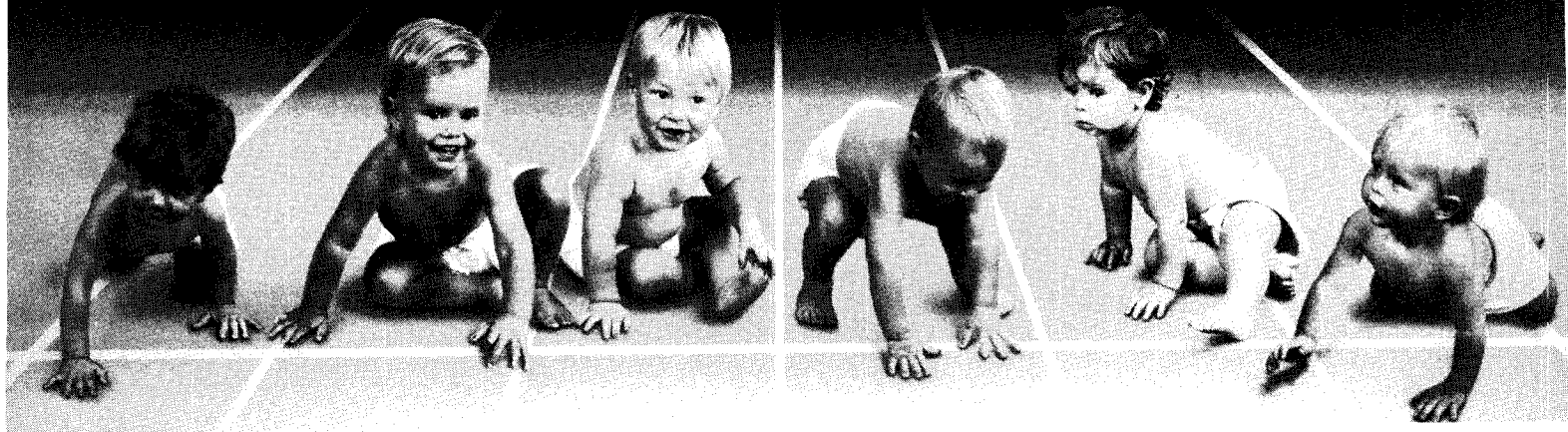
The newly created financial rand costs the South African foreign currency reserves nothing at the time of creation. However, any future earnings on these funds will impact negatively as transfers through commercial rand are effected.

Non-resident companies wishing to establish a subsidiary in South Africa, or to expand an existing operation might, on application, find the exchange control authorities willing to allow them to have the financial rand designation on an account *removed*. Instead of being eligible for the purchase of JSE listed securities, such funds can then be used for the purchase of plant and equipment, for motor vehicles, inventory, wages and salaries and the like. From an accounting point of view, the rands will be credited to share capital of the subsidiary and thereafter shown as disbursements for assets or expenses. These happy investors will, of course, first need to acquire financial rand and their demand in the market will incline the dollar price upward. However, the price paid will undoubtedly still be well below the normal exchange rate. Recent exchange control policy permits, on application, the release of financial rand also for the partial purchase of properties.

This destruction of financial rand has no significance for the foreign currency reserves of South Africa. Dividends on the enlarged share capitals of the relative companies may flow outward through commercial rand, but so too could earnings on the relative financial rand.

The amounts involved in these transactions can be very great indeed. Perhaps even running to nine figures.

South African banks are sometimes able to match purchase and selling orders in their books and they will certainly play a role in smoothing the creation and destruction "bumps" on the market. Nonetheless, there



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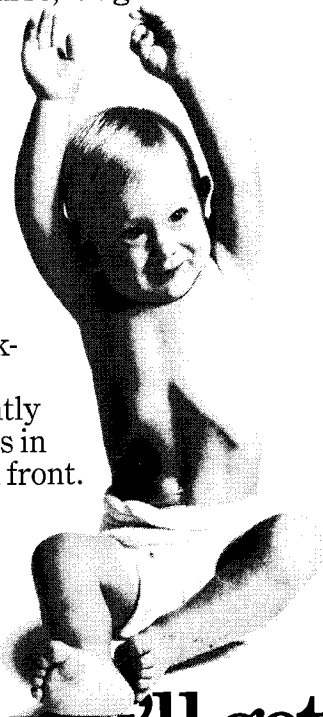
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will from time to time be unmatched buying and selling orders and these will impact directly on the financial rand price. These "bumps" cannot be anticipated, nor can they be easily detected as all is done behind the normal veil of banking secrecy.

It has been estimated that an unmatched order for a mere 2 million financial rand will move the price.

It is, thus, not surprising that many chartists have left the financial rand market with burned fingers.

