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Number 35 – Winter 1992

Die
Beleggings-
ontleders
Tydskrif

Nommer 35 – Winter 1992

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This paper updates a 1987 study on market timing on the JSE. It shows that the crash of October 1987 had little impact on the probability of successfully using a timing strategy to “beat the market”. It was also found that there was little difference in the potential for timing between an investment in the All-Share Index and one in the gold sector only. The distinction lay in the higher volatility of the gold share index. Finally it is shown that investors who retain a degree of liquidity in their portfolios face dramatically lowered ranges of possible returns and require a higher level of forecasting ability in order to beat the returns on the market index.

Modelling a series of uneven deposits and a series of uneven percentage withdrawals

The theory of interest is a widely discussed area of application in financial management. For practical purposes several basic interest formulas have also been developed to be selected depending on the circumstances under which they are to be applied. The most extensively used among them is the compound interest formula which is necessary to deal with long term investment. Usually in accountancy literature the development of the basic interest formulas are given case by case. Furthermore, the withdrawals and receipts are treated as exact values.

In this paper the development of a general formula for a series of uneven deposits and a series of uneven percentage withdrawals is presented. The derivation uses the “time value of money” concept which is central to the theory of interest arguments. It is also shown that the general formula can be reduced to obtain the commonly applied basic interest formulas instead of the traditional method of developing them separately for each case.

The Impact of the Efficiency of the South African Share Index Futures Market on Hedging Effectiveness and Optimal Exposure Management over the Period 1987 to 1989

An empirical investigation was undertaken to assess the impact of futures market efficiency on hedging effectiveness and optimal exposure management in the South African SIF market for the period June 1987 to December 1989. It was found that hedge performance in the market has remained on the same levels over the period. Results further suggest that optimal (risk-minimising) hedges are significantly affected by contract mispricings albeit in a manner not consistent enough to formulate general conclusions.

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An evaluation of the market rating of retained earnings of companies listed on the Johannesburg Stock Exchange: An empirical analysis

This investigation evaluates the efficiency of retained earnings of a sample of 50 companies listed on the Johannesburg Stock Exchange during the period 1978-1987. The empirical evidence shows that company managers are not always efficient in deciding how much profits should be retained for reinvestment. While, on average, the companies in the sample benefitted from an increase in market price associated with retained earnings, the majority of companies were penalized by the decision to retain earnings. There appears to be no correlation between the popular measures of company performance and the three measures representing shareholder interests.

Given the limitations of return on equity and other company performance measures, appropriate ratios are suggested which could be used to measure shareholder interests as well as operational decision criteria for company performance evaluation. The use of the suggested ratios could assist in removing the various impediments and structures which prevent shareholders from obtaining the maximum benefits from retained earnings. The suggested operational decision criteria could also assist in the creation of a more efficient capital market which redistributes capital from the less efficient to the more efficient companies.

A South African Corporate Bond Market?

This paper explores the attitude of major players in the capital markets to the question of why there is virtually no corporate bond market in South Africa. Information was sought as to whether investors ought to be provided with a broader range of risk instruments; what criteria investors seek in a corporate bond market; whether these overlap with the criteria important to potential debt issuers, and what hurdles restrict the development of such a market.

Information was elicited through the medium of a mailed questionnaire sent to a sample of listed companies. Included were all life insurers and banks, together with the larger pension funds, investment companies and merchant banks.

It was found that the attitudes of South African financial managers were generally positive towards the issuing of corporate bonds. Enough potential issuers with appropriate attributes existed. High inflation was seen as a critical stumbling block impeding formation of such a market. Needed too were market makers and the establishment of a rating agency. The presence of derivative markets and the introduction of more floating rate debt were also seen as factors which would lead to the formation of a formal bond market.

Investment Basics – XXV Volume and the Bull-Bear Cycle

Four basic assumptions on the relationship between market behaviour and price action enable a descriptive model of changes in turnover during a complete bull-bear cycle. It is found, contrary to common wisdom, that an increase in volume does not necessarily confirm the ruling trend. Instead, when turnover begins to increase following a period of sustained rising or falling trend, it may well signal the end of that trend. This fact can be used to anticipate changes in the trend.

The following firms have, in addition to our advertisers, assisted in the financing of this issue of the journal and thanks are due to them for their kindness.

Bo en behalwe ons adverteerders, het die onderstaande maatskappye hulp verleen met die finansiering van hierdie uitgifte van die tydskrif en hulle word bedank vir hulle vriendelikheid.

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The Investment Analysts Journal

Thirty-fifth issue – Winter 1992

Die Beleggingsontleders Tydskrif

Vyf-en-dertigste uitgawe – Winter 1992

The failure of Working Group 2 at the Codesa negotiations to reach agreement on the institution of interim constitutional change will have come as a disappointment to most South Africans. After the decisive 'Yes' vote in April's referendum, a climate of expectation had built up regarding progress towards an interim government, this being seen as necessary not only for the final lifting of sanctions and the normalisation of South Africa's relationship with the IMF and World Bank, but also for the taking of important initiatives regarding the domestic economy. The economy has been stagnating for at least three years. During this time unemployment has continued to rise exponentially. Today, estimates of formal unemployment, ie the difference between the aggregate of the economically active population and the aggregate of employment in the formal sectors of the economy, range from a low of 4 million to well over 6 million. In these data are rooted all the evidence that we have of social breakdown including violent crime which has begun to spill over into the areas of residence of our more affluent communities. Physical insecurity has ceased to be only a problem of the poor. There can be no durable solution to the problem of violence and crime without sustained economic recovery, and it is now long overdue.

A factor in South Africa's disappointing economic growth over the last three years has been the global recession. Because of the Gulf war and German unification, this has lingered on for longer than most economic analysts and governments had expected. However, the evidence is now beginning to accumulate that the global economy is recovering. In Germany and Japan, the rate of real GDP growth has fallen sharply but is still positive, and likely to remain so. In the US and Britain, it has dipped into negative territory but is in the process of bouncing back. By the end of the year, recovery should be more widespread and advanced. All this augers well for South Africa. If sanctions etc can be removed, the chances are good that economic growth here will increase, perhaps even above the rate at which the economically active population is increasing.

Notwithstanding the abovementioned Codesa disappointment, progress has been made on the establishment of an Economic Forum. Organised business and labour between them have already agreed on a framework for deliberations, and government is being drawn into what is happening. At a meeting between business, labour and government on 15 May, the new Minister of Finance, Derek Keys, showed his awareness of the need to achieve the common ownership of all important economic initiatives in the new South Africa. The time has passed when government can hand down such initiatives from on high and expect others to follow compliantly. The Economic Forum could assume in time an importance as great as that of Codesa itself.

THE EDITOR

Die feit dat Werkgroep 2 tydens die Codesa onderhandelinge nie ooreenkoms kon bereik oor die daadwerklike instelling van tussentydse konstitusionele verandering nie, sal vir meeste Suid-Afrikaners 'n teleurstelling wees. Na die beslissende 'Ja' stem in die April Referendum, het verwagtinge al hoe meer toegeneem dat 'n tussentydse regering mettertyd daargestel sou word. Dit is nie alleenlik gesien as noodsaaklik, vir die finale opheffing van sanksies en die normalisering van Suid-Afrika se verhouding met die IMF en die Wêreldbank nie, maar is ook beskou in die lig van belangrike inisiatiewe betreffende die binnelandse ekonomie wat nou al vir drie jaar stagneer. Gedurende hierdie tyd het werkloosheid eksponensieel toegeneem. Vandag wissel ramings van formele werkloosheid, d.w.s. die verskil tussen die ekonomies aktiewe bevolking oor die geheel en indiensneming in die formele sektore van die ekonomie globaal geneem, van 4-miljoen tot ruim meer as 6-miljoen. In hierdie data vind 'n mens reeds al die bewyse dat ons sit met 'n sosiale ineenstorting met inbegrip van gewelddadige misdaad wat begin oorstort na die woongebiede van ons meer welvarende gemeenskappe. Fisiese gebrek aan sekuriteit is nie meer net 'n probleem van die armes nie. Daar kan geen blywende oplossing vir 'n probleem van geweld en misdaad wees sonder volgehoue ekonomiese herstel nie, en dit bly nou al lank uit.

'n Faktor in Suid-Afrika se teleurstellende ekonomiese groei oor die afgelope drie jaar was die wêreldwye resessie. Vanweë die Golf-oorlog en Duitse eenwording, het dit langer voortgeduur as wat die meeste ekonomiese ontleders en regerings verwag het. Daar is egter nou al hoe meer bewyse dat die wêreld ekonomie aan die herstel is. In Duitsland en Japan het die reële BBP groeikoers skerp gedaal, maar is steeds positief, en sal waarskynlik so bly. In die VSA en Brittanje was daar 'n kortstondige negatiewe daling, maar 'n herstel het begin intree. Teen die einde van die jaar behoort die herstel meer algemeen en verder gevorderd te wees. Dit alles beloof veel vir Suid-Afrika. Indien sanksies ens verwyder kan word, is die kans goed dat ekonomiese groei hier sal styg, selfs bo die koers waarteen die ekonomies aktiewe bevolking toeneem.

Nieteenstaande bovermelde teleurstellende gebeure by Codesa, is vordering gemaak met die stigting van 'n Ekonomiese Forum. Georganiseerde besigheid en arbeid het onderling ooreengekom oor 'n raamwerk vir raadpleging, en die regering word tans betrek in wat aan die gebeur is. Op 'n vergadering tussen sakemanne, georganiseerde arbeid en die regering op 15 Mei, het die nuwe Minister van Finansies, Derek Keys, getoon dat hy daarvan bewus is dat daar 'n behoefte bestaan aan gemeenskaplike eienaarskap van alle belangrike ekonomiese inisiatiewe in die nuwe Suid-Afrika. Die tyd is verby dat die regering net sulke inisiatiewe uit die hoogte van stapel kan stuur om dan te verwag dat diegene onder aan die ontvangant inskiklik moet volg. Die Ekonomiese Forum kan met verloop van tyd net so belangrik word soos Codesa self.

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Market Timing Revisited

ABSTRACT

This paper updates a 1987 study on market timing on the JSE. It shows that the crash of October 1987 had little impact on the probability of successfully using a timing strategy to "beat the market". It was also found that there was little difference in the potential for timing between an investment in the All-Share Index and one in the gold sector only. The distinction lay in the higher volatility of the gold share index. Finally it is shown that investors who retain a degree of liquidity in their portfolios face dramatically lowered ranges of possible returns and require a higher level of forecasting ability in order to beat the returns on the market index.

INTRODUCTION

Although market timing formed the subject of research papers as early as the 1960's (eg Treynor and Mazuy, 1966; Jensen, 1968), the period since the stock market crash of October 1987 appears to have spawned fresh interest in the subject (eg Clarke, FitzGerald, Berent and Statman, 1989; Samuelson, 1989; Vandell and Stevens, 1989; Samuelson, 1990, and Sy, 1990.)

Research into the accuracy required for successful timing decisions on the JSE covering the period 1967 – 1986 was published by Firer, Ward and Teeuwisse in 1987. This study was based on work done by Jeffrey (1984) on the New York Stock Exchange. He compared buy-and-hold strategies for the Standard and Poor 500 Index and for Treasury Bills with a timing strategy where the fund manager had perfect forecasting ability and was either completely in or completely out of the market. He concluded that the potential gains were outweighed approximately twice by the potential losses.

He then developed a 'football' shaped graph, the boundaries of which represented the best and worst possible returns resulting from market timing, given various levels of predictive ability. All the possible outcomes of a timing strategy were contained within the 'football'. Using the graph he concluded that a 75% level of predictive accuracy was required in order to better a 'buy-and-hold the market' strategy.

Firer *et al.* (1987) examined the influence of forecasting ability, transaction costs, asset choice and timing frequency on the performance of a portfolio managed using a market timing strategy. The Industrial Holdings Index, All Share Index, Banks and Financial Services Index, T-bills and Banker's Acceptances were the investment instruments used in the study. Seven different combinations of a relatively high-beta and a relatively low-beta asset between which switching was to take place were chosen. Their results were consistent with those of Jeffrey and it was concluded that, on average, a 70% accuracy rate in forecasting market moves was required for an equal chance of gaining or losing relative to a buy-and-hold strategy. An accuracy rate of at least 86% had to be achieved in order to eliminate the possibility of obtaining a return below that of buy-and-hold.

Given the renewed interest in the subject of market timing, it was felt that the 1987 study should be extended.

Research Objectives

- (a) Gold shares, which form a significant sector of the JSE, were not included in the earlier study. This study investigates the impact on a timing strategy when the All Gold Index is used to represent the relatively high-beta asset.
- (b) Periods of very high volatility provide an interesting test of a timing strategy. In October 1987, the JSE fell some 23%. By February 1988 it had fallen 44% from its August high, yet by December 1989 it stood 10% higher than it was at its pre-crash peak. The Firer *et al.* (1987) study, which only used data up to the end of 1986, is extended by three years in order to investigate the effect of a major stock market crash on the timing strategies studied in the original work.
- (c) The 1987 research is extended to cover timing strategies in relation to South African unit trusts. Originally, in terms of the Unit Trust Control Act (1962) as amended, a minimum of 5% of a unit trust's portfolio had to be held in liquid assets. The 'all or nothing' approach of the previous research, where an investor was assumed to be entirely in or out of the market, is modified in order to determine the influence of constraints on portfolio performance which would result from the holding, either voluntarily or due to legal constraints, of a portion of the portfolio in a cash asset.

Methodology

Timing may be defined as switching between asset classes in order to adjust the systematic risk (beta) of the portfolio ahead of an anticipated turning point in a capital market. The All Share Index (and where appropriate, the All Gold Index) on the JSE was selected to represent the high-beta asset since this index usually forms the benchmark against which the performance of professional portfolio managers is judged. South African Treasury Bills were used for the relatively low-beta asset.

Raw monthly data for the All Share and All Gold indices were obtained from the JSE. Treasury Bill discount rates were sourced from the Financial Mail.

A portfolio review period was defined as the length of time during which the composition of a portfolio is not altered. At the end of the period the investor has the option of exchanging the asset in the portfolio for the alternative investment or leaving the portfolio unchanged. Monthly, quarterly and annual review periods were used.

Transaction costs, as calculated by Teeuwisse (1987), were maintained at an average 1.38% per switch. Holding period returns were calculated using monthly index values and dividends. It was assumed that all funds invested during a period, plus the earnings accrued during the period, would be reinvested at the start of the next period.

The potential range of returns achievable through market timing was evaluated using a micro-computer spreadsheet. In the first instance the asset with the higher holding period return was chosen each review period in line with the achievements of an investor who was able to forecast market turns perfectly. The annualised return over the 23 year study period was calculated, taking into account transaction costs which were incurred in the process of switching between assets.

The returns obtained when forecasting ability was less than perfect were then established. The number of incorrect choices increases as the level of forecasting accuracy decreases. A best and a worst result can be associated with each precision level, depending on the periods which are missed. If the investor is incorrectly positioned only once then a variety of possible outcomes exist, depending upon whether, in the period

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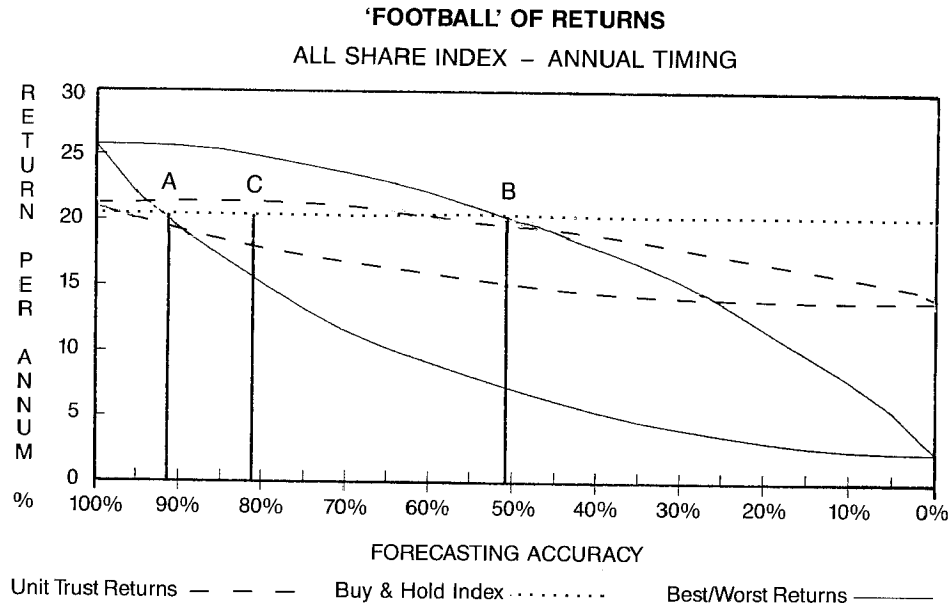


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Market Timing Revisited

missed, the marginal difference between the returns on the two assets is 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).

level was the level below which market timing always resulted in a lower return than buying and holding the relatively high-beta asset (B). Between the previous two levels can be found a level at which there is an equal probability of gain or loss relative to buying and holding the high-beta asset (C).



Five levels of forecasting accuracy were calculated. The first two, which are self explanatory, were at 100% and 0% accuracy. The third was the level above which the return from market timing was always higher than the return from buying and holding the asset with the higher overall return (A). The fourth

Due either to legal constraints or for precautionary motives, unit trusts are likely not to be fully invested in the market. The calculation of the best and worse case returns was therefore modified to allow for a variation in the percentage invested in the two assets. The portfolio was reviewed on an annual ba-

TABLE 1
Potential returns from market timing

Investment Period	Asset Choice	Timing Interval	B & H Index Return p.a.	B & H T-bills Return p.a.	100% Perfect Timing Return p.a.	100% Incorrect Timing Return p.a.	Gain/Loss Spread p.a.*	Loss/Gain Ratio **	% Switching †	Compression ‡‡	Certain Gain	Certain Loss	Equal Chance of Loss or Gain in Returns
67-86	AS-TB	monthly	20,2%	8,3%	49,0%	-23,8%	72,8%	1,53	41,4%	12,9%	87,1%	37,6%	68,3%
67-86	AS-TB	quarterly	20,2%	8,3%	38,5%	-10,3%	48,8%	1,67	43,0%	13,1%	86,9%	37,9%	69,4%
67-86	AS-TB	annual	20,2%	8,3%	25,7%	2,5%	23,3%	3,24	42,1%	8,5%	91,5%	50,1%	81,0%
67-89	AS-TB	monthly	20,1%	8,9%	48,8%	-23,6%	72,4%	1,52	42,0%	12,7%	87,4%	37,1%	68,3%
67-89	AS-TB	quarterly	20,1%	8,9%	38,6%	-9,6%	48,2%	1,61	39,1%	12,8%	87,2%	35,8%	68,7%
67-89	AS-TB	annual	20,1%	8,9%	25,5%	3,1%	22,4%	3,21	43,5%	8,3%	91,7%	49,0%	80,7%
67-86	AG-TB	monthly	25,2%	8,3%	69,8%	-30,8%	100,6%	1,26	43,2%	12,2%	87,8%	32,9%	65,3%
67-86	AG-TB	quarterly	25,2%	8,3%	50,3%	-14,0%	64,3%	1,57	44,3%	12,1%	87,9%	34,2%	70,0%
67-86	AG-TB	annual	25,2%	8,3%	34,1%	-0,4%	34,5%	2,88	57,9%	9,7%	90,3%	46,1%	79,3%
67-89	AG-TB	monthly	22,8%	8,9%	67,6%	-31,2%	98,8%	1,21	44,5%	12,6%	87,4%	32,4%	64,1%
67-89	AG-TB	quarterly	22,8%	8,9%	48,0%	-13,8%	61,8%	1,45	42,4%	13,0%	87,0%	32,3%	67,7%
67-89	AG-TB	annual	22,8%	8,9%	33,0%	-1,0%	34,0%	2,30	56,5%	12,1%	88,0%	43,5%	75,0%

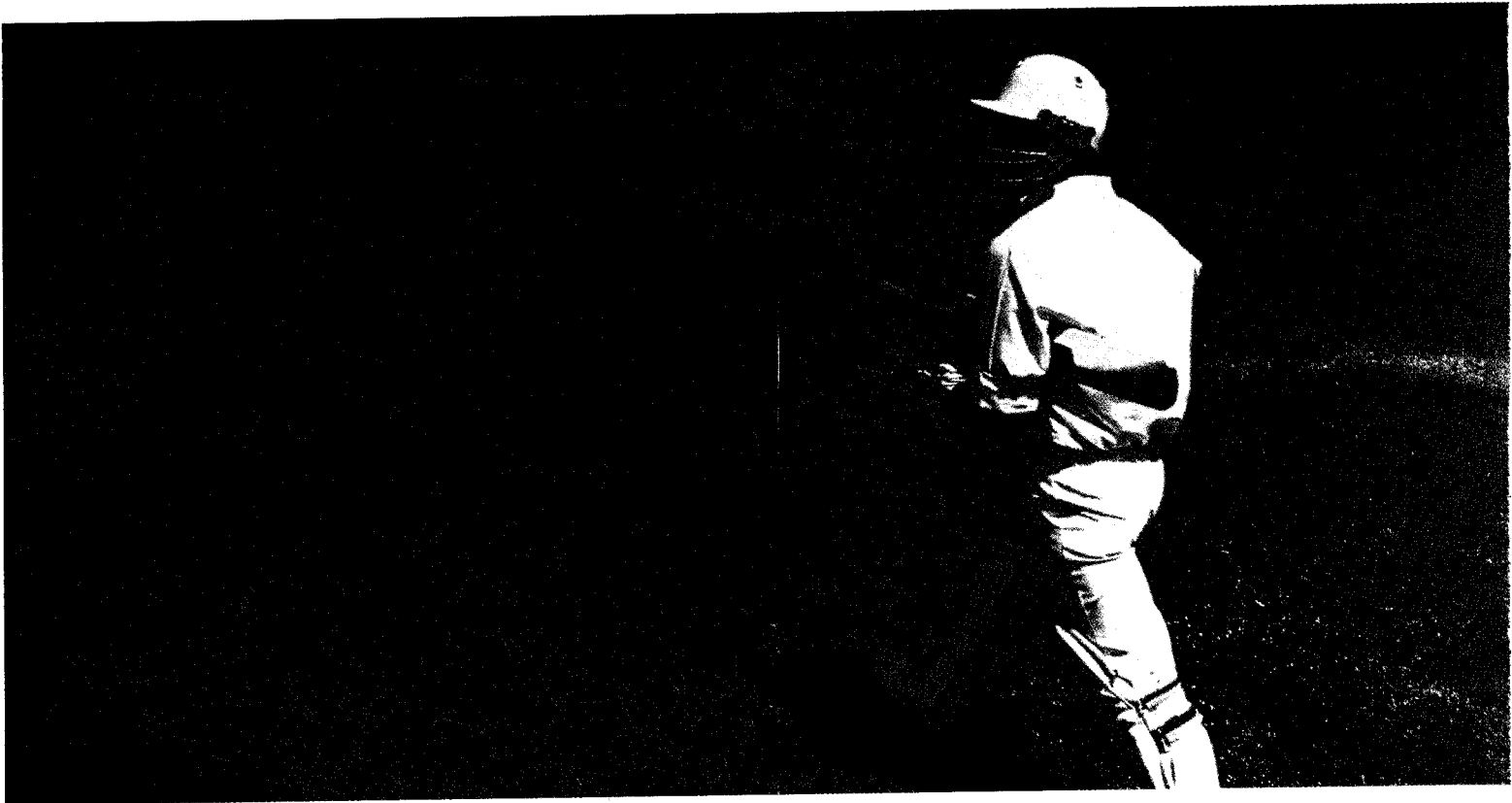
* Difference between best case and worst case returns

** Absolute ratio of potential loss on 100% incorrect timing to potential gain on 100% perfect timing, relative to the buy-and-hold return on the index

† Number of portfolio changes necessary for 100% perfect timing relative to the possible number of switches, expressed as a percentage.

‡‡ The percentage of holding periods with the most influence on the results from perfect timing. Missing these periods would yield a return below buy-and-hold.

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sis, and the effect on the positioning of the 'football', when only a partial switch in assets took place, was studied.

Results

The results for monthly, quarterly and annual timing strategies for the period 1967-1986 using the All Gold Index and T-bills are presented in Table 1 together with the comparative results obtained by Fifer *et al.* (1987) on the All Share Index. The impact of extending the study to December 1989 is also presented in the table.

The returns from perfect timing using the All Gold Index were on average 34% higher than the returns from the All Share Index. This would, of course be expected, given the higher volatility of the Gold Index as compared to the All Share Index.

The return from 100% incorrect timing was consistently lower for the All Gold Index than for the All Share Index. An investor in the All Gold Index switching at monthly intervals could have achieved a return as low as -31% by forecasting wrongly every period.

The spread between the return from perfect timing and the return from incorrect timing was calculated for the various timing intervals and combinations of assets. The spread was far greater for the All Gold Index than for the All Share Index. It was at its widest using monthly timing intervals and was slightly higher over the shortest investment period.

The ratio of the potential loss from 100% incorrect timing to the potential gain from perfect timing, relative to buying and holding the high-beta asset, was greater than one in all cases, indicating that an investor could lose more than he could gain. The ratio was higher for the All Share Index than for the All Gold Index, was at its greatest for annual timing intervals and decreased slightly over the extended investment period.

Successful market timing requires a specific number of switches between assets during the investment period. A comparison between the number of switches required for perfect timing using the different asset combinations, investment periods and timing intervals is also presented in Table 1.

On average it is necessary to make a switch in approximately 45% of the periods, regardless of the timing interval. There was no marked difference between the number of switches required when the different asset combinations were used. In addition there was no relationship between the number of switches and the magnitude of the returns achieved from perfect timing.

It is obvious that certain holding periods offer much higher returns than others. If the wrong decision is taken for these specific periods, a return which is worse than the return achieved from a buy-and-hold strategy will result. The compression ratio is defined as the ratio between the number of the abovementioned holding periods and the total number of holding periods. It is so called because "most of the 'positive action' is compressed into just a few periods." The smaller the ratio the more difficult it is to achieve a return which is above the buy-and-hold return. In all cases the compression ratio (see Table 1) was at its lowest for annual review periods. Thus if an investor missed the best 2 years, a lower return than that offered by a buy-and-hold strategy would have been achieved. This has significant implications regarding the required forecasting ability of anyone attempting to time the market.

The level of accuracy above which market timing yielded a return which was certain to be higher than that obtained from buying and holding the All Gold Index varied between 87% and 90%. A forecasting ability of between 65% and 79% was required in order to have an equal chance of being above or below the buy-and-hold return on the All Gold Index. These values

do not differ significantly from the equivalent figures for the All Share Index.

The levels of accuracy required for the period 1967-1989 were slightly less than those required during 1967-1986. The higher the required rate of accuracy the more difficult it is to time the market successfully. An investor timing his portfolio on an annual basis was in all cases required to be more accurate in his forecasting than an investor who was switching monthly or quarterly. This is in agreement with the results from the compression ratio analysis. It implies that successful market timing on an annual basis is more difficult than monthly or quarterly timing. Furthermore the potential returns are lower.

A review of Table 1 indicates that the effect of the October 1987 market crash on a long term timing strategy would appear to be minimal. The buy-and-hold returns fell slightly during the period 1967 to 1989, and the returns from perfect timing were marginally lower in all but one case.

What was the significance of the October 1987 market crash to the long term investor? The returns from a passive investment strategy with a horizon up to the end of 1989 were not diminished by the crash, due of course to the market recovery over the following two years. Had a 20 year review period ended in February 1988 at the post crash market low, the buy-and-hold return on the All Share Index would have been 17,1%, down 3% on both the 20 year (1967-1986) and 23 year (1967-1989) periods studied.

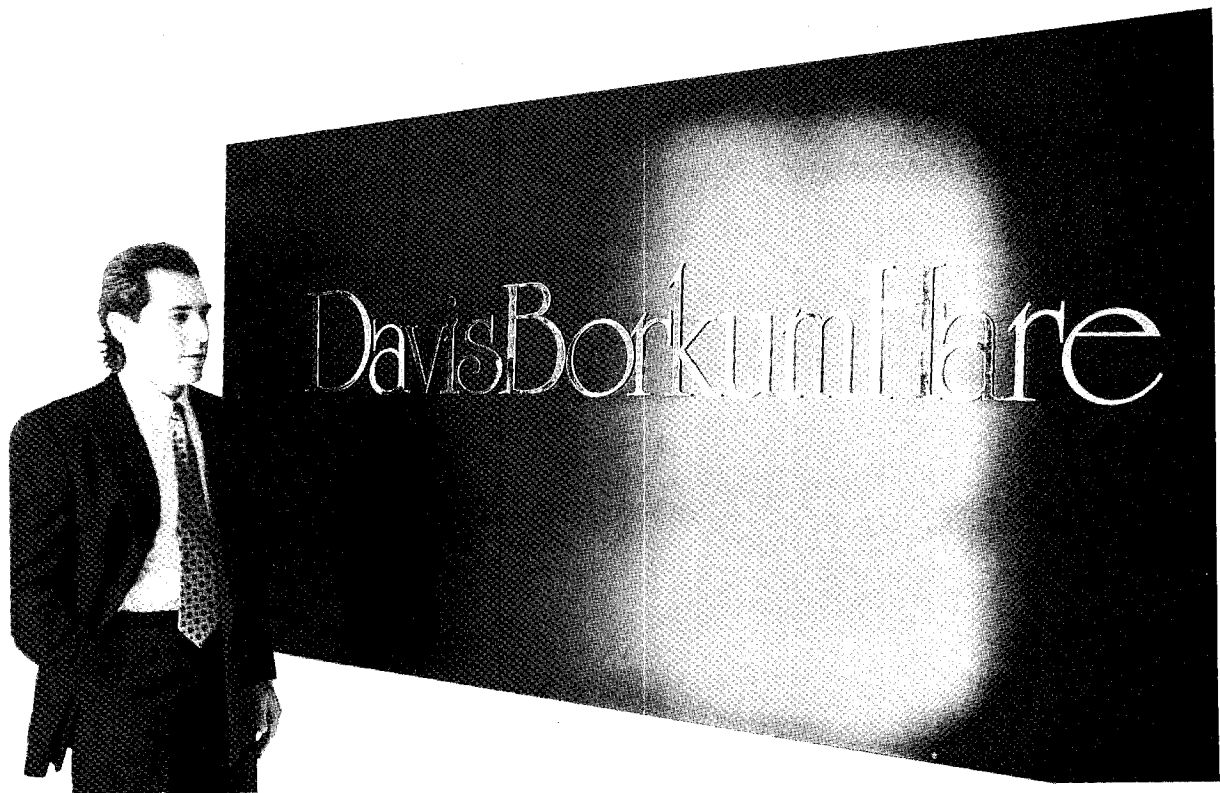
The implication of the high degree of similarity in Table 1 between the two investment periods indicates that the compound annual returns of investors with long term horizons are not seriously affected by the sometimes dramatic swings in market sentiment. The changes in the various measures relating to timing ability were found to be minimal, indicating that a long term market timer's chances of success were not significantly affected by the major market movement which occurred in 1987.

It was observed by Knight (1987) that Unit Trusts in South Africa have historically held between 5% and 35% of their total assets in liquid assets. However, an assumption underlying the research of Jeffrey (1984) and Teeuwisse (1987) was that a portfolio manager who engaged in market timing was either fully invested in the market or in a risk free asset but not in a combination of the two. The effect of moving between a 95% and 65% investment in the market was therefore investigated for the period 1967 to 1986, and the results for an annual review period are presented in Figure 1 and Table 2.

As can be seen in Figure 1, the 'football' becomes narrower as more stringent restrictions are imposed. This indicates a smaller range of possible returns at each accuracy level. Furthermore the gain - loss spread between perfect and incorrect timing decreases as restrictions are imposed.

Limiting the maximum amount invested in the market resulted in lower returns from both a buy-and-hold strategy and from perfect timing because full advantage could not be taken of those periods with the highest market returns. However, the returns from 100% incorrect timing were considerably increased because the effects of mistiming were cushioned.

Holding a proportion of the portfolio in liquid assets has the effect of decreasing the gain-loss spread. Using this spread as the definition of risk would lead to the conclusion that timing is less risky if a fixed percentage of the portfolio is always invested in liquid assets. The required accuracy levels in forecasting are however higher when restrictions are imposed. In addition the incremental gains of perfect timing over buy-and-hold are decreased. The decrease in the compression ratio which is associated with a fixed percentage invested in the risk-free asset means that less of the best periods can be missed before a buy-and-hold strategy yields higher returns.



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TABLE 2

Returns	Percentage Invested in the All Share Index and T-bills	
	100%-0%	95%-65%
Buy-and-Hold the Index at Maximum in Market	20,2%	19,9%
100% Perfect Timing	25,7%	21,0%
100% Incorrect Timing	2,5%	14,3%
Gain-Loss Spread	23,3%	7,0%
Potential Gain of Perfect Timing over Buy-and-Hold the Index	5,5%	1,3%
Accuracy Levels		
Certain Gain	91,5%	92,4%
Certain Loss	50,1%	55,9%
Equal Probability of Gain or Loss in Terms of Returns	81,0%	84,1%
Switches	42,1%	42,1%
Compression	8,5%	7,6%

Legal constraints or liquidity considerations which result in the holding of liquid assets therefore encourage a strategy of buy-and-hold rather than one of market timing.

Conclusions:

Markets rise and markets fall, yet even a cursory glance at the JSE Actuaries Indices will show an overall upward trend in share prices.

Dramatic as a crash of the magnitude of that of October 1987

may have been, it had little impact on the probability of successfully using a timing strategy to "beat the market". Even if a market timer had predicted the crash it would not have significantly influenced the return achieved over a long investment horizon. The effect of a market crash on a buy-and-hold strategy is however dependent on the starting and ending dates of the review period.

This research has also shown little difference in the potential for timing between an "All-Share" investor and one who seeks to switch in and out of the Gold sector only. The impact lay only in the higher volatility of Gold share prices.

Finally, it was observed that investors who retain a portion of their portfolios in cash in order to maintain a degree of liquidity, to lower the risk profile of their investments or for statutory reasons, face a dramatically lowered range of possible returns, and require a higher level of forecasting ability in order to beat the returns on the market index.

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Modelling a series of uneven deposits and a series of uneven percentage withdrawals

INTRODUCTION

The theory of interest is a widely discussed area of application in financial management. For practical purposes several basic interest formulas have also been developed to be selected depending on the circumstances under which they are to be applied. The most extensively used among them is the compound interest formula which is necessary to deal with long term investment. Usually in accountancy literature the development of the basic interest formulas are given case by case. Furthermore, the withdrawals and receipts are treated as exact values.

In this paper the development of a general formula for a series of uneven deposits and a series of uneven percentage withdrawals is presented. The derivation uses the "time value of money" concept which is central to the theory of interest arguments. It is also shown that the general formula can be reduced to obtain the commonly applied basic interest formulas instead of the traditional method of developing them separately for each case.

DEVELOPMENT OF THE GENERAL MODEL

Here, the development of the general model for the amount of a series of uneven deposits and a series of uneven percentage withdrawals is presented.

Notation

Denote as:

- P_o – the deposit made at the beginning of the first interest period;
- P_j – the deposit made at the end of the j th interest period;
- r_j – the percentage withdrawal (receipt) of the sum left at the end of the j th interest period prior to the deposit made in the j th interest period;
- i – the rate of interest per interest period;
- X_j – the sum left at the end of the j th interest period;
- Y_j – the accumulated receipts during the first ' j ' (inclusive) interest periods;
- S_j – the 'amount' at the end of the j th interest period.