8. Financial rand "investment" in South Africa

It has already been noted that financial rand "investment" brings with it no new funds to South Africa. From the South African point of view such "investment" is not investment at all but a mere recycling of existing investments.

However, at a time when consumer and investor confidence is at a low ebb, the release of financial rand has the effect of transferring funds from financial assets to real fixed investment and this can have a stimulatory effect on the economy.

9. Disinvestment

In recent times several multinationals have grandly announced their disinvestment from South Africa. However, it is now quite evident that this "disinvestment" is not a disinvestment at all, from the South African point of view.

Should their investment have been in shares which were listed on the JSE, the sale of those shares to South African residents would have resulted in a switch from one form of financial rand to another. Without impacting on the foreign currency reserves of South Africa, those financial rand could certainly be offered for sale to other non-residents. When one observes, however, that the amounts involved can sometimes be as much as 700 or 800 million financial rand, it would no doubt take a very long time indeed to turn those financial rand into dollars at any reasonable sort of price. It is suspected that some "disinvestors" will, willy, nilly, remain invested for a long time to come.

Should the investment have been in shares which were not listed on the JSE, the proceeds of the sale to South African investors would go to an ordinary blocked account and might, depending on administrative policy, remain there indefinitely.

The financial rand mechanism thus allows non-residents to "disinvest" publicly without any real net foreign disinvestment. It is an important defense against capital account shocks to the foreign currency reserve position.

10. Friend or foe to South Africa?

In the short term there is no doubt that the financial rand is a friend to South Africa in protecting its reserves.

Nonetheless, the fact remains that the financial rand is an integral part of exchange control. Exchange control, as an economic policy option can be defended when fixed rates of exchange prevail. But those days are long gone. Fluctuating exchange rates are the order of the day and South Africa too has adopted the policy of a "managed float".

In these circumstances, exchange control will inevitably result in untenable distortions in the pricing system, less than optimal resource allocation and possible adverse employment and inflationary impulses.

Exchange control furthermore, inhibits any *real* new investment in South Africa and real investment, which adds to reserves, is essential if the country is to have any hope at all of growing sufficiently to accommodate the economic aspirations of all her peoples.

11. Conclusion

Before any real new investments will materialise, the financial rand discount must first close and the financial rand system must then be dismantled.

This cannot happen until investor confidence has been restored and confidence is very sensitive in this instance to political perceptions.

Until political perceptions improve, South Africa dare not dismantle the financial rand.

Meaningful political change must necessarily be implemented by the ruling party. It is believed that some compromise will be reached which will certainly not satisfy all but which will at least provide a platform for a healing of race relations in a post-apartheid society. It is a society which even now proclaims itself to be Christian: black and white alike. Perhaps a bridge of love will unite those Christians and establish the foundations for the healing platform.

Until that happens, the financial rand remains.

Investment basics XXI

Options trading in the gilt-market

Part 1: A background to the market

In early January, gilt traders returning from Christmas holidays were looking forward to some action after a dull December. Long gilt rates were at 15,42% and had been fairly lacklustre for some time. The 400 point bull market of 1986 had left most operators with good profits but 1987 had not been quite so kind. Long dated gilts had traded generally within the 14,50% to 15,50% band with most of the year's activity above 15%. The "common consciousness" in January was that the market would resume a bull trend and rates would drift gently down. Consequently, most of the market's active traders were holding long positions. In the early weeks of January, interest rates rose substantially. The year had not started auspiciously for most. In an attempt to read the "top of the market", traders bought stock at just under 16% and watched helplessly as rates continued to pass through the "so called" 16,20% resistance level like a hot knife through butter. Within a few weeks, long term gilts yields had risen some 180 basis points, representing a potential capital loss of some R70 000 per million nominal stock purchased. Certainly, the buyer had the benefit of running yield but that is little comfort when interest rates rise sharply and has never been one of the better reasons for keeping a long position.

What could a portfolio manager have done to avert this crisis? If he was a visionary, he could have sold his position out before the rise and invested in shorter dated security. He could also have sold short, borrowing the stock every account day until he closed out his position when rates had risen. This is often a cumbersome exercise and there is no guarantee that the stock can be borrowed. Besides, there are still many market participants who fail to grasp how one can sell what one does not own. In all probability he did nothing at all.

The enlightened portfolio manager would have made use of options and would have, at worst, minimised the damage of rising interest rates and, at best, made substantial capital gains.

Options in South Africa are a fairly new financial innovation in fixed interest markets. The market began with over the counter options in the early 1980s. One of the problems of running a gilt position was the absence of hedging mechanisms. Decisions were either right or wrong and if they were wrong, you dropped the stock into the bottom drawer and withdrew until your wounds had healed. We had no such thing as futures with which to insure against the unthinkable possibility that an investment decision may go awry. So, in a rather strange twist to the logical sequence of events, options were introduced in SA ahead of the futures market.