Assumption

1. The rate of interest per interest period is constant

The Model

The series of the sum left and the accumulated receipts at the end of each of the first ' n ' interest periods is shown in Table 1.

Table 1. The sum left and the accumulated receipts at the end of each interest period

Interest period (j)	Accumulated Receipts (Y_j)	Sum left (X_j)
0 (start)	0	$P_o = X_o$
1	$X_o(1+i)r_1$	$X_o(1+i)(1-r_1) + P_1 = X_1$
2	$X_o(1+i)r_1 + X_1(1+i)r_2$	$X_1(1+i)(1-r_2) + P_2 = X_2$
.....
n	$\sum_{t=1}^n X_{t-1}(1+i)r_t$	$X_{n-1}(1+i)(1-r_n) + P_n = X_n$

It follows then that;

$$S_n = X_n + Y_n$$

where,

$$Y_n = \sum_{t=1}^n X_{t-1}(1+i)r_t$$

and

$$X_n = \sum_{k=1}^n \{P_{k-1}(1+i)^{n-k+1} \cdot \prod_{q=k}^n (1-r_q)\} + P_n$$

Further, when the expression for X_n is substituted in the expression for the accumulated receipts, it follows that;

$$Y_n = \sum_{t=2}^n \left\{ \sum_{k=1}^{t-1} P_{k-1}(1+i)^{t-k+1} \cdot \prod_{q=k}^{t-1} (1-r_q) \right\} r_t + \sum_{t=1}^n P_{t-1}(1+i)r_t$$

APPLICATIONS

Application of the general model for frequently occurring different situations is presented here.

(a) Single deposit at the beginning of the first interest period

When only a single deposit is made and at the beginning of the transaction, the general expressions for the sum left and the accumulated receipts reduces to;

$$X_n = P_o(1+i)^n \cdot \prod_{q=1}^n (1-r_q)$$

and

$$Y_n = \sum_{t=2}^n \{P_o(1+i)^t \cdot \prod_{q=1}^{t-1} (1-r_q)\} r_t + P_o(1+i)r_1$$

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These reduced expressions covers a wide range of practical applications. For instance, when the percentage receipts are even (ie. $r_1=r_2=.....=r_n=r$) the sum left and the accumulated receipts become;

$$X_n = P_o(1+i)^n \cdot (1-r)^n$$

and

$$Y_n = \sum_{t=2}^n \{ P_o(1+i)^t \cdot (1-r)^{t-1} \cdot r \} + P_o(1+i)r$$

Further, it follows that when there are no receipts until end (ie. $r=0$), the amount of the single deposit is;

$$S_n = P_o(1+i)^n$$

This is the compound interest situation.

When the percentage receipts are even so that $r=i/(1+i)$, the amount of the single deposit is;

$$S_n = P_o(1+i)^n \cdot \frac{1}{(1+i)^n} + \sum_{t=1}^n \{ P(1+i)^t \cdot \frac{1}{(1+i)^{t-1}} \cdot \frac{i}{(1+i)} \}$$

$$= P_o(1+in)$$

This is the simple interest situation.

Furthermore, when only a single deposit is made and at the beginning of the transaction, the receipts will be even when;

$$P_o(1+i)r_1 = P_o(1+i)^2 (1-r_1)r_2 = \dots\dots\dots$$

$$\dots\dots\dots = P_o(1+i)^n (1-r_1)(1-r_2)\dots\dots\dots(1+r_{n-1})r_n$$

It follows then that,

$$(1+i)(1-r_j) = \frac{r_1}{r_{j+1}}, \quad j=1, 2, \dots\dots\dots, (n-1)$$

and the sum left at the end of the nth interest period is,

$$X_n = P_o \cdot \frac{r_1}{r_n} (1+i)(1-r_n)$$

The above expression can be used to determine how large can each withdrawal be to be left with a zero balance after the last one has been made. This can be obtained by letting $X_n=0$. Then $r_n=1$. After a series of substitutions in the relationship for r_j and r_{j+1} , it can be shown that;

$$r_j = \frac{(1+i)^{n-j}}{\sum_{k=0}^{n-j} (1+i)^k}, \quad j=1, 2, \dots\dots\dots, (n-1)$$

By substituting the corresponding value for r_1 in the expression for the receipt in the first interest period it follows that the magnitude of the even receipt (R) is;

$$R = P_o(1+i)r_1 = \frac{P_o i(1+i)^n}{(1+i)^n - 1}$$

When the interest period is an annum, this expression is equivalent to the formula for determining the annual receipt (R) to retire a loan 'P_o' within 'n' interest periods which is the annual receipts from an annuity situation. Therefore, it can be concluded that to retire a loan of 'P_o' within 'n' interest periods so that the receipts are even, the percentage withdrawals corresponding to the jth interest period should be;

$$r_j = \frac{i(1+i)^{n-j}}{\{(1+i)^{n-j+1} - 1\}}, \quad j=1, 2, \dots\dots\dots, n$$

(b) Even deposits and a single receipt at the end of the transaction

When the deposits are even (P) and made at the end of each interest period over the time span and no receipts prior to the lapse of the time span (ie. $r_1=r_2=.....=r_n=0$), the general formula for the amount reduces to;

$$S_n = \sum_{k=2}^n \{ P(1+i)^{n-k+1} \} + P$$

$$= \sum_{k=1}^n P(1+i)^{n-k}$$

When the interest period is an annum the above formula represents the compound value of a regular annuity. This formula is also applicable to find the periodic payment necessary for accumulation of a future sum. In this case 'P' is considered the periodic payment and 'S_n' the future sum.

GRAPHICAL INTERPRETATION

When only a single deposit of P_o is made and at the beginning of the first interest period and the percentage receipts are even over the time span, the expression for the sum left at the end of the nth interest period can be used to interpret graphically the different circumstances under which the basic interest formulas have been developed.

Now,

$$X_n = P_o(1+i)^n (1-r)^n$$

Live life, don't force it.

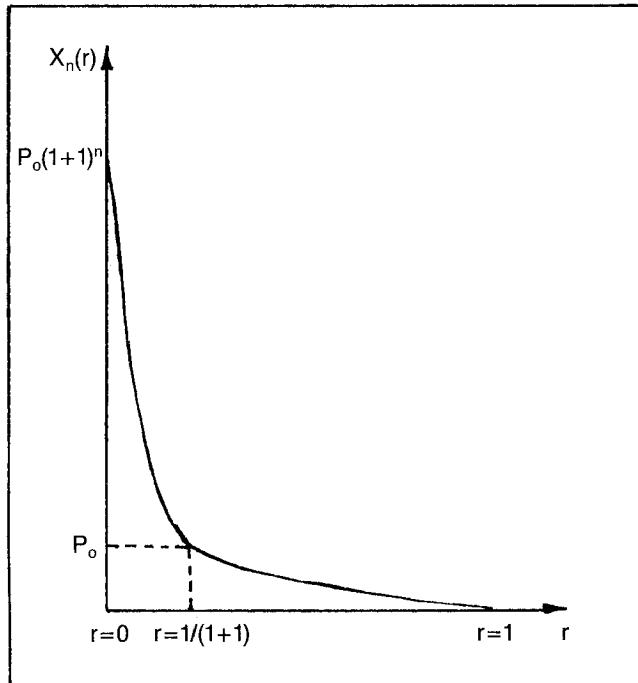


You can't escape all the pressures and hassles of life. It's a case of living life not forcing it, working smarter not harder and putting a little of the weekend into every day. We'll help you live your life by adapting our policies to suit you.

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For given 'i' and 'n' the sum left will then be a function of 'r'. The graph of $X(r)$ is given in Figure 1.

Figure 1. Graph of sum left of a single deposit and after a series of even receipts for given 'i' and 'n'



Using the graph of Figure 1 the sum left corresponding to different values of 'r' or in the alternative the possible sum left when the desired even percentage withdrawal is known can be determined. For easy reference the possible sum left and the accumulated receipts for different values of 'i' and 'n' can be tabulated for each of the desired values of 'r'.

CONCLUSIONS

This paper has outlined the development of the general model for a series of uneven deposits and a series of uneven percentage receipts over a time span. In the formulation it has been assumed that the rate of interest per interest period remain constant through out the time span. It has also been demonstrated that the general model can be reduced to obtain the commonly applied basic interest formulas by incorporating appropriate conditions of their applicability.

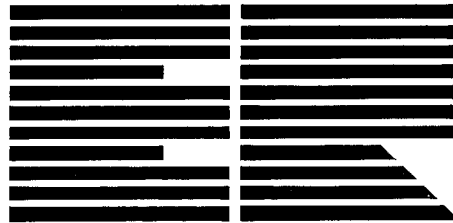
The main emphasis in this study has been the introduction of the percentage factor for receipts instead of exact values. Among the reduced versions of the general model discussed here, the one with the even percentage receipt will be the most useful in practical applications. In this case the structure of the function for the accumulated receipts indicate that the periodic receipts over the time span will be decreasing at a constant rate depending on the selected value for the percentage receipt. Further, the corresponding sum left will also be a decreasing function of the percentage receipt and has been interpreted graphically.

Even though the application areas considered in this study are not exhaustive, it has been demonstrated that the use of a general model extends the application of the theory of interest to a broad range of financial decisions. A recent study (Galagedera, 1990) has also demonstrated the development of a general model for a series of uneven deposits and a series of uneven receipts of exact values and highlighted the reduction of the general model to obtain some useful basic interest formulas. Further, it has also highlighted the previously relatively less discussed applications areas.

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The Impact of the Efficiency of the South African Share Index Futures Market on Hedging Effectiveness and Optimal Exposure Management over the Period 1987 to 1989

ABSTRACT

An empirical investigation was undertaken to assess the impact of futures market efficiency on hedging effectiveness and optimal exposure management in the South African SIF market for the period June 1987 to December 1989. It was found that hedge performance in the market has remained on the same levels over the period. Results further suggest that optimal (risk-minimising) hedges are significantly affected by contract mispricings albeit in a manner not consistent enough to formulate general conclusions.

1. Introduction

A previous study (Snell and Smit, 1990) has indicated that severe departures from strict cost-of-carry pricing have occurred in the stock index futures (SIF) market over the period mid-1987 to December 1989. The pricing efficiency in this market is of much more than mere academic interest. The subject is of particular importance to hedgers with very short term objectives. Daily mispricing of SIF contracts produces a stochastic return component which affects daily returns on a hedged portfolio and consequently the effectiveness of short-term hedging. This holds implications for hedge-ratio selection on entering into futures contracts for the purposes of such hedges. Mispricing affects the suitability of the usage of the contracts as hedging instruments. Apart from this, it affects overall hedging costs. This study addresses this issue empirically in the local context by examining the implications of mispricings for *ex post* short-term hedging over the abovementioned period.

2. Hypotheses tested

The notion that market efficiency affects hedging effectiveness holds implications for hedge-ratio selection in a situation where contract mispricings persist. One of the objectives of hedging is to reduce portfolio risk. Mispricing produces an additional risk-component not accounted for in normal hedge-decisions. Merrick's (1988) analytical work on the incorporation of mispricing effects into hedge-ratio selection procedures, provides a framework within which to seek empirical evidence in support of an argument that (short-term) hedging effectiveness is significantly affected by pricing efficiency in so far as hedging effectiveness increases in sympathy with an increase in pricing efficiency. The hypotheses in this regard can be stated as:

- H₀: mispricing has had no effect on optimal hedge-ratio selection over the period relevant to the investigation; against
- H₁: mispricing has had implications for optimal hedge-ratio selection over the period relevant to the investigation.

3. Theoretical overview

Mispricing, the deviation of futures contract prices from the theoretical values of such contracts, affects hedged portfolio returns – positively or negatively. This holds implications for portfolio risk management, and consequently hedge-ratio selection. Portfolio theory dictates that:

$$R_{t+1} = R_{t+1}^C + h_t R_{t+1}^f \quad (1)$$

where: R_{t+1} = the expected one-day return on the hedged portfolio;

R_{t+1}^C = the expected return in the spot market; = $(C_t - C_{t-1})/C_{t-1}$; C_t the date t spot index value;

R_{t+1}^f = the expected return in the futures market; = $(F_t^1 - F_{t-1}^1)/C_{t-1}$;

F_t^1 = the actual date t futures price; and

h_t = the selected hedge-ratio.

Merrick (1988) shows analytically that in contrast to what is implicitly assumed when a constant hedge-ratio is used, optimal (risk-minimising) hedges require dynamic intervention. The optimal hedge ratio is determined by:

$$h_t^* = f(\tau_{t+1}; \pi_{t+1}; R_{t+1}^f; R_{t+1}^w) \quad (2)$$

where: h_t^* = optimal (conditional) hedge-ratio;

π_t = the cost-of-carry yield; = $\frac{T-t}{s} \ln \{ \exp(r_t \tau) - (\sum_{s=1}^T D_{t+s} \exp(r_t \tau_{t+s})/C_t) \}$;

τ_t = time to contract expiration (in years);

R_{t+1}^w = $(W_{t+1} - W_t)/C_t$;

W_t = $F_t^1 - F_t$;

F_t^1 = the actual date t futures price;

F_t = the theoretical price;

r_t = risk free interest rate; and

D_t = dividends "received" on the index.

In theory, risk-management objectives can be achieved through the proper manipulation of h_t . The degree to which such objectives can be met is, however, affected by contract mispricing, as is suggested by equation (2). Mispricing affects optimal hedging in a manner which cannot be predetermined on days prior to the date one day before contract expiry. The elimination of mispricings through improved performance of arbitrageurs, should therefore bring about improved hedging effectiveness.

It can be shown analytically (Merrick (1988)) that the particular manner in which mispricing affects returns can be described by a model:

$$R_{t+1} = \exp(f_1(\pi_t; \tau_t)) - R_{t+1}^w \exp((f_2(\pi_t; \tau_t)) + \exp(f_3(\pi_t; \tau_t)) f_4(R_{t+1}^f; R_{t+1}^w) \quad (3)$$

All symbols are as defined before.

The equation reveals that, if it is assumed that arbitrage trading enforces $|W_j| < |W_i|$ ($j > i$) over the short term, contracts that are initially overpriced ($W_i > 0$) lead to a negative

¹ A linear relationship between τ and the dependent variable is implicitly assumed. Furthermore, increases in the number of market participants and the number of contracts traded are not explicitly modelled.

mispricing return component ($R_{t+1}^w < 0$) and consequently a positive contribution to overall returns, on average over a period date; to date j . The opposite is true for contracts that are initially underpriced ($W_i < 0$; $R_{t+1}^w > 0$ and hence negative returns over a period spanning date i to date j).

The focus of this study is on the consequences of mispricing for exposure management. Equations (2) and (3) provide the insight required to empirically inspect the effects of contract maturity and mispricing on hedging effectiveness and portfolio returns in real futures markets.

4. Delimitations and assumptions

The analysis on hedging and hedge performance is done with the equity index portfolios. Hedging with real-world portfolios involve the additional complication of "tracking" problems. The approach of using index portfolios in hedging analysis eliminates the need to consider tracking error complications, so that these are ignored in the study. It is assumed that this approach does not invalidate major conclusions.

Only data spanning the period June 29, 1987 to December 15, 1989 are analysed.

5. Research Methodology

5.1 Testing the hypotheses on hedge performance trends

Mispricing brings about both risk and return repercussions to a hedged portfolio. Johnson's (1960) measure of hedge performance is one widely used in research literature on hedge effectiveness. The measure estimates the risk reduction achieved during a hedge. In symbols:

$$\epsilon = 1 - \text{Var}(R^h) / \text{Var}(R^u) \quad (4)$$

where: ϵ = hedging effectiveness measure;
 $\text{Var}(R^h)$ = return variance on hedged portfolio;
 $\text{Var}(R^u)$ = return variance on unhedged portfolio.

The major shortcoming of this measure is that it ignores return considerations. Howard and D'Antonio (1987) derived a measure which considers both the risk and return elements of hedging decisions. They proposed:

$$\text{HBS} = (r + \theta^H \sigma^c - R^c) / \sigma^c \quad (5)$$

where: HBS = hedging benefit per unit risk;
 $\theta^H = (R^p - r) / \sigma^p$
 R^p = the average expected daily return for the hedged portfolio;
 R^c = the average expected daily return in the cash market;
 r = the risk-free rate;
 σ^p = the standard deviation of daily returns on the hedged portfolio; and
 σ^c = the standard deviation of daily returns in the cash market over the hedge period.

The above measure is fairly simple to apply on an *ex post* basis and does not suffer from the shortcoming of Johnson's measure. It was therefore applied in measuring hedging performance in the market. Simple two-sample analyses were used in comparing the average hedge performance period over the 1987 period with that over the same period in 1988 (June – December), and similarly for a 1988/1989 comparison. The following hypotheses were tested:

$$\begin{aligned} &H_0: \mu_{\text{HBS87}} = \mu_{\text{HBS88}} \\ \text{vs } &H_1: \mu_{\text{HBS87}} \neq \mu_{\text{HBS88}} \\ \text{and } &H_0: \mu_{\text{HBS88}} = \mu_{\text{HBS89}} \\ \text{vs } &H_1: \mu_{\text{HBS88}} \neq \mu_{\text{HBS89}} \end{aligned}$$

Periods for the respective comparisons were subdivided into

two-week hedge periods and the average hedge effectiveness per two week hedge per year computed. Hedged portfolio returns were calculated with equation (1) and the particular hedge-ratios for each day were computed via regression modelling discussed in Section 5.2. Monday-returns and returns over holidays were excluded from the analysis to steer clear from possible day-of-the-week effects. So were the October 1987 crash period returns.

5.2 Effects of contract mispricing on hedge-ratio selection

It was pointed out that the particular hedge-ratio which would minimise risk is a function of both time-to-expiry of the contract and the extent and direction of mispricing. There might be valuable lessons to be learned from an investigation into the *ex post* effects of these two variables on optimal hedge-ratio selection.

Daily returns on the risk-minimising hedge portfolio can be expressed as:

$$R_{t+1}^* = R_{t+1}^c + h_t^* R_{t+1}^f \quad (6)$$

where: R_{t+1}^* = the risk-minimisation portfolio return; and
 h_t^* = the risk-minimising hedge-ratio.

Both R_{t+1}^* and h_t^* can be expressed as functions of (W_t/C_t) and τ_t . On the assumption of a linear relationship, linear expansion of eq. (6) facilitates the application of OLS-regression analysis to make inferences about the manner in which departure from cost-of-carry pricing has dictated the selection of optimal (risk-minimising) hedges. The equation can be rearranged as:

$$R_{t+1}^c = \alpha + \alpha_1 (W_t/C_t) + \alpha_2 (\tau_t) + \{\beta + \beta_1 (W_t/C_t) + \beta_2 (\tau_t)\} R_{t+1}^f + e_{t+1} \quad (7)$$

where: $\alpha, \alpha_1, \alpha_2, \beta, \beta_1$ and β_2 are regression coefficients to be estimated; and
 e_{t+1} = the random error term.

The (conditional) hedge-ratio is the linear function constituting the coefficient of R_{t+1}^f . Multiple linear regression analysis using R_{t+1}^c as dependent variable, and variables $(W_t/C_t), \tau, R_{t+1}^f$ and products $R_{t+1}^f \tau_t$ and $(W_t/C_t) R_{t+1}^f$ as independent variables could reveal information about both direction and size of the impact of W_t and τ_t on the optimal hedge ratio.¹

Should the coefficients β_1 and β_2 be significantly different from zero, it would indicate the hedge-ratio determination will not be optimal if mispricing and contract maturity are not taken into account. The following hypotheses were therefore tested:

$$\begin{aligned} &H_0: \beta_1 = 0 \\ \text{vs } &H_1: \beta_1 \neq 0 \\ \text{and } &H_0: \beta_2 = 0 \\ \text{vs } &H_1: \beta_2 \neq 0. \end{aligned}$$

Estimated coefficients with acceptable levels of significance could now be used to calculate the optimal daily hedge-ratios and daily returns required to test whether hedge performance has shown any trend over the three years.

The above regression-based methodology was suggested by Merrick (1988) and can be used to determine *ex post* revisions required to keep hedges optimal. The methodology is not necessarily fit for *ex ante* application. For these purposes, the use of objective goal programming is proposed. The technique is fairly powerful in that it can incorporate specific objectives into the determination of optimal hedges. These could include the minimisation of transaction costs, maximisation of profits and objectives in respect of risk. Sharda and Musser (1986) illustrate the application of the approach on interest rate futures.



THE SHAPE OF THINGS TO COME

If the recent past is anything to go by, the future is most definitely in need of a new mould. A new way of doing things, and a new realisation of the unique problems that face the African continent.

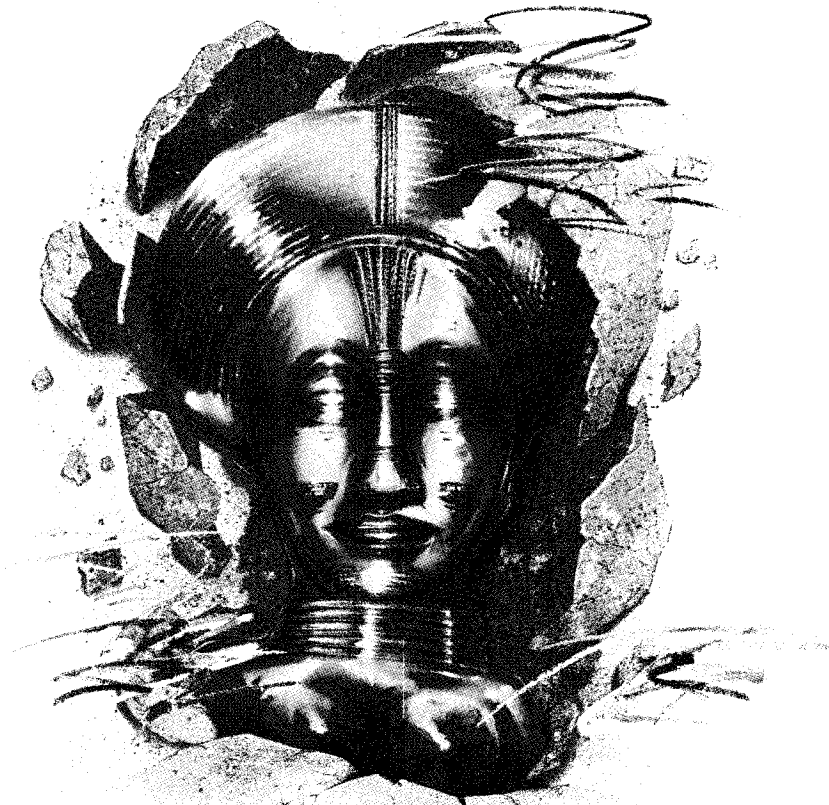
The developed world is increasingly concerned with problems at home or at least close to home, and there is little benefit for Africa in waiting for assistance from afar. What is needed is for the continent to unleash its undoubted natural resources. Wealth and employment opportunities have to be created to

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6. Results and discussion

6.1 Hedge performance trends

Table 1 presents the results for the two-sample tests conducted to compare the mean benefit per unit risk over two-week hedge periods for 1987/1988 and 1988/1989 respectively. The tests show that no significant trends are present and that H_0 cannot be rejected at $\alpha = 0,05$ significance level in all cases. This implies that the hedge performance of all SIF contracts has shown no significant improvement during the first three years of trading. Table 2 reports on comparisons between the risk-return performance of unhedged portfolios with that ob-

tained when the same portfolios are hedged with the optimal (risk-minimising) hedge-ratio over the last three months of near contract lives. Return figures should be regarded as approximations due to exclusion of returns specified earlier (i.e. Monday returns etc.). The statistics show that at best, hedging removed 73% of portfolio return variability and at worst 6%. The results also show that the hedging benefit per unit risk (HBS)-measure was negative in most cases, indicating that *ex post*, it was better to leave index portfolios unhedged. Note that the HBS becomes negative when the benefit per unit risk in the cash market exceeds that of the hedged portfolio:

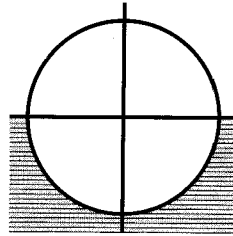
$$(R^c - r)/\sigma^c > (R^p - r)/\sigma^p$$

TABLE 1
T-TESTS CONDUCTED TO TEST FOR HEDGE EFFECTIVENESS TRENDS

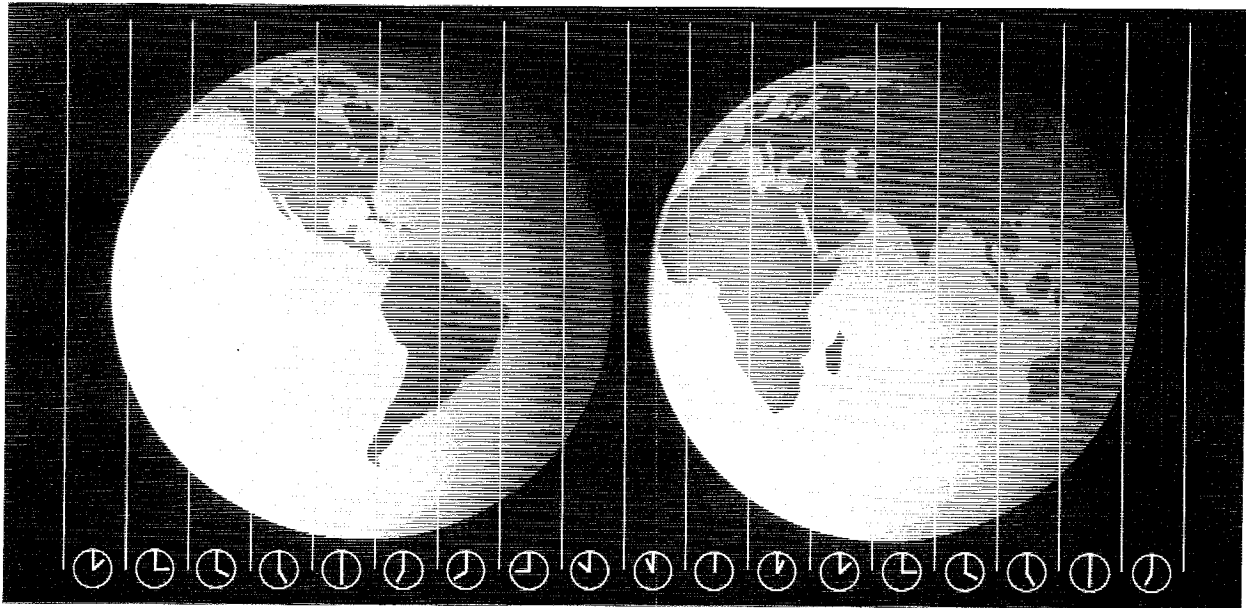
Contract	Comparison	HBS87	HBS88	HBS89	t-stat	Result at $\alpha = 0,05$	Observations
ALSI	1987/1988	-0,1134	-0,1297	—	0,2067	Do not reject H_0	8
	1988/1989	—	-0,0649	-0,1823	1,0304	Do not reject H_0	16
GLDI	1987/1988	-0,1110	5,7E-4	—	-0,8370	Do not reject H_0	8
	1988/1989	—	0,0464	-0,0855	1,6547	Do not reject H_0	16
INDI	1987/1988	-0,1024	-0,1292	—	0,2016	Do not reject H_0	8
	1988/1989	—	-0,1030	-0,2711	1,0581	Do not reject H_0	16

TABLE 2
HEDGING EFFECTIVENESS MEASURES

	Risk Reduction Average (%)	Annual (%) Riskless Return	Unhedged portfolio		Hedged portfolio		HBS Effectiveness Measure
			Daily Returns (%)	Average St. Dev. in Returns	Daily Returns (%)	Average St. Dev. in Returns	
<i>September 87</i>							
ALSI	16,761	8,495	0,331	0,008	0,179	0,007	-0,177
GOLD INDEX	33,492	8,495	0,259	0,013	0,053	0,011	-0,146
INDUST. INDEX	8,208	8,495	0,318	0,005	0,219	0,005	-0,179
<i>December 87</i>							
ALSI	37,673	8,585	0,059	0,016	-0,016	0,013	-0,052
GOLD INDEX	60,373	8,585	0,146	0,028	-0,142	0,018	-0,135
INDUST. INDEX	36,019	8,585	0,193	0,009	0,181	0,007	0,030
<i>March 88</i>							
ALSI	38,887	9,603	-0,187	0,013	-0,078	0,010	0,061
GOLD INDEX	52,343	9,603	-0,501	0,024	-0,116	0,017	0,131
INDUST. INDEX	37,778	9,603	-0,028	0,007	0,006	0,005	0,043
<i>June 88</i>							
ALSI	45,315	11,051	0,134	0,011	0,012	0,008	-0,118
GOLD INDEX	73,897	11,051	-0,014	0,020	0,010	0,010	0,006
INDUST. INDEX	19,670	11,051	0,140	0,006	0,100	0,005	-0,054
<i>September 88</i>							
ALSI	56,765	11,990	0,048	0,009	0,040	0,006	0,000
GOLD INDEX	50,451	11,990	0,018	0,015	0,106	0,011	0,081
INDUST. INDEX	11,204	11,990	0,270	0,007	0,076	0,006	-0,007
<i>December 88</i>							
ALSI	27,903	13,796	0,215	0,007	0,079	0,006	-0,188
GOLD INDEX	34,203	13,796	0,095	0,012	0,017	0,009	-0,067
INDUST. INDEX	6,197	13,796	0,270	0,005	0,076	0,005	-0,356
<i>March 89</i>							
ALSI	55,738	14,593	0,499	0,008	0,805	0,005	-0,390
GOLD INDEX	69,049	14,593	0,496	0,014	0,176	0,008	-0,143
INDUST. INDEX	71,387	14,593	0,349	0,013	0,057	0,007	-0,203
<i>June 89</i>							
ALSI	73,674	15,703	0,216	0,010	0,011	0,005	-0,209
GOLD INDEX	37,657	15,703	0,069	0,018	0,059	0,014	0,000
INDUST. INDEX	71,279	15,703	0,217	0,010	0,125	0,005	-0,004
<i>September 89</i>							
ALSI	61,711	16,069	0,245	0,008	0,108	0,007	-0,136
GOLD INDEX	56,639	16,069	0,328	0,016	0,159	0,010	-0,062
INDUST. INDEX	22,525	16,069	0,149	0,004	0,034	0,003	-0,291
<i>December 89</i>							
ALSI	55,442	16,784	0,453	0,012	0,182	0,008	-0,153
GOLD INDEX	66,572	16,784	0,728	0,021	0,258	0,012	-0,138
INDUST. INDEX	60,510	16,784	0,332	0,011	0,169	0,007	-0,072



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The success of the market should be judged against the degree to which it fulfils its ultimate economic purpose – namely the transfer of risk from those who are risk averse to those who are less risk averse. The hedging performance of the market can, however, not be assessed in isolation as it is very much dependent upon the performance of arbitrageurs in the market. In a market where efficiency suffers because of liquidity risk, real index arbitrage opportunities will be few and far between so that hedge effectiveness will suffer. The results reflect the general lack of improvement in arbitrageur performance during 1987 – 1989. This indicates that the contracts have not increased their viability as vehicles for hedging over this period. It is necessary to bear in mind, however, that the period examined is short so that the power of tests conducted can admittedly be regarded as suspect, especially those conducted for the 1987/1988 comparisons.

The random pattern in both hedging performance measures reflected in Table 2 (in relation to time) provides further evidence of no particular trend in any direction. The table shows that the risk reduction capability of the contrasts are significant in most cases, but that the reduction in return coupled with this made hedging of the index portfolios unattractive. It is stressed, however, that the “performance” of a hedge is dependent upon the particular hedging strategy and rationale which will in turn be a function of each individual’s attitude towards risk. The objective of the hedges on which the analysis is based was to minimise risk, and the results show that it is seldom beneficial to opt for such a strategy – i.e. from a reward-risk perspective.

6.2 Effects of mispricing on optimal hedge management

The computation of the risk-minimising hedge-ratios required to test the hypotheses on hedge performance provided an opportunity to assess the impact of mispricing on optimal (*ex post*) hedge management. Equation (7) is a rearrangement of the form:

$$R_{t+1} = h^*_t R_{t+1}^f$$

The hedged portfolio return was expanded into:

$$R_{t+1} = \alpha + \alpha_1 (W_t/C_t) + \alpha_2 (\tau_t); \tag{8}$$

and the conditional optimal hedge-ratio into:

$$-h^*_t = \beta + \beta_1 (W_t/C_t) + \beta_2 (\tau_t) \tag{9}$$

Equations (2) and (3) have indicated that mispricing and contract maturity could play an important role in the selection of an optimal hedge-ratio. It also suggested that dynamic intervention might be required while a portfolio is being hedged in order to keep such hedges optimal. The impact (if any) of the coefficients β_1 and β_2 on hedges should be interesting, especially against the background of the hedging strategy debate. Traditional hedging theory prescribes a one-to-one strategy with regards to positions simultaneously held in the futures and cash markets (Hieronymus, 1971). The prudence of this strategy has been questioned by many researchers, and a number of them (e.g. Ederington, 1979; Junkus and Lee, 1985; Figlewski, 1985) provided evidence that the use of the classic one-to-one is indeed suboptimal in the case of financial futures. Their empirical results indicated that even pure risk-avoiders may have wished to underhedge portfolios (hedge-ratios less than one rendered optimal hedge performance from a risk-minimising point of view).

Regressions of the form in equation (7) were therefore conducted. The coefficient β would indicate the base-ratio before consideration of mispricing and contract maturity. The coefficients β_1 and β_2 would suggest how this ratio was to be adjusted in order to remain optimally positioned. Table 3 reports on the regressions. Firstly note that the base-ratio- β (the coefficient of R_{t+1}^f) is below one in all cases and that the optimal base-ratio averaged between 0,5 and 0,7. In the case of the All Share contract, the ratio had to be adjusted downward on a daily basis as indicated by the significant positive coefficient of τR_{t+1} (β_2 in equation (9)) if the contract was hedged within the 1987-1988 period. For the 1988-1989 period, no such adjustment was necessary as coefficients are not significantly different from zero. Optimal daily hedges for the Gold Index contract were not significantly affected by either mispricing or contract maturity over the first half of the period under analysis, while for the 1988-1989 period, ratios had to be adjusted to cater for mispricing (upward for negative and downward for positive mispricings). The Industrial Index contract regression exhibits exactly the same type of result as for the Gold Index contract. In the case of both of the latter two, contract maturity did not have significant impact on optimal conditional hedge-ratio selection.

**TABLE 3
MODEL FITTING RESULTS FOR R_{t+1}^c**

Contract	Period	Estimated coefficients of variables*:							SE	DW
		(W_t/C_t)	τ_t	R_{t+1}^f	$(W_t/C_t)R_{t+1}^f$	$\tau_t R_{t+1}^f$	$R^2(Adj)$			
ALSI	June 87-	-0,118	0,004	0,513	-1,381	1,0843	0,4894	0,0088	2,222	
	June 88	(0,028)	(0,717)	(0,000)	(0,6571)	(0,011)				
	June 88-	-0,107	-0,008	0,618	-1,583	0,376	0,5892	0,0060	1,905	
	Dec 89	(0,000)	(0,163)	(0,000)	(0,445)	(0,337)				
GLDI	June 87-	-0,219	0,002	0,686	-0,084	0,656	0,6358	0,0134	2,015	
	June 88	(0,000)	(0,895)	(0,000)	(0,973)	(0,1407)				
	June 88-	-0,153	-0,017	0,652	-3,543	-0,119	0,5856	0,0106	2,052	
	Dec 89	(0,000)	(0,054)	(0,000)	(0,034)	(0,683)				
INDI	June 87-	-0,284	0,010	0,333	-2,640	0,005	0,3132	0,0066	2,558	
	June 88	(0,000)	(0,505)	(0,000)	(0,214)	(0,990)				
	June 88-	-0,058	-0,004	0,581	-3,157	-0,049	0,6080	0,0054	2,064	
	Dec 89	(0,003)	(0,394)	(0,000)	(0,029)	(0,865)				

*Estimated standard errors in brackets

In summary, optimal hedge management of the portfolios seems to have a dynamic nature which requires substantial skill in forming the correct expectations with regard to mispricings, cash market and futures market returns. Maturity and

mispricing effects were not consistent enough to formulate general conclusions on the impact of the two variables on optimal hedging. The results show, however, that both can affect hedging costs. A constant one-to-one approach during a

hedge would, for example, have lead to overhedging and as a result, overpayment on hedging costs. In addition, this traditional approach would have been suboptimal under criteria which emphasise risk reduction.