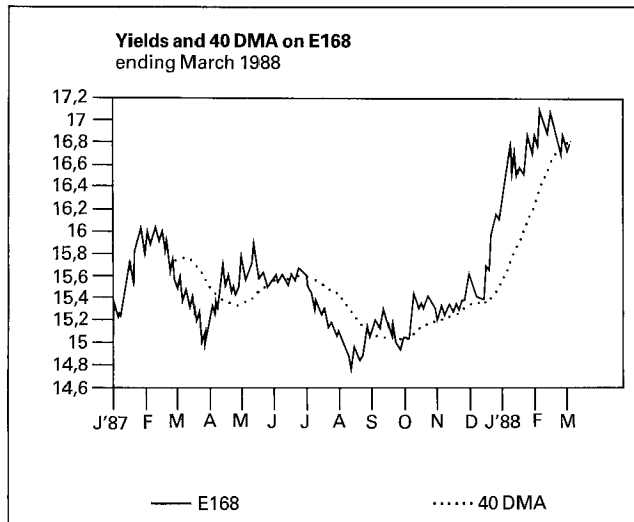
Options are quite simply a right, but not an obligation, to buy or sell a certain stock at a certain price within a certain time frame. The call option gives the holder the right to buy stock and the put option the right to sell stock. The option trades at a price, known as the premium, which takes into account the period of the option and the likelihood of the option being exercised. In other words, the purchaser is paying for time and probability.

The need for some means of insuring against risk was

long overdue in 1983 when over-the-counter (OTC) options made their appearance. Somewhat more cumbersome than their modern standardised counterparts, OTCs involved buyer and seller agreeing on dates, prices and strike rate. In a rapidly moving market it was often difficult to strike a bargain because one or the other party was watching rates move erratically and hoping to squeeze a better deal. The result was a fairly thin and inefficient market. The next step, in August 1987, was the development of a standardised option. This was very much the initiative of Eskom and a group of innovative bankers who, after consulting with interested parties, introduced options on loan 168, maturing on the first Thursday of the following months: February, May, August and November. As one maturity passes, so the next is activated. Another development was to quote the buying and selling prices via the Reuters screen. This meant that traders could display prices and attempt to make a market, thereby greatly increasing liquidity. The market is currently trading for only the nearest two maturity dates, although that may be due in part to the complexities of the Reuter system. The strike rates are fixed and are determined by the level of market rates. They are currently 17%, 16,5% and 16%. The spot rate for Eskom 168 is 16,75% at the time of writing. If that rate were to trade above 17% for five consecutive trading days, then a new strike rate of 17,5% would appear and 16% would come off the quoted screen. Conversely, if the rate were to close below 16,5% for five consecutive days then 17% would disappear and be replaced by 15,5%. Prior to this, there were no strict rules as to how strike rates should be determined with the result that a strong enough vested interest could keep strike rates artificially low if it believed this would prevent spot rates from rising. This happened earlier this year and the result was that the quoted options market bore less and less relevance to the spot market and temporarily lost its liquidity. Meanwhile, participants traded off screen at market related strike rates. It also served as a lesson to the unsophisticated that trying to interfere with natural market forces not only costs money but also affects market credibility. The major advantage of the standardised option is the fixed strike rate and date, leaving only the premium as the variable. Obviously, it is easier to trade an instrument with only one variable, however complex the pricing of that variable may be.

The current situation then, is that we have a standardised option on Eskom 168 which is quoted through Reuters. The option is usually in the form of a bearer negotiable instrument and is transferred by delivery. There is no standardised format for option documents as yet, which ought to be a major cause for concern. Nor are the documents printed on security paper which makes possible forgery a problem. Furthermore, there is no reporting of any sort to the monetary authorities (because they have not asked for the information) so it is impossible to tell what options are in the market at any time, how many have traded and what the major players' exposure is. This is not an ideal situation and the result is that the market is relatively small and trades between institutions that feel comfortable with each other. The

comparative lack of sophistication makes the market attractive in the sense that profitable arbitrage opportunities often arise, but unattractive, particularly to foreign investors, because of the unstructured nature of the market.



The fact that options on other stocks are still traded only on an OTC basis must inhibit their potential. Also, out of four major long dated stocks (R124, SAPO, SAT and Eskom) why should the market choose the E168? The reason is very simple. Although both R124 and SATS have had their day as the market's bell-wether long dated stock, volume on Eskom 168 is about five times the volume of the other stocks every day because Eskom have concentrated on making a market in both stocks and options and obviously investors prefer to buy something they know they can sell. After all, why buy stock that not even the issuer is prepared to buy? This makes options in other long dated stocks as unattractive as the stock itself and, apart from technical strategies, the market prefers to stick with the E168.

While option activity is concentrated on the long end of the market, there is a very definite demand for some similar instrument in the medium dated gilts. Whether this gap is filled by options or futures, or both, remains to be seen. The few options that are written on medium dates are, again, over the counter and only trade sporadically.

Options were developed by both stockbrokers and bankers in the early 1980s but it was the banks that formed the nucleus of the market in 1984, with stockbroking firms developing and selling the concept to their institutional clients. Although considerable lip-service was paid to the idea at a conference in May 1984, the actual support in the early days of the market was a little disappointing. It was only really when standardised options were introduced that more participants became aware of opportunities; probably because they could see prices quoted on their Reuter screens and therefore were aware of the potential profits. Although the market is still growing, options are now being used, for a variety of reasons, by banks, discount houses, parastatals, mining houses, brokers, life companies, pension funds and even private investors. There are still the reactionary few who will have nothing to do with options, but this is probably due more to an unwillingness to learn new tricks than any rational opposition to options. Unlike other capital markets, the competition for top investment jobs is not

as seen in SA with the result that standards are generally poorer because performance is not under the spotlight.

Having set the scene, the second part of this series will concentrate on the practical use of options, the theory of pricing and how market forces often make a mockery of even the most sophisticated pricing mechanisms. A glossary of Optionspeak follows.

Glossary of option terminology

American option	An option exercisable at any stage of its life up to the strike date.
At the money	Spot rate and strike rate are identical.
Bear	One who believes prices will fall and therefore, in the bond market, that yields will rise. The bear will either be short of stock or buy put options.
Bearer document	A financial instrument, ownership of which is transferred by simple delivery. If the financial instrument carries a special endorsement it is no longer a bearer document but is payable to the endorsee.
Bond	A certificate issued by a borrower as security for monies borrowed. A generic term for gilts and semi gilts.
Box option	A simultaneous purchase of both a call and a put option.
Break even point	The level at which an option neither loses nor makes its owner money.
Bull	One who believes prices will rise, and therefore that yields will fall. The bull will either be long of stock or buy call options.
Call option	The right, but NOT the obligation to buy a particular bond at a specific rate within a specified period.
Confirmation note	A written notification that a transaction has taken place. It should contain all the details of the transaction. It is not a bearer document.
Coupon	The annual interest rate payable on a bond.
Delivery date	The settlement date on which the bond is bought in the case of an exercised call option; or delivered in the case of an exercised put option.
Discount stock	A bond trading at a yield above its coupon therefore giving a clean price below its par or redemption value.
European option	An option exercisable ONLY on the strike date and not at any other stage of its life. SA options are almost all of the American kind.
Exercise	To invoke the right granted in the option. Call holders will buy bonds, put holders will sell bonds.
Grantor	The writer or maker of the option and, therefore, the party to whom the buyer has recourse. The grantor's name will appear on the original document.
In the money	An option which if exercised would produce a profit for the holder.
Long of stock	To hold a bull position in bonds that are expected to rise in price and give the holder a profit.
Intrinsic value	The value of an option if it were to expire immediately. The amount by which the option is in the money.
Option contract	The underlying contract is an option deal. The contract pledges to buy or sell a certain stock at a certain price within a certain time. The right to exercise is at the discretion of the holder.

Out of the money	An option which, if exercised, would produce a loss for the owner.	Short of stock	To hold a bear position by selling bonds that you do not own in the hope of buying it at a cheaper price before the settlement date.
Point	A point in the SA bond market refers to ,01% on the yield. Therefore, 20 points below 14,90% would be 14,70%.	Spot rate	The rate quoted in the market for the current settlement date.
Premium	The price paid for an option. The sum of the intrinsic value and the time value premium.	Stock	A general term for a position in bonds: long of stock.
Premium stock	A bond trading at a yield below its coupon thereby giving a clean price greater than its par or redemption value.	Strike date	The final date on which an option can be exercised.
Price	The amount of consideration payable for a particular bond.	Strike rate	The rate at which the holder can exercise an option.
Put option	The right, but NOT the obligation to sell a particular bond at a specific rate within a specified period.	Time value	The amount by which an option's total premium exceeds its intrinsic value.
Rate	The terms RATE and YIELD are interchangeable. Rate is simply an abbreviation for interest rates which is the same as yield.	Volatility	A measure of the amount by which an underlying bond can be expected to fluctuate within a given period.
Settlement date	Bonds are normally traded in the spot market for delivery on the third Thursday from the date of the transaction. When an option is exercised the stock is delivered on the third Thursday from that date.	Yield to maturity	Bonds trade at a yield to maturity and have to be converted to a price. The yield moves constantly and reflects the level at which investors are prepared to lend money for a given period.

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