The regression analysis results can also be used to make inferences about the manner in which maturity and mispricing impacted upon portfolio returns. Coefficients of (W_t/C_t) and τ_t in eq. (8) should provide information on this matter. In general coefficients for the mispricing variable were significant ($\alpha = 0,1$) while that for contract age were not, which implies that the latter bore little relation to return performances. Estimated mispricing coefficients were negative and small in all cases. The negative signs in a sense contradicts the earlier conclusion in Section 4 that underpricing leads to negative contributions to returns and vice versa for overpricing, as it implies the contrary for the local situation. That conclusion was, however, based on an assumption that the market will partially or completely eliminate – a date t (say) mispricing over the very short term. Coefficients will only be positive if the market eliminates mispricing for a particular day on the next trading day. On average, it would seem that mispricing on a particular day was followed by even greater mispricing on the next trading day, so that negative mispricings contributed positively and positive mispricings negatively to hedged portfolio returns.

7. Conclusions

An empirical investigation was undertaken to assess the impact of futures market efficiency on hedging effectiveness and (ex post) optimal exposure management in the South African stock index futures market for the period June 1987 to December 1989. Standard two-sample analysis done on the hedging benefit per unit risk of two-week risk minimising hedges for 1988/1987 and 1988/1989 comparisons respectively, have shown that hedge performance of the three contract types have

not improved significantly with passage of time. A comparison of the hedging effectiveness of all contracts (June 1987 – December 1989) suggested that it was seldom advantageous from a risk-return point of view to use a risk-minimising hedging strategy.

Computation of the risk-minimising hedge ratios gave an opportunity to evaluate the impact of contract maturity and mispricing on optimal hedging (using risk reduction criterion). OLS-regressions have shown that the traditional hedge, which prescribes the futures position to be the exact opposite of the cash market position, is suboptimal in that the position do not necessarily minimise portfolio return variability. Abovementioned variables affected optimal hedging significantly but not in a manner consistent enough to draw general conclusions.

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GROWTH THROUGH PARTICIPATION

Penelope Gracie GBL 2226

An evaluation of the market rating of retained earnings of companies listed on the Johannesburg Stock Exchange: An empirical analysis

ABSTRACT

This investigation evaluates the efficiency of retained earnings of a sample of 50 companies listed on the Johannesburg Stock Exchange during the period 1978-1987. The empirical evidence shows that company managers are not always efficient in deciding how much profits should be retained for reinvestment. While, on average, the companies in the sample benefitted from an increase in market price associated with retained earnings, the majority of companies were penalized by the decision to retain earnings. There appears to be no correlation between the popular measures of company performance and the three measures representing shareholder interests.

Given the limitations of return on equity and other company performance measures, appropriate ratios are suggested which could be used to measure shareholder interests as well as operational decision criteria for company performance evaluation. The use of the suggested ratios could assist in removing the various impediments and structures which prevent shareholders from obtaining the maximum benefits from retained earnings. The suggested operational decision criteria could also assist in the creation of a more efficient capital market which redistributes capital from the less efficient to the more efficient companies.

Introduction

An important function of a stock market in an economy is that of allocating the capital for productive purposes to the most efficient users of that capital. The stock market performs the function of allocating capital on the basis of the profitability of listed companies. The higher the profitability, the greater the returns due to the shareholders. The more profitable companies are therefore in a better position to raise further capital than less profitable companies. Companies that consistently earn high profits will command a high share price. On the other hand, those companies that consistently earn low profits will trade at low share prices. The higher share price enables the profitable company to attract larger amounts of capital at a cheaper rate than the less profitable company. This implies a direct link between the company's share market performance and the company's financial performance.

A recent study by Ball (1987) showed that no correlation exists between the company's short-term and long-term profitability and the performance of its shares. This investigation analysed 50 of the largest mature-listed companies in the United States for the period 1970-84. It was found that in many companies profits did not enrich shareholders either as dividend payments or as higher share prices over the period investigated. Furthermore, for more than half the companies investigated, a large portion of retained earnings disappeared because the market penalized their share prices.

The lack of a correlation between company earnings and share prices observed by Ball (1987) has serious financial implications for listed companies. It suggests that certain companies should distribute a greater portion of their earnings as dividends because the market will discount retained earnings and in some cases even penalize share prices. This is in direct contrast to the classic work of Miller and Modigliani (1961),

which demonstrated the irrelevance of dividend policy for firm value in a rational world. It is argued that since neither the firm's expected future net cash flows nor its discount rate is affected by the choice of dividend policy *per se*, its current market value cannot be changed by a change in that policy. Therefore, dividend policy "does not matter". Although, under Miller and Modigliani's proposition, there are no *a priori* reasons for firms to follow a systematic dividend policy, there are also no penalties if they choose to do so.

The purpose of this investigation is to replicate the Ball (1987) study to test the hypothesis that there is no correlation between company performance and the three measures representing shareholder interests for companies listed on the Johannesburg Stock Exchange (JSE). In addition, the market rating mechanism for retained earnings of listed companies will be evaluated. Based on the empirical evidence appropriate guidelines will be presented for enabling listed companies to maximize the wealth of their shareholders and to enable company managers to make the most efficient use of investment capital.

RESEARCH METHODOLOGY

The sample for this investigation consisted of a random selection of 50 companies listed on the JSE during the 10-year period 1978-1987. Companies in the Mining Sectors were excluded from the sample because the share prices of these companies are influenced more by the price fluctuations in the international commodity markets than by company dividend and reinvestment policies. Companies involved in acquisitions and mergers and whose data were incomplete during the ten year period of the investigation were also excluded. Companies incurring losses over lengthy periods were also excluded as they were likely to generate misleading results. Also excluded from the analysis were the high growth companies which raised large amounts of capital through new equity issues.

The analysis of shareholder returns is conducted from the standpoint of a long-term investor. It is assumed that the investor follows a naive "buy and hold" strategy i.e. the investor purchases shares unconcerned with market timing. Dividends are collected for five years and the shares are sold at the end of the fifth year. To avoid period-specific peculiarities in the share market the average of the high and the low prices for the years of purchase and sale were used. The total shareholder enrichment from the investment is the sum of the dividends paid and the increase or decrease in the market price over the 5-year period.

The 10-year period of study is considered to be long enough to cover the different phases of the business cycle and the several market cycles that are likely to influence share prices. Furthermore, it is necessary to avoid the influence of market sentiment on the share prices in a given period. This is achieved by selecting several successive overlapping 5-year periods. For each company rolling averages covering the six overlapping 5-year periods 1978-1982, 1979-1983, 1980-1984, 1981-1985, 1982-1986 and 1983-1987 were obtained. The average company performance was calculated for each 5-year period and was compared with the corresponding shareholder enrichment over the same period.

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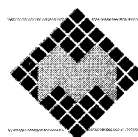
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THE DIVIDEND DECISION

Investment literature has over a prolonged period debated the relevance of the dividend policy with respect to the valuation of the firm. Miller and Modigliani (1961) showed that, in a perfect capital market, the dividend policy does not matter. Thus, in a perfect capital market the value of a company will depend on real economic considerations such as earnings and investments and not the manner in which the return from assets is distributed i.e. dividend payments and capital gains. Although several researchers have presented reasons to believe that investors are not indifferent between cash dividends and capital gains, the empirical evidence to date is still inconclusive for rejecting Miller and Modigliani's proposition.

Several researchers have incorporated the advances in portfolio theory and efficient market theory to describe the rational investor and rational management (Black, 1971). According to this theory, rational managers operating in an efficient market will pursue a "passive residual" dividend policy. Therefore, the company should have a preference for reinvesting the profits generated instead of declaring dividends as long as the expected return on reinvestment is greater than the company's capitalisation rate. Solomon (1963) suggests that after all such investment opportunities are exhausted any profits remaining should be distributed to shareholders as dividends.

Several surveys have been undertaken to determine the rationale for the dividend policies pursued by companies. Lintner (1956) showed that managers tend to change dividends primarily in response to unanticipated and non-transitory changes in their firms' earnings, and they are guided by target payout ratios in making those changes. There is also evidence that managers take into consideration the desires of shareholders as well as the long-term wellbeing of the company. A survey by Thompson and Walsh (1967) showed that when deciding to distribute earnings or to retain them for future growth, most companies follow a policy that meets the shareholders's need for dividends or capital gains, and at the same time preserves the long-term viability of the company.

A company's dividend policy and its retention policy are two sides of the same coin since, by definition, what a company does not distribute as dividends is retained in the business. Shareholders can enjoy extra dividends now at the expense of dilution of future returns necessitated by a further issue of capital to finance investments, or to forgo dividends now and have offsetting increased returns in the future. Therefore, retained earnings represent deferred dividends – earnings the company reinvests for the long-term benefit of shareholders. Rational managers can maximize the shareholders' wealth by distributing the company's earnings as dividends, unless the invested funds will raise the company's share price by more than the corresponding dividend payment.

The efficiency of a company's investment of retained earnings can be ascertained by calculating the total returns earned by shareholders which can be compared with the reported net earnings. The shareholder's enrichment is the capital gain on the share investment plus the dividends received from the company. If the shareholder enrichment is less than the company's net earnings, the market is penalizing the company (discounting retained earnings) for reinvesting profits inefficiently. That is, while the company is reporting profits, the shareholders are not receiving maximum benefits from their investment. On the other hand, if the shareholder enrichment is greater than the company's net earnings, the market is rewarding the company for the efficient use of retained earnings.

The shareholder enrichment (S) is the total wealth acquired by the shareholder from his investment in the company. The shareholder enrichment is the sum of the total dividends plus the capital gains (increase in market price) during the period

of investment. The company's total earnings (available for dividends) during the same period is represented by (E). The shareholder enrichment-to-earnings (S/E) ratio measures the extent to which shareholders have benefitted relative to the performance of the company, as measured by the company's earnings.

The earnings of the company belong to the shareholders. Therefore, we can expect the S/E ratio to be at least 100% over the long-term. If all the company's earnings were distributed as dividends, and the share price remained constant, the S/E ratio, by definition, would be 100%. An S/E ratio greater than 100% indicates the degree to which the market places a premium on the company's retained earnings, thereby enriching the shareholders. An S/E ratio greater than 100% can be viewed as the market's collective judgement that the company has made an efficient use of the earnings it has retained.

Companies having S/E ratios of less than 100% indicate the degree to which the market has discounted the retained earnings, thereby causing shareholders to experience a decline in wealth. An S/E ratio of less than 100% can be regarded as a market judgement reflecting that the company has made inefficient use of the earnings it has retained in the business. An S/E ratio of less than 100% would suggest that the shareholders of these companies would have been better off if the companies had paid out all earnings as dividends.

EMPIRICAL RESULTS

TABLE 1

THE SHAREHOLDERS' ENRICHMENT-TO-EARNINGS (S/E) RATIOS FOR A SAMPLE OF COMPANIES LISTED ON THE JSE DURING 1978-1987.

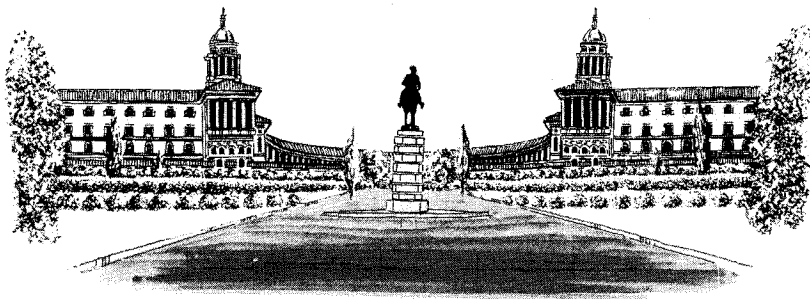
RANGE OF S/E VALUES (%)	NUMBER OF COMPANIES	AVERAGE S/E (%)
300 TO 399	4	330,8
200 TO 299	7	238,0
100 TO 199	17	144,5
0 TO 99	14	69,4
-1 TO -99	7	-47,3
LESS THAN -100	1	-129,0
AVERAGE		119,1

Table 1 lists the distribution of S/E ratios for the sample of companies listed on the JSE during the period 1978-1987. The average S/E ratio for all companies included in the sample is 119,1%. That is, for every R1 of retained company earnings, the shareholders were enriched by R1,19. However, the results in Table 1 show a wide distribution of S/E ratios. Four companies attained an average S/E ratio of 330,8%. That is, over the 10-year period, investors, in these companies were enriched by an average of R3,31 for every R1 of the company's retained earnings. If these companies distributed all their earnings in dividends their shareholders would have been enriched only to the amount equal to earnings (producing an S/E of 100%). These companies were very efficient in investing retained earnings i.e., the stock market placed a premium on their retained earnings.

Seven companies attained an average S/E ratio of 238,0% and a further 17 companies produced an average S/E ratio of 114,5%. The shareholders in these companies also benefitted from the effective utilization of retained earnings, which implies that the stock market placed a premium on its reinvestment. Such performance can be expected for large com-

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panies listed on the JSE. However, for 14 companies in the sample the average S/E ratio was only 69,4%. For these companies the shareholders received significantly less enrichment than if the companies had paid out the entire earnings as dividends.

The most surprising results are to be found at the bottom of Table 1. Eight companies produced negative S/E ratios. Seven companies attained an average S/E ratio of - 47,3% and another company an S/E ratio of - 129,0%. Shareholders in these companies incurred losses on their investment, even though they continually reported positive earnings. For instance, the shareholders in the company that produced the lowest S/E ratio lost R1,29 for every R1 the company retained as earnings. For these eight companies having negative S/E ratios, the stock market gave retained earnings a negative rating which cancelled out any dividends received by the shareholders.

It can be seen from Table 1 that just under half of the companies in the sample (22 companies) have not enriched their shareholders. Therefore, it is necessary to determine if the "lost" retained earnings have been counterbalanced by an increase in the market value of the investment. A change in market value-to-retained earnings (CMV/RE) ratio can be used for this purpose. The CMV/RE ratio measures the increase in the market value of shares over the five year period relative to increases in retained earnings over the same period. The CMV/RE ratio is more useful than the traditional "market-to-book equity" ratio. The problems associated with the traditional ratio have been highlighted by Chen and Shimerda (1981). The limitations of accounting conventions and, in particular, the valuation of long standing assets at historical costs limits the usefulness of the traditional ratio. By contrast, the CMV/RE ratio provides a meaningful measure of the value which the stock market places on retained earnings added during recent periods (five years).

If retained earnings increase by one rand, then we can expect the market value of the shares to increase by at least one rand within a reasonably short period of time (five years). Whenever a company decides to retain earnings, the market rating mechanism evaluates this decision. If the market believes that the retained earnings are efficiently invested, then it places a premium on them, and the CMV/RE ratio will be greater than 100%. Therefore, shareholders benefit from the company's decision to retain earnings. On the other hand, if the market believes that the retained earnings are inefficiently invested, then it will discount their value. The CMV/RE ratio will be less than 100%, and the shareholders will be penalized by the company's decision to retain earnings. Table 2 lists the distribution of CMV/RE ratios for the 50 companies included in the sample.

TABLE 2

THE CHANGE IN MARKET VALUE-TO-RETAINED EARNINGS (CMV/RE) RATIOS FOR A SAMPLE OF COMPANIES LISTED ON THE JSE DURING 1978-1987.

RANGE OF CMV/RE (%)	NUMBER OF COMPANIES	AVERAGE CMV/RE (%)
MORE THAN 400	1	460,0
300 TO 399	4	353,0
200 TO 299	7	243,6
100 TO 199	12	156,4
0 TO 99	18	46,7
-1 TO -99	4	-72,8
LESS THAN -100	4	-156,0
AVERAGE		107,6

For the top company in Table 2, the market price increased by R4,60 for each R1 of retained earnings. Ranking second, four companies attained an average CMV/RE ratio of 353,0%. In total, shareholders of 24 companies benefitted by the decision to reinvest earnings (CMV/RE ratio greater than 100%). In the case of 18 companies the average market price increased by only R0,47 for each R1 of retained earnings. An important finding is that the share price of 8 companies declined substantially in value (negative CMV/RE ratios). The market pricing mechanism discounted the value of these companies despite the injection of additional capital in the form of retained earnings. The average CMV/RE ratio for all companies included in the sample is 107,6%. That is, for every R1 of retained earnings the market price increased by R1,08.

Comparing the CMV/RE and the S/E ratios reveals some very interesting results. First, the CMV/RE ratio has a far greater range than that observed with the S/E ratio. For the CMV/RE ratio, the high values are higher and the low values are substantially lower than the corresponding S/E ratio. This was expected, since the inclusion of dividends in the S/E ratio tends to reduce the extremes. On balance, it can be said that the CMV/RE ratio is a more reliable indicator of the share market's rating of the efficiency of the company's retained earnings. Second, while on average the companies in the sample benefitted from an increase in market price associated with retained earnings, the majority (26 companies) were penalized by the decision to retain earnings.

A major weakness of the measurement of shareholder enrichment is that it does not take the opportunity cost of the investment into consideration. The return on shareholders' investment (ROSI) ratio measures the shareholder enrichment in relation to the size of the investment or opportunity cost of owning the shares. Therefore, the ROSI ratio is a more meaningful measure of the extent to which shareholders have benefitted from retained earnings. Table 3 lists the distribution of ROSI ratios for the sample of companies listed on the JSE.

TABLE 3

THE RETURN ON SHAREHOLDERS' INTEREST (ROSI), RETURN ON EQUITY (ROE), AND ROSI/ROE RATIOS FOR A SAMPLE OF COMPANIES LISTED ON THE JSE DURING 1978-1987

RANGE OF ROSI & ROE VALUE (%)	AVERAGE ROSI (%)	NUMBER OF COMPANIES	AVERAGE ROE (%)	NUMBER OF COMPANIES	ROSI/ROE %
30 TO 39	32,3	3	31,0	3	104,2
20 TO 29	23,9	14	23,1	13	103,5
10 TO 19	15,8	13	16,1	32	98,1
0 TO 9	5,4	15	7,5	2	72,0
-1 TO -10	-5,8	5	—	—	—
AVERAGE	13,8		18,5		74,6

The average ROSI ratios in Table 3 range from 32,3% for the 3 top ranking companies to -5,8% for the 5 companies having the lowest ranking. The average ROSI value for all companies included in the sample is 13,8%. The ROSI ratio takes into consideration the opportunity cost of the investment in shares. Therefore, the ROSI ratio can be compared to the shareholders' alternative investment opportunities, compared to inflation, and also take risk into consideration. South Africa has faced a high rate of inflation during the study period of 1978-1987. The average inflation as measured by the Consumer Price Index (CPI) during this period was 14,3% (Central Statistical Services, 1987). The average yield on 5-year Government Stock during this period was 13,1% (South African

Reserve Bank). Comparing the ROSI values with the average inflation rate and the yield on Government Stock reveals interesting results. The ROSI values of the top 30 companies compare favourably with inflation and the return from fixed-income securities. However, the average ROSI for all companies (13,8%) is below the inflation rate and is slightly higher than the return from fixed-income securities represented by Government Stock.

The yardstick of return on equity (ROE) is used extensively as an investment criterion to evaluate the performance of companies (Abdallah and Keller: 1985). Furthermore, ROE is also widely used by investment analysts and shareholders to evaluate investment performance. Therefore, it is worthwhile to compare this traditional investment yardstick with shareholder enrichment as represented by ROSI. The ROE figures for the sample of companies listed on the JSE are displayed in Table 3.

The average ROE ratios range from 31,0% for the 3 top ranking companies to 7,5% for the 2 companies having the lowest ranking. The average ROE for all companies included in the sample is 18,5%. A comparison of the shareholder return represented by ROSI with the traditional yardstick reveals a surprising finding. Despite the high ROSI values for the top 17 companies, investors in the remaining 33 companies obtained a lower return on their investment (ROSI) compared to the traditional investment yardstick (ROE). Five companies actually obtained negative ROSI values, while no companies in the sample obtained negative ROE values. None of the fifty companies investigated had an average ROE of below 7,5%, yet 20 companies had ROSI, below 7,5%. For the entire sample, there is a big discrepancy between low investors' ROSI and the fairly reasonable level of reported ROE, which exceeds the ROSI measure by 34,1%.

Table 3 also shows the results obtained by dividing each company's ROSI by the corresponding ROE. The traditional ROE values are greater than the actual returns to shareholders represented by ROSI. The average ROSI/ROE ratio for all companies in the sample is only 74,6%. Only 17 companies in the sample obtained a ROSI/ROE ratio greater than 100%. The remaining 33 companies obtained a ROSI/ROE ratio less than 100%. The average shareholder enrichment is 25,4% less than that represented by the conventional ROE yardstick. Despite ROSI being more representative of shareholder enrichment, companies continue to use ROE as the principal criterion of decision when considering capital investments.

MULTIPLE REGRESSION ANALYSIS

Statistical analysis was necessary to determine whether the three measures representing shareholder interests i.e., S/E, CMV/RE and ROSI are correlated with any of the more popular financial criteria used by investment analysts in evaluating company performance. The following common financial measures were used as independent variables:

1. Price-to-earnings (P/E ratio)
2. Dividend payout ratio
3. Return on Equity (ROE)
4. Capital intensity (capital expenditure/revenue)
5. Financial risk (debt/market value)
6. Internal capital % (internal funds/capital expenditure)
7. Earnings growth

The financial data for the companies included in the sample were obtained from their published financial statements. In addition, the financial ratios provided in McGregor's Who Owns Whom – The Investors Handbook (editions 1 to 9) were used. Aggregate data for each of the companies were obtained by first calculating the five year rolling averages and then calculating an aggregate arithmetic average for each of the financial

measures and the three variables (S/E, CMV/RE, ROSI) representing shareholder value. Multiple regression analysis was undertaken to determine the correlation between shareholder wealth and the popular financial measures.

**TABLE 4:
MULTIPLE REGRESSION TEST TO DETERMINE
CORRELATION BETWEEN S/E RATIO AND THE VARIOUS
FINANCIAL MEASURES FOR A SAMPLE OF COMPANIES
LISTED ON THE JSE DURING 1978-1987**

DEPENDENT VARIABLE: S/E

COEFFICIENT	t-STATISTIC	INDEPENDENT VARIABLE
0,736	0,459	CONSTANT
-0,326	-0,581	P/E RATIO
-0,431	-0,514	DIVIDEND PAYOUT RATIO
1,915	0,823	ROE
0,452	0,216	CAPITAL INTENSITY
-0,073	-0,326	FINANCIAL RISK
0,376	0,685	INTERNAL CAPITAL (%)
4,824	3,274	EARNINGS GROWTH
R-SQUARED	0,426	
ADJUSTED R-SQUARED	0,351	
DURBIN-WATSON STATISTIC	2,520	

Table 4 displays the results of the multiple regression analysis to determine the correlation between the S/E ratio (dependent variable) and the various financial measures (independent variables). The results in Table 4 suggest that of all the independent variables the only one that is statistically significant or affects shareholder enrichment is earnings growth. Although the t-value is statistically significant ($t > 2$), the coefficient of determination (r^2) and the adjusted r^2 are low. For a variable to have impressive explanatory power, the r^2 should be above 0,75 (Johnston, 1972). Therefore, earnings growth does not explain an impressive amount of the variation in shareholder enrichment (S/E). The Durbin-Watson statistic of 2,52 indicates that there is no auto-correlation between the variables.

**TABLE 5:
MULTIPLE REGRESSION TEST TO DETERMINE
CORRELATION BETWEEN CMV/RE AND THE VARIOUS
FINANCIAL MEASURES FOR A SAMPLE OF COMPANIES
LISTED ON THE JSE DURING 1978-1987**

DEPENDENT VARIABLE: CMV/RE

COEFFICIENT	t-STATISTIC	INDEPENDENT VARIABLE
0,823	0,594	CONSTANT
-0,245	-0,471	P/E RATIO
-0,083	-1,093	DIVIDEND PAYOUT RATIO
4,658	1,142	ROE
-2,079	-0,365	CAPITAL INTENSITY
-0,154	-0,426	FINANCIAL RISK
0,321	0,247	INTERNAL CAPITAL (%)
4,156	2,358	EARNINGS GROWTH
R-SQUARED	0,321	
ADJUSTED R-SQUARED	0,264	
DURBIN-WATSON STATISTIC	2,725	

Table 5 displays the results of the multiple regression analysis to determine the correlation between CMV/RE and the various financial measures. The results are similar to those found in Table 4. Once again, earnings growth is the only statistical-

ly significant variable that has an effect on CMV/RE. However, the r^2 and adjusted r^2 for this test are somewhat lower than those in Table 4. Therefore, it can be said that earnings growth explains an even less impressive amount of the variation in CMV/RE than S/E.

TABLE 6:
MULTIPLE REGRESSION TEST TO DETERMINE CORRELATION BETWEEN ROSI AND THE VARIOUS FINANCIAL MEASURES FOR A SAMPLE OF COMPANIES LISTED ON THE JSE DURING 1978-1987

DEPENDENT VARIABLE: ROSI

COEFFICIENT	t-STATISTIC	INDEPENDENT VARIABLE
0,623	1,241	CONSTANT
-0,006	-1,143	DIVIDEND PAYOUT RATIO
0,147	0,325	ROE
0,518	1,042	CAPITAL INTENSITY
-0,232	-0,987	FINANCIAL RISK
0,215	0,148	INTERNAL CAPITAL (%)
2,141	3,784	EARNINGS GROWTH
R-SQUARED		0,529
ADJUSTED R-SQUARED		0,441
DURBIN-WATSON STATISTIC		2,325

Table 6 displays the results of the multiple regression analysis to determine the correlation between return on shareholders' investment (ROSI) and the various financial measures. The P/E ratio was deleted from the list of independent variables. The market price is a significant factor in the numerator and the denominator of the ROSI ratio. Furthermore, the market price has a significant influence in the numerator of the P/E ratio. Therefore, in accordance with sound statistical practice (Newbold, 1984), the P/E ratio was excluded from the multiple regression analysis. The results in Table 6 are very similar to those in Tables 4 and 5. Earnings growth is the only statistically significant variable that has any effect on ROSI. However, the r^2 and adjusted r^2 for this test are slightly higher than those found in Tables 4 and 5. Nevertheless, earnings growth still does not explain an impressive amount of the variation in return on shareholders' investment (ROSI).

An international study on the financial criteria used by managers to evaluate company performance revealed that return on equity and earnings growth were the two most important yardsticks used (Scapens, Sale & Tikkas, 1982). Therefore, statistical tests regressing ROE and earnings growth only against the dependent variables representing shareholder interests were undertaken. A further advantage of these tests is that they could serve to confirm the results already shown in Tables 4, 5, and 6.

TABLE 7:
THE REGRESSION OF ROE AND EARNINGS GROWTH ONLY AGAINST S/E FOR A SAMPLE OF COMPANIES LISTED ON THE JSE DURING 1978-1987

DEPENDENT VARIABLE: S/E

COEFFICIENT	t-STATISTIC	INDEPENDENT VARIABLE
-0,327	-1,215	CONSTANT
2,513	1,526	ROE
5,679	4,943	EARNINGS GROWTH
R-SQUARED		0,461
ADJUSTED R-SQUARED		0,395
DURBIN-WATSON STATISTIC		2,262

TABLE 8:
THE REGRESSION OF ROE AND EARNINGS GROWTH ONLY AGAINST CMV/RE FOR A SAMPLE OF COMPANIES LISTED ON THE JSE DURING 1978-1987

DEPENDENT VARIABLE: CMV/RE

COEFFICIENT	t-STATISTIC	INDEPENDENT VARIABLE
-0,973	-1,986	CONSTANT
2,542	1,553	ROE
5,437	2,321	EARNINGS GROWTH
R-SQUARED		0,341
ADJUSTED R-SQUARED		0,275
DURBIN-WATSON STATISTIC		2,412

TABLE 9:
THE REGRESSION OF ROE AND EARNINGS GROWTH ONLY AGAINST ROSI FOR A SAMPLE OF COMPANIES LISTED ON THE JSE DURING 1978-1987

DEPENDENT VARIABLE: ROSI

COEFFICIENT	t-STATISTIC	INDEPENDENT VARIABLE
1,453	0,721	CONSTANT
-0,145	-0,834	ROE
2,854	5,347	EARNINGS GROWTH
R-SQUARED		0,489
ADJUSTED R-SQUARED		0,417
DURBIN-WATSON STATISTIC		2,072

Tests regressing ROE and earnings growth against (i) shareholder enrichment (S/E), (ii) CMV/RE, and (iii) ROSI were undertaken and the results displayed in Tables 7, 8, and 9 respectively. The results reveal that earnings growth is still significant, but the r^2 measures are relatively unchanged from the preceding multiple regression analyses. Therefore, it can be concluded that earnings growth is not a good predictor of the three variables representing shareholder interests. The results in Tables 7, 8 and 9 also confirm that S/E, CMV/RE, and ROSI are all not correlated with ROE.

The following conclusions can be made from the various statistical tests undertaken to determine which of the popular financial measures can be used to predict the three measures representing shareholder interests (S/E, CMV/RE, ROSI):

1. The dividend policy of a company does not appear to have any significant influence on the three variables representing shareholder interests. The findings of this investigation seem to confirm the argument of dividend irrelevance propounded by Miller and Modigliani (1961). This result was not expected because it can be expected that a higher payout would be positively correlated with a higher shareholder enrichment. For instance, it has been reported by Seneque and Gourley (1983) that managers of companies listed on the JSE tend to follow an active dividend policy as they regard dividend payments as having a positive influence on investors' perception of the company.
2. The return on equity of a company does not appear to have any significant influence on the three variables representing shareholder interests. An explanation for this lack of correlation is that the equity value reflected in the balance sheet roughly corresponds to the total paid-in capital and retained earnings over the life of the business. The shareholders' equity reflected in the company's financial statements has no bearing on the current shareholder's initial investment or the market value of the investment (Antho-



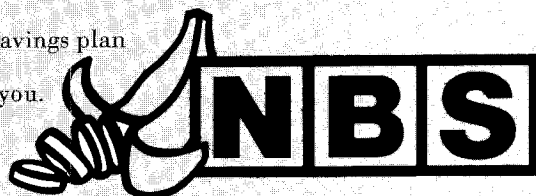
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ny, 1987). The ROE concept is not intended to measure investment, despite the fact that it is extensively used for this purpose by managers, investment analysts and investors.

3. The capital intensity of a company does not appear to have any influence on the three variables representing shareholder interest. It would appear that the ability of a company to reinvest retained earnings is not affected by its capital intensity.
4. The amount of debt in the capital structure of a company does not appear to have any appreciable influence on the three variables representing shareholder interests. This implies that providers of debt are not able to influence managers with respect to the efficiency of the projects which are financed with retained earnings.
5. The internal capital as a percentage of the total capital expenditures does not appear to be correlated with the three variables representing shareholder interests. This confirms the observation made by Wildsmith (1973) that large companies are able to finance capital expenditures from retained earnings plus funds generated by depreciation without resorting to either additional borrowing or raising new equity capital.
6. Although earnings growth is statistically significant for the three variables representing shareholder interests, it is not a good predictor of the future stock market performance of the company's shares.

RESOLVING THE RETAINED EARNINGS DILEMMA:

Shareholders investing in equity capital receive a return on their investment in two possible ways. The shareholder can benefit from the cash dividends declared and also participate in the capital gain (or loss) associated with the share price. The results of this investigation have shown that there is no guarantee that the retained earnings will be translated into an increase in market price. Therefore, the dividend decision is crucial to the objective of maximizing shareholder wealth. However, shareholders rarely influence the decision regarding the distribution of profits to shareholders as dividends and profits retained in the business for reinvestment. The dividend decision vests in the hands of the company directors. In theory, shareholders exert an influence over the dividend decision because they are required to approve the recommended dividends at the general meeting of shareholders. As a result of diffusion of shareholding in listed companies, shareholders rarely attend company meetings. The few shareholders that make use of the mechanism of proxy voting invariably delegate their votes to the incumbent directors of the company.

The key dividend issue becomes a routine decision to accept the directors' recommended dividend at company meetings. Shareholders normally do not challenge the dividend decision at company meetings because they believe that the incumbent management is better informed about the capital needs of the firm and that their wealth will be maximized by this decision. The empirical results of this investigation have shown that company managers are not always efficient in deciding how much of the profits are to be retained for reinvestment. The shareholders of several companies would have been better off if a greater percentage of the profits were distributed as dividends. However, management need not necessarily be inefficient in the decision to reinvest retained earnings. Management may have a vested interest to follow a conservative dividend policy and to use a greater portion of earnings to finance growth which is compatible with their self-interest (Williamson, 1963).

An important function of the stock market in the economy is that of allocating capital for productive purposes to the most efficient users of that capital. Efficient companies are able to

raise sufficient capital to ensure their long-term survival. The stock market penalizes inefficient companies because they will experience difficulty in attracting sufficient capital to ensure growth and survival. Wildsmith (1973) has shown that large listed companies are able to evade the discipline of the capital market by being able to finance their growth from retained earnings and depreciation funds. Such management behaviour is another reason for shareholders to scrutinise the efficiency of the dividend/retained earnings decision.

The previous income tax legislation in South Africa created a bias of shareholders towards low dividend payout shares. Sealy and Knight (1987) had shown that shareholders of companies listed on the JSE display a negative dividend preference (dividend aversion). It is suggested that the previous South African income tax structure provided a plausible reason for certain investors to prefer returns on securities in the form of capital gains rather than dividends. The income tax legislation penalized earnings distributed as dividends because they were classified as taxable income, whereas shareholders not regarded as sharedealers for tax purposes were, and are exempt from capital gains. Therefore, the income tax legislation inhibited companies declaring large dividends. The results of this investigation shows that, for many companies, shareholder wealth would be maximized by the payment of higher dividends.

This impediment to higher dividend payments was removed by amending the income tax legislation to make dividends paid by companies exempt from taxation in the hands of the recipient, as recommended by the Margo Commission (1987). For those companies whose market price is penalized by retaining earnings for reinvestment, it is recommended that they pay out a greater percentage of profits as dividends and raise capital for new investments through a further issue of outside capital. A more favourable income tax dispensation for dividend payments by companies will assist in a more efficient allocation of investment funds in the economy and also contribute towards the maximization of shareholders' wealth.

Many companies use the return on equity as one of their major criteria for evaluating capital projects and measurement of company performance. Furthermore, the ROE is also widely used by investment analysts and shareholders to evaluate investment performance. However, statistical analysis has not shown any significant relationship between the company's ROE and the various measures representing shareholder enrichment. Company managers cannot be faulted for being preoccupied with ROE as they are evaluated and compensated by this yardstick. The investment community also uses ROE as a surrogate for shareholder wealth, but in reality it is unrelated to the actual returns realized by shareholders. The ROE is an inappropriate measure of company performance as well as shareholder enrichment and this has created an impediment to the existing systems, procedures and structures which allocate investment capital.

What is required is the development of more appropriate measures of efficiency of the reinvestment decision and company performance. It is suggested that the three measures representing shareholder interests used in this investigation as well as other yardsticks representing investment efficiency could be used to measure company performance and the related shareholder enrichment. The use of these operational criteria could result in a meaningful redistribution of capital from less efficient to the more efficient companies. The suggested operational criteria could serve as a link between the investment decisions of company managers and the market's judgement related to those decisions. Armed with meaningful criteria, company managers can be expected to make the correct dividend decision that will maximise shareholders' wealth.

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CONCLUSION

There appears to be no correlation between the popular measures of company performance and the three measures representing shareholder interests. While earnings growth is statistically significant for the three measures of shareholder interests, the coefficient of determination is low, indicating that it is not a good predictor of share price. Therefore, earnings growth or any other company performance measures cannot be used as a basis of a share investment strategy. These findings are in agreement with the efficient market hypothesis propounded by Fama (1970). The positive correlation between earnings growth and shareholder enrichment is probably due to the compounding effect of the attractive (poor) returns from previously invested retained earnings being continually added to the superior (modest) earnings growth in the basic business itself.

The relatively modest S/E ratios for fifty large and seasoned companies listed on the JSE was unexpected. The shareholders of just under half the companies in the sample were not enriched by the earnings retained in the business. The market's judgement is that about 44% of the companies in the sample are making inefficient use of their retained earnings. An efficient market would redistribute funds from companies with low S/E to companies with high S/E. However, this flow is impeded by the systems, procedures and structures we have in place. For the entire sample there is a major discrepancy between the low investor's ROSI and the fairly reasonable level of reported ROE, which exceeds the ROSI measure by 34,1%. These results clearly indicate that ROE is not an appropriate measure of shareholder interest.

The previous income tax legislation in South Africa created a shareholder bias towards low dividend payout shares. The impediment to higher dividend payments has been removed by amending the income tax legislation to make dividends paid by companies exempt from taxation in the hands of the recipients. Those companies whose market price is penalized by the perceived inefficient use of retained earnings would be better served by following a policy of distributing a greater percentage of profits as dividends. Such companies could finance new investments most efficiently by raising capital by an additional issue of outside capital.

Many large companies use ROE as one of their major criterion in evaluating capital expenditure and company performance. However, ROE is not correlated with the three measures representing shareholder interest. Given the limitations of ROE and other company performance measures, it is suggested that there is an urgent need to develop operational criteria which could be used to measure shareholder interests. These criteria could form the basis for company performance evaluation. The use of the suggested operational criteria could assist in removing the various impediments and structures which are preventing shareholders from obtaining the maximum benefit from retained earnings. The suggested operational criteria could also assist in the creation of a more efficient capital market which redistributes capital from the less efficient to the more efficient companies. The use of the recommended operational criteria could also assist in minimizing the conflict between shareholder interest and management interests that is becoming increasingly prevalent in large companies.

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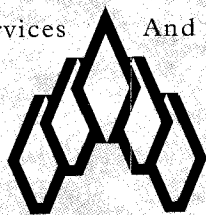
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A South African Corporate Bond Market?

ABSTRACT

This paper explores the attitude of major players in the capital markets to the question of why there is virtually no corporate bond market in South Africa. Information was sought as to whether investors ought to be provided with a broader range of risk instruments; what criteria investors seek in a corporate bond market; whether these overlap with the criteria important to potential debt issuers, and what hurdles restrict the development of such a market.

Information was elicited through the medium of a mailed questionnaire sent to a sample of listed companies. Included were all life insurers and banks, together with the larger pension funds, investment companies and merchant banks.

It was found that the attitudes of South African financial managers were generally positive towards the issuing of corporate bonds. Enough potential issuers with appropriate attributes existed. High inflation was seen as a critical stumbling block impeding formation of such a market. Needed too were market makers and the establishment of a rating agency. The presence of derivative markets and the introduction of more floating rate debt were also seen as factors which would lead to the formation of a formal bond market.

Major South African companies, in the six years 1984-89, raised in excess of R9,6bn in new equity but only R1bn in debentures (Davey, 1990: 2). The total market capitalisation of the Johannesburg Stock Exchange (JSE) was of the order of R300bn at end-1989 whereas that of listed corporate bonds was only some R2,4bn.

Trade in fixed interest securities is dominated by institutions which until recently were required by law to invest a substantial portion of their funds in so-called prescribed assets. This has resulted in the relatively higher importance of the gilt and semi-gilt markets in South Africa which had a nominal market capitalisation exceeding R96bn in 1989. Although the corporate bond market traded 13,5% of its nominal value during 1989 compared to the 6,9% in the equities market, the overwhelmingly larger size of the JSE completely overshadows the bond market.

These figures beg the question: "Why do South African companies generally raise their capital through equity instruments?" This paper explores the attitude of major players in the South African capital markets to this issue.

International Bond Markets

Global bond markets are indisputably more successful than the local market. The U.S. market has grown to over \$890bn (Rines, 1988: 140). Despite its size only 1 800 out of a population of 23 000 companies have used the US public debt market (Drexel Burnham Lambert, 1989), and of these only 800 are considered investment grade (AAA-BBB).

The secondary bond market is broadly based with one in every six Americans holding bonds (Drexel Burnham Lambert, 1989: 7). 25% of US corporate bonds are owned by individuals or other companies, 7% by banks and 39% by insurance and pension funds. 15% are foreign owned and the remaining 15% belong to the public sector (Federal Reserve Board, 1988: 152). According to Rines (1988) US institutions place a large emphasis on the liquidity of an issue, which is considered satisfactory if the minimum issue size is about \$100m. In order to retain liquidity in secondary markets, Smith (1986) has

suggested that companies should offer multiple securities with the same coupon rate, coupon date, maturity and conversion, instead of designing new issues.

The US has very stringent regulations which ensure full disclosure, thus providing both the investor and the rating agencies with the necessary information to make investment decisions. Third party opinion on the credit worthiness of issuers plays an important role in bond markets. In fact there is a move towards the establishment of global credit ratings because of the increasing internationalisation of bond markets (Pinkes, 1988: 179-186).

Another feature of the US markets is the extent to which innovative new instruments were created during the eighties. Apart from the junk bond which, by the end of 1988, represented some 25% of the total bond market, deep discount bonds, zero coupon bonds, variable rate bonds, index linked bonds, exchangeable bonds and most recently the unbundled stock unit have seen the light of day.

The Japanese debt market ranks second to that of the United States (Troughton, 1988) having grown rapidly towards the end of the 1970s, when Japan established its own rating agency (Nippon Investors Service). Only at the end of 1987 did the Japanese government relax certain regulatory measures relating to restrictions placed on the number of companies that were permitted to issue unsecured debt and convertible debt. This further stimulated the market.

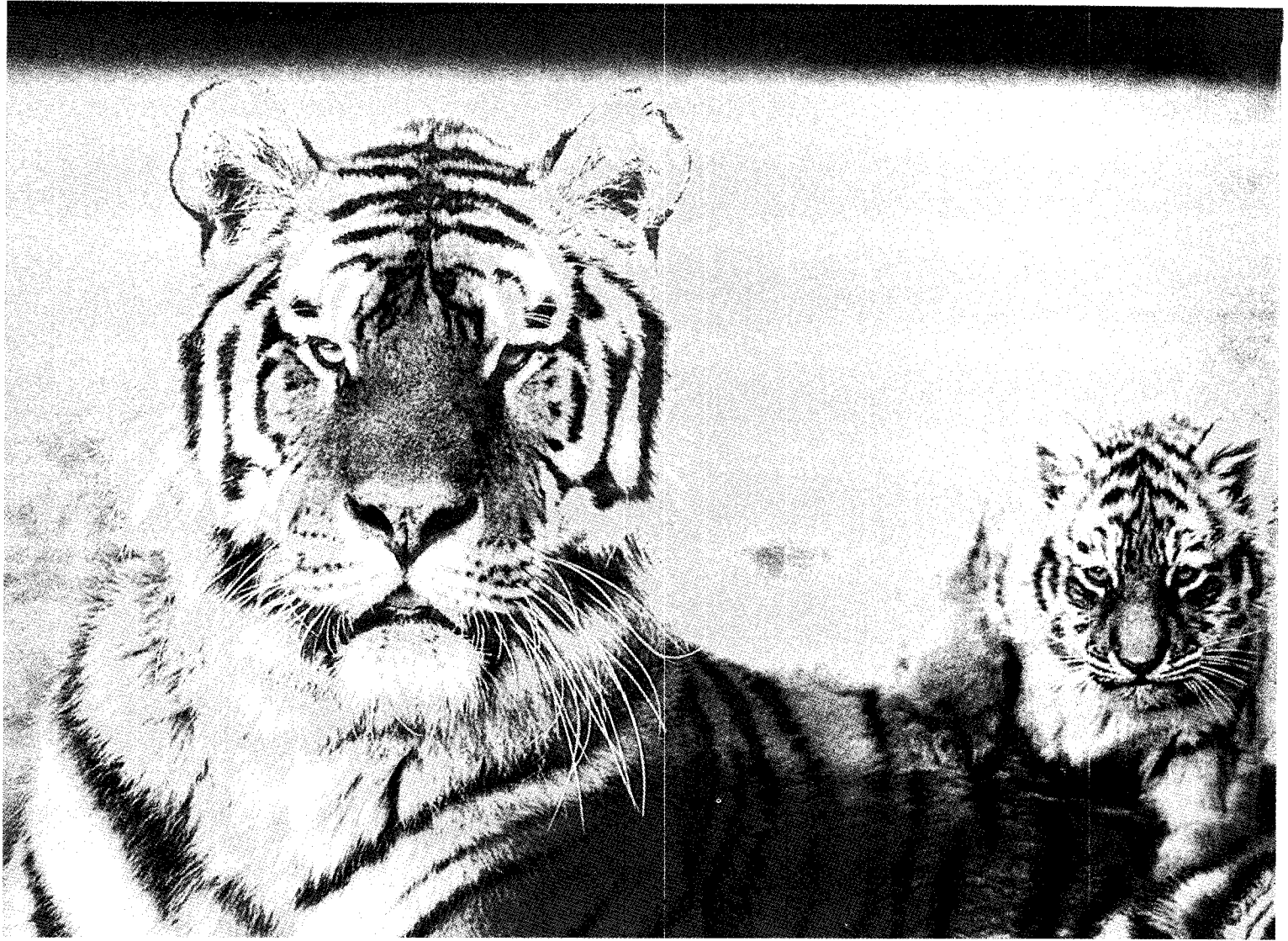
Factors Which Have Influenced the S.A. Bond Market

The Public Investment Commissioners were until recently required to hold 75% of their portfolio of state pension funds in government bonds. Until 1989 pension funds had to keep a minimum of 53% of their "book valued" assets in either public sector debt or cash, and long-term insurers were required to hold a minimum of 33% of their liabilities, at an actuarial valuation, in public sector debt.

The Jacobs Committee Report (1988) examined the South African public sector's securities with the purpose of recommending improvements in the structure. The report's two major findings/recommendations were that requirements for prescribed investment should be abolished to 'free the market' and that market makers in government bonds had to be appointed. As a result of the report pension funds and long term insurers are now only required to keep a minimum of 10% of their "market valued" assets in public sector debt or cash.

To date corporate bonds have been traded on the equities floor of the JSE. Fixed commissions and the exclusive rights of the stockbrokers may have been an inhibiting factor in the tradeability in this market. The recently formed Bond Market Association has recommended the use of both open outcry floor trading and screen trading since the JSE requires that its members offer all deals on its trading floor first.

The South African capital market operated under conditions of double digit inflation for the past decade. This has resulted in a number of years in which the real interest rate on fixed interest securities was negative. It is therefore not surprising that virtually no pressure has been forthcoming from the investment community for growth in the corporate bond market. In addition, individuals, have tended to place higher percentages of their savings into inflation-hedge instruments such



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as retirement annuities and unit trusts which have focused on equity investment.

Shepherd (1987) researched the cost of equity finance in South Africa. He concluded that, despite the frequency of new listings on the JSE, equity finance was more expensive than debt finance. His report did highlight a paradox: 45% of his respondents quoted equity as being cheaper than debt, whilst at the same time claiming that the cost of equity was at least above inflation – at a time when real interest rates were negative. This suggested that equity was more expensive than debt. The explanation proposed by Shepherd was that these respondents probably considered the cumulative cost (dividend payments) of equity, which was less than the cumulative yearly cost of the interest payments for a period of up to eight years – a perception of cashflow advantage in the early years.

Persistent government intervention in the economy, the high level of inflation and the perception among managers that equity is cheaper than debt may in part explain the virtual absence of a South African corporate debt market.

The study reported here was aimed at establishing if the present environment is capable of stimulating a more efficient South African corporate bond market. Information was sought as to:

- (a) whether South African financial managers' or bond investors' attitude towards corporate bonds is different to their foreign counterparts;
- (b) whether South African institutions consider it important to provide investors with a broader range of risk instruments;
- (c) what criteria the investment market looks for in a corporate bond market and whether they overlap with the criteria that potential issuers consider important for the funding needs of their companies;
- (d) whether there are any remaining hurdles that continue to restrict the formation of a SA debt market such as the lack of a bond credit rating agency, the need for market makers or the view that equity is cheaper than debt.

Research Methodology

The view of a broad sample of South African managers were obtained through the use of a mailed questionnaire. This was kept as simple as possible, and the use of time consuming open ended questions was avoided. It was sub-divided into the following 4 sections:

- 1. Respondent's details;
- 2. General views on the corporate market;
- 3. Questions for issuers/potential issuers;
- 4. Questions for portfolio/investment managers.

A pilot study was carried out by interviewing four suitably qualified, senior persons in UAL Merchant Bank, Gencor, Anglovaal and the FSI Group. The results of these interviews were included in the respondent sample.

The questionnaire was mailed, together with a covering letter and stamped addressed return envelope, to 213 directors/managers of a sample of JSE listed companies and some unlisted financial institutions. It was addressed to specific individuals to help reduce the risk of rejection. The respondents were given a three week return deadline from the date of posting.

In selecting the sample, the following criteria were used:

- the questionnaire was sent to persons in decision-making positions;
- at least one questionnaire was sent to the financial director/general manager of each parastatal: these already de-

pend upon their semi-gilt instruments for capital funds and with privatisation looming, they would effectively lose the semi-gilt status on their current bonds;

- all listed life assurers and banks were included in the sample, together with the larger pension funds, investment companies and merchant banks;
- in large companies and institutions (eg Gencor Group, Sanlam, Anglovaal Group, SA Mutual, etc.), more than one decision-making person was targeted;
- in large groups such as FSI, AMIC, Barlow Rand and Anglovaal, the financial decision-makers are, in many instances, in the holding company. The subsidiary companies in these groups were excluded from the population sampled. One hundred and forty six questionnaires were sent to a randomly selected sample of the remaining listed industrial companies.
- using the same logic, mining companies were omitted, since the financial decisions for capital funds are made in the head offices of the mining houses.

The categorisation of the organisations making up the sample is shown in table 1, together with the responses received. In all, there were sixty-seven responses (32%), all of which were usable. This was considered to be an acceptable response rate, especially considering that managers of listed companies are inundated with research questionnaires. The spread across the various categories was adequate. As the questionnaire offered anonymity, it was not possible to conduct a follow-up to increase the response rate.

**TABLE 1
STRUCTURE OF SAMPLE**

	Sample	Responses	% Return
Parastatals & SARB	7	3	43
Pension Funds & Life Insurers*	20	12	60
Other Investment Companies**	10	5	50
Merchant banks	8	3	38
Commercial banks	10	5	50
Mining houses	12	8	67
Other JSE Listed companies (excludin gold mines)	146	31	21
	<u>213</u>	<u>67</u>	<u>32</u>

* Listed and unlisted
** Generally unlisted

The only problem that arose from the completion of the questionnaires was that several respondents (11 out of a possible 45), who were likely to be potential issuers of debt (such as the listed companies in the sample), failed to appreciate this fact and therefore only completed the first and second sections. However the 34 issuers/potential issuers that did complete section 3 were considered to be representative of the group.

Results

Table 2 categorises the respondents by their position within the company. A third of the respondents operated outside the borders of South Africa, indicating exposure to forex dealing and perhaps offshore financing. 64% had an asset base in excess of R1bn with a further 25% in the range R100m – R1bn. Half expected to achieve a growth rate of 11-20% per annum over the next five years and a further 32% projected growth in the range 21-30% per annum. Three quarters of the group reported having a debt/equity ratio of less than 50%.

**TABLE 2
POSITION OF RESPONDENTS**

	<i>Frequency</i>
Financial Director	21
Financial Manager	13
Managing Director	3
Chairman	4
Director	4
Portfolio Manager	12
Other	<u>10</u>
	<u>67</u>

72% felt that in order to provide South African investors with a broader range of securities, the establishment of a corporate bond market is necessary. The factors which respondents felt were most likely to improve the chances for the establishment of a bond market were the maintenance of positive real rates of interest and the reduction of inflation to single digit figures.

Other factors which more than 60% of the respondents felt were 'likely' or 'most likely' to improve the environment for a formal bond market, ranked in order were:

- a reduction in the government's demand for funds which could create a vacuum to be filled by corporate debt.
- the privatisation program and the conversion of semi-gilt debt into corporate debt.
- the introduction of more floating or index linked corporate debt.
- the establishment of market makers in corporate debt issues.
- the presence of derivative markets.
- changes to the prescribed asset requirements.
- the introduction/formation of a bond credit rating agency.
- re-introduction to the world financial markets.
- the ability to issue corporate bonds in foreign currencies, in order to remove the currency risk for foreign investors.

Factors which were recorded as neither likely or unlikely to have a significant impact on the chances of establishing a bond market included:

- the introduction of 5 year straight line depreciation of fixed assets and the tax consequences thereof.
- the deconcentration of economic power in South Africa.
- a reduction in transaction costs.
- the issuing of convertible debt instruments.
- the clearer definition of a capital gain and its associated tax status.

Respondents were divided on the question of who should run a bond rating agency, with a third favouring an independent organisation and a third opting for a merchant bank. They were also almost equally divided on the issue of whether or not companies provide enough information to enable a rating agency to run successfully. Finally, two thirds believe that companies do not issue equity only when they consider the market to be overpriced, and nearly half felt that a corporate commercial paper market has a better chance of success in South Africa than a corporate bond market.

The majority of the 34 respondent companies which completed the third section of the questionnaire have confined themselves to bank loans, equity and preference shares as shown in table 3. The most commonly quoted reason for the selection of the type of financial instrument was the matching of project needs, namely the use of equity for long term projects and short term loans for bridging finance. Other reasons included the availability of finance at the time required and the

tax efficiency of debentures and preference shares for some companies. When asked whether the investment or the financing decision was the more important, surprisingly 8 respondents selected the financing decision, although theoretically this is incorrect.

**TABLE 3
TYPES OF INSTRUMENTS USED IN CORPORATE FINANCING**

	Response Frequency With		
	<i>Normal</i>	<i>Convertible</i>	<i>Warrant</i>
Loan stock	12	7	4
Loans (bank, inter-company)	34		
Fixed interest security (debentures etc)	18	10	5
Variable rate security	12	6	4
Equity	34		
Preference shares	22	10	3

A third of the respondents considered bank loans to be a cheaper source of funds than corporate bonds. The explanations given included the need to match project requirements (bank loans give such flexibility) and the perception that South African banks are more efficient than the existing bond market.

Nearly 80% agreed that corporate debt is cheaper than equity. Those who disagreed either noted the up-front cash flow advantage of equity (ie. dividends are not mandatory) or the fact that their firm's return on equity has been less than the prime rate of interest over the past few years.

The methods used by the respondents to calculate costs of equity were:

Dividend Yield - P/E ratios or Return on Equity	35,0%
Investors required return/risk adjusted market return	38,6%
Historical or projected dividend yield plus an estimate of growth	16,8%
A weighted cost of debt + equity	<u>9,6%</u>
	<u>100%</u>

35% of the response thus fell into the first (conceptually incorrect) category and this could in part explain why some executives view debt as being more expensive than equity.

When asked to rank a variety of methods of financing according to their wealth creating characteristics for shareholders, retained earnings was ranked highest, followed by bank loans and then equity and corporate debt equally ranked. These responses present a somewhat confusing picture, given that the costs of retained earnings and new equity only differ by the cost of raising the new equity.

Even though 89% of respondents stated that their corporate policy was to gain access to as broad a range of financing sources as possible, the evidence presented in table 3 indicates the difference between policy and practice.

Finally, most companies indicated that they would use a 3-9 year term if raising finance by issuing corporate bonds. The next most popular maturity range was 1-3 years. This contrasts with responses to an earlier question where 43% felt that corporate commercial paper had a better chance of success than corporate bonds.

Most potential investors in corporate paper believed that issue sizes should be in excess of R50 million (78%) and should have maturities in the 3-10 year range (69%). Institutional respondents did not report being restricted by any trustee covenants from purchasing corporate bonds.

Three quarters of institutional respondents were satisfied there were enough potential issuers of corporate bonds to make an efficient market. A similar proportion (76%) did not consider that convertible bond instruments were appropriate for use by high risk companies but 65% did consider them suitable for highly levered/high growth companies. Could this indicate that South African portfolio managers do not equate risk with financial leverage?

Nineteen respondents (53%) felt that convertible bonds could be used as a temporary means to exceed the 65% ceiling on the amount of equity an institution can hold, according to the recently (1989) revised Prudential Investment Guidelines.

Cross-referencing the maturity ranges and issue sizes with the type of investor yielded no obvious differences in outlook between the banks and other financial institutions as to their maturity and issue size preferences were apparent. However banks did not appear to have an affinity for maturities over ten years.

Discussion – General Environmental Issues

Inflation and positive real interest rates. South Africa has had a serious (double digit) inflationary condition since the seventies and therefore it is not surprising that the reduction of inflation and the maintenance of positive real interest rates were at the top of the list of factors necessary for improving the environment for bonds. Copeland (1982) studied the magnitude of the market risk premium of equity over bonds and found that the premium narrows as inflation rises. In order to renew investor confidence in the US bond market, he suggested that inflation would have to be brought under control. It is therefore not surprising to find an emphasis on equity financing in South Africa, given the high level of local inflation.

Floating rate/index linked bonds. Respondents thought that the introduction of floating or index linked debt would help stimulate the South African corporate bond market. This is in line with Cornell's (1986: 173-177) finding that variable rate bonds will tend to predominate in a highly volatile interest rate environment.

Privatisation. Privatisation will result in affected companies losing their semi-gilt status. Respondents thought that this would be positive for a corporate bond market.

The role of convertible bonds. The proliferation of convertible bonds/debentures in the US, prompted Brennan and Schwartz (1986: 163-171) to conclude that investors were willing to pay a premium for the convertible's relative insensitivity to a company's risk. This resulted from higher earnings ability and stronger growth potential. The observation is not supported in this research, since respondents did not agree that convertible instruments could stimulate a bond market in South Africa. A more appropriate investment might be a synthetic convertible bond (bond with warrant) as suggested by Finnerty (1986) since it is more flexible. Responses by potential South African issuers indicate that they are seeking flexible instruments although they also have an affinity for bank debt. This strategy would fit in with Jones and Mason's (1986) ranking according to tax benefits, where bonds with warrants are rated the second best instrument after retained earnings. Perhaps some of the mining houses or pyramid companies would prefer to venture further and consider Jones and Mason's third highest instrument, the exchangeable bond – exchanging the warrant for a share other than that of the issuer (eg. a share from the company's own portfolio holding).

Equity should be issued when shares are overpriced. The South African respondents did not agree with this statement,

which is contrary to studies carried out in the United States by Smith (1986). In the US the market perception was that management only issued equity when the share was considered to be overvalued, and consequently share prices were marked down on announcements of new equity issues. In South Africa when a new equity issue of an established company is announced, the shares are quickly absorbed with minimal effect on the share price (Shepherd, 1987).

South Africa's unique financial structure. Respondents were neutral over the implications that de-concentration of economic power would have for a corporate bond market. Raine (1990) has postulated that the new Banks Act could stop the pyramid companies (mining houses) from offering banking services to their subsidiary and associate companies, forcing these companies to issue their own debt. Ferreira (1990) and others were of the opinion that the monetary authorities did not see the situation as a problem and supported the respondents' view that de-concentration of economic power would have little benefit for a South African corporate bond market.

Bond credit rating agency. The majority of the respondents saw the establishment of a credit rating agency as beneficial, but did not give a clear view as to who the most suitable candidate would be to establish such an agency. Although 32% of the respondents thought that a merchant bank would be most suitable to run a rating agency, credibility for an agency may well be linked to its independence. South Africa's first bond rating agency was incorporated on 1 May 1990 (Republic Ratings). Like the US rating agencies, the basis of the rating will be 30% quantitative and 70% qualitative. This will be nationally based until South Africa is re-admitted to the world financial markets, when a global rating will be applied.

The outlook for a more efficient bond market is very favourable considering that the Reserve Bank has stated its policy will be to maintain real interest rates and the high priority that the Government has attached to the reduction of inflation to single digit figures. However, twenty nine respondents (43%) favoured the prospects for a short-term corporate paper market over a full blooded corporate bond market. It is therefore suggested that companies should start by issuing short-term (1-3 years) paper. This could then act as the catalyst for a corporate bond market, taking cognisance of the maturity terms preferred by the respondents.

Discussion – Views of Potential Issuers

Investment or finance decision, which comes first? Generally, South African managers arrived at the same conclusion as Meyers' (1983) US study, from which he concluded " . . . You can make a lot more money by smart investment decisions than by smart financing decisions . . . ". The finance decision is there to be moulded around the investment decision and it is important for all financial managers not to forget this statement in the belief that the company survives on its financing decisions.

Cost of equity. The answers to questions on the cost of equity indicate that there are South African financial decision makers that have the wrong perception of the cost of equity. The number of managers that still think dividend and earnings yields are a measure of the cost of equity is worrying and can perhaps partially explain the lack of a more successful corporate debt market in South Africa.

The results of the present study are compared to those of Shepherd (1987), and Gitman & Mercurio (1984) in table 4. The results confirm Shepherd's finding that many managers are using incorrect methods of costing equity.

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TABLE 4
METHODS USED TO ESTIMATE THE COST OF EQUITY

	This Study (%)	Shepherd Study (%)	Gitman & Mercurio Study (US) (%)
Dividend Yield	5,6	9,5	1,4
Earnings Yield	18,3	21,0	13,4
Return required by investors	23,9	22,0	30,1
Historical dividend yield plus an estimate of growth	5,6	5,5	2,9
Projected dividend yield plus an estimate of growth	14,1	14,0	22,0
Market return adjusted for risk	11,3	15,0	19,1
Debt plus premium of equity	21,1	13,0	11,0
	<u>100,0</u>	<u>100,0</u>	<u>100,0</u>
Sample size	67	71	177

Methods of finance rankings. The respondents ranking of financing methods supported Meyer's (1985) modified pecking order theory. The simplified theory is that companies set a dividend cover that will ensure enough internally generated funds (retained earnings) to cover normal rates of capital investment. If the firms need more capital, they will use the less risky securities first, ie. bank loans, followed by risky debt, then convertibles and finally new equity. Respondents in this study volunteered the same order, thereby providing supporting evidence in the South African context.

Discussion – Views of Investment Managers

Issue size. Rines (1988: 156) noted that in the foreign bond market, major institutions are often deterred from participating in a corporate issue of less than US \$100 million. The result of this study suggests that South African investment managers in the major institutions are thinking along the same lines, since sixteen respondents (44%) chose the R50m-R100m and R100m-R500m ranges for a minimum issue size. Lawson (1988) reports that the UK bond issues are generally less than £100 million. South African corporate bodies should therefore target bond issues for at least R100 million.

Maturity terms. Reilly (1986: 44) places interest rate risk high on the list of priorities when investing in fixed interest securities. In an inflationary environment it is therefore not surprising that both issuer and investor look to the lower maturity ranges to improve the market for corporate bonds. The potential issuers selected 1-3 year and 3-9 year maturities as the ranges that should be issued, whilst 69% of the institutional managers selected the 3-10 year range.

Conclusions

A corporate bond market is conspicuous by its absence in South Africa. Companies repeatedly turn to equity instruments for their capital needs. The corporations of this country appear to be under-gearred, (48% of the respondents claimed a debt: equity ratio of less than 20%), and at first glance, it seems that this is a consequence of the size of the corporate bond market.

The research seems to indicate that the attitude of South African financial managers is generally positive towards corporate bonds. There appear to be enough potential issuers with the correct attributes, namely

- a high percentage of tangible assets against which bonds can be secured if necessary;
- a net tax base, against which the interest payments can be offset.

In addition, companies need a broader range of financial instruments, and institutions need greater instrument diversification.

The most critical stumbling block for a corporate bond market was the need for a lower and less volatile inflation rate. Weinstein (1987) concluded that unstable inflation substantially reduces the returns on high yield bonds in relation to other corporate bonds. This suggests that until inflation is brought to lower levels, South Africa's corporate bond market will never develop a high yield (junk) component. Copeland's (1982) research probably best explains the absence of South African corporate bonds. He showed that the risk premium of equity over bonds narrowed during periods of high inflation in the United States. Shepherd's (1987) investigation into the equity risk premium implicit in share prices relative to treasury bills showed some correlation between the premium and the level of the South African inflation rate.

Another factor that was highlighted was one of flexibility. One-third of the respondents listed this as the reason for their choice of funding. Although many respondents presently use bond market instruments such as loan stock, fixed interest securities and variable rate securities, the market is so small (R2,4 bn; 0,6% of total SA capital market) that the instruments do not really appear to be taken seriously as a major source of finance. Yet Finnerty (1986), amongst others, has shown how innovative it is possible to be in applying financial engineering to corporate bonds.

The changes made to the prescribed asset regulations have certainly helped to improve the semi-gilt market's tradeability. Eskom ascribes their success to being able to make a market in their own bonds. This factor is supported by the results of the study, and seems to suggest that the appointment of market makers would certainly stimulate a South African corporate bond market, as will the newly established credit rating agency. The announcement of the phasing out of marketable securities tax in the 1990 budget is a further positive step by the Government towards stimulating the South African capital markets.

Finally the current economic policy of the South African Government should help to stimulate the increasing awareness of the South African financial community as to the advantages of a corporate debt market.

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Investment Basics-XXV Volume and the Bull-Bear Cycle

ABSTRACT

Four basic assumptions on the relationship between market behaviour and price action enable a descriptive model of changes in turnover during a complete bull-bear cycle. It is found, contrary to common wisdom, that an increase in volume does not necessarily confirm the ruling trend. Instead, when turnover begins to increase following a period of sustained rising or falling trend, it may well signal the end of that trend. This fact can be used to anticipate changes in the trend.

Go with the money – this is one of the more popular rules of thumb used by many people in the market. It means that one should follow the lead given by an increase in turnover:

*If the price is increasing on high, rising turnover, it must mean that clever people in the know must be buying.

*If the price is falling on increasing turnover, it means that the clever people are selling.

In either case, so the contention goes, high turnover reveals that the clever people are favouring the ruling trend, and to make money one should follow their lead and do exactly the same.

Unfortunately, this is not always so. Consider the following model for market behaviour during a bull-bear cycle. The model is founded on four assumptions:

- a) When demand exceeds supply, the price will rise.
- b) When supply exceeds demand, the price will fall.
- c) In a rising market, sellers tend to withdraw to wait for higher prices.
- d) In a falling market, buyers tend to withdraw, to wait for lower prices.

The first two assumptions, perhaps better described as truisms, are well known, as they have been used by Joseph Granville as the basis of his On Balance Volume indicator.

The other two assumptions are supported by observation. When a market is in a firm upward or downward trend, turnover is generally lower than it had been at the start of the trend.

Consider a complete bear-bull-bear cycle, beginning just after the market had topped out at the end of a bull phase.

The transition from the bull phase into the bear phase of the cycle takes place when prices no longer increase over the previous close, but begin to show a decline.

The first reaction of actual and potential buyers when they detect the change in trend, would be to withdraw from the market and adopt a wait and see attitude. At least initially, their interest in the market would remain high, and their intention would be to delay the purchase of the shares they want only until they could obtain them at a better price.

According to the assumptions, when prices continue to decline, many prospective buyers will elect to remain out of the market until the bear trend has definitely ended.

Holdings of shares react in one of two ways when the market turns at the top. Once the down trend is established, holders with firm stop loss discipline will sell aggressively at any price. This will help to bring prices lower. Other holders will withdraw from the market. They will wait for the 'correction' to end, and a resumption of the previous bull market. Only when the bear market shows no sign of an imminent reversal, do these holders become eager sellers.

The net result of the reduction in active buyers and, initially, in the number of sellers, is a sharp fall in the turnover of both the volume of shares traded and in the money value of daily turnover.

During most of a long bear market, the turnover remains low. Prices drift lower. The only reason why prices do not plummet steeply, is the absence of demand. Trades are few and far between, and tend to occur near to previous traded prices. The net effect is that prices decline gradually over time.

At some point in time, prices would have fallen to levels where the shares, particularly those of quality, are good value for money. At this time, institutions will return to the market. Fundamental analysis will identify these opportunities, and will trigger buying of selected shares.

By now, many holders of shares are desperate. They have seen their paper profits evaporate during the bear market and are keen to sell before prices fall even lower.

When buyers begin to return to the market, supply still far exceeds this early demand. In this buyer's market it is relatively easy to obtain shares at a price lower than the previous trade, because the brokers would have been instructed to accept any reasonable bid.

The paradoxical situation now arises where buying interest returns to the market, turnover increases, yet prices decline at a steeper rate. Since the quality shares lead the way, the change is evident to the whole market. The 'Go with the money' syndrome is activated, and sellers flood the market, driving prices even lower.

Of course, the lower prices makes all shares more attractive to the fundamental analyst, so that more and more buyers enter the market. The buying spree that develops sooner or later exhausts the supply, and buyers then find that they have to raise their bids to obtain the shares they want.

Prices bottom on very high volume. When prices begin to recover, a last round of selling takes place, as some holders of shares 'sell into the correction'. Then, as the upward reversal in the trend is confirmed, the sellers withdraw to await higher prices, and buyers continue to raise their bids in competition for the scarce supply.

Turnover is suddenly much lower than at the turn of the market, and it remains low during the now established bull phase.

At some point in time, prices reach a level which some holders of shares consider unrealistically high. They decide to take a profit, and become sellers. Volume picks up, and the outstanding demand is gradually satisfied as more and more sellers decide to take profit.

Soon supply balances demand, and prices levels off. Any further selling pressure will cause prices to decline, and will herald the start of a new bear cycle, and a concomitant fall in volume.

CONCLUSIONS

This descriptive model of how volume varies over a bull-bear cycle, shows that there are two occasions when the rule of thumb, 'Go with the money' will be the wrong advice. Just before a bottom reversal, near the end of an extended bear trend, the initial entry into the market of new buyers will result in an increase in turnover, while, at the same time, prices at first fall steeply.

Secondly, approaching the end of a bull market, there will also be a sharp rise in turnover, on increasing prices, when sellers begin to enter the market.

While the advice may initially seem correct for the duration of the final move in the price, the imminent change in trend will prove it false.

Good turnover just before, during, and just after a bottom reversal at the end of a bear trend is a positive sign, revealing that

it is likely to be more than merely a temporary correction. On the other hand, an increase in turnover following a sustained rise in prices, and accompanied by a leveling off in the bull trend, must be interpreted as a sell signal.

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