The Investment Analysts Journal

Number 45 – 1997

Die Beleggings-ontleders Tydskrif

Nommer 45 – 1997

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Contents

Die Beleggings-ontleders Tydskrif

Nommer 45 – 1997

Inhoud

This issue in brief

Share volatility after the introduction of index futures
This paper studies the effect of the establishment of the South African Futures Exchange in April 1990 on the volatility of equity index constituents on the Johannesburg Stock Exchange. It measures the volatility of a sample of index constituents from 1988 to 1994, and finds no statistically significant increasing trend in volatility over this period. It also compares the volatility of index constituents with matched samples of non-constituents over the period 1989 to 1994, and finds no statistically significant increasing trend in the relative volatility of the index constituents.

Contrary to popular opinion, but consistent with the findings of similar research in the United States, this study concludes that the establishment of the South African Futures Exchange and its listing of equity index futures contracts did not have a statistically significant effect on the volatility of index constituents listed on the Johannesburg Stock Exchange.

Are financial markets different?
It has often been argued that financial markets have special features which set them apart from other markets. Information is incomplete and, when it is available, is subject to asymmetry between suppliers and users. Potential investors find it difficult to distinguish between firms which are good and bad credit risks, nor do they have the incentive to make the socially optimal amount of investment in acquiring information. Because of these characteristics financial markets demand a degree of state intervention which would not otherwise be necessary. This article argues that the fashionable arguments have been exaggerated, that financial markets are not alone in being subject to information asymmetry and that the evidence does not suggest that they are in particular need of regulation.

A test of Graham's stock selection criteria on industrial shares traded on the JSE
Benjamin Graham believed in value investing, whereby he proposed that investors should purchase only those shares that are worth significantly more than they cost. He had listed ten criteria which investors could use to identify undervalued stocks.

The industrial shares traded on the Johannesburg Stock Exchange were screened in order to select those securities which met various sets of Graham's criteria.

Obituary: Professor Ronnie Bethlehem 6

L Vanden Baviere and JU de Villiers
Share volatility after the introduction of index futures 9

H Kenney
Are financial markets different? 17

WG Klerck and AC Maritz
A test of Grahm's stock selection criteria on industrial shares traded on the JSE 25

K Waelkens and M Ward
The low price effect on the Johannesburg Stock Exchange 35

Association for Investment Management and Research
Investment Basics: XXXV. AIMR's performance presentation standards: Gaining global acceptance 49

The simulation of portfolios based on Graham's criteria yielded risk adjusted returns significantly higher than that predicted by the capital asset pricing model, at the ten percent level of significance. The lack of diversity in the portfolios presented the biggest problem to this investment approach.

The low price effect on the Johannesburg Stock Exchange

Studies in the United States and elsewhere have provided empirical evidence which suggests that low priced shares outperform high priced shares on a risk adjusted basis, commonly referred to as the "low price effect". The existence of such an anomaly undermines the evidence for an efficient market and questions the validity of traditional pricing models such as the Capital Asset Pricing Model.

This research examines share returns on the Johannesburg Stock Exchange over the period 1983 to 1993 to establish the existence of a low price effect. Five portfolios consisting of 20 shares each were reconstructed each year over the ten year period. The shares were selected from the entire population of listed companies using a stratified sampling technique on ranked share price. Great care was taken to control for survivorship bias. Two different risk adjustment methods were used and the risk adjusted monthly returns of portfolios comprising low priced shares were contrasted with those of high priced shares.

No evidence of a low price effect was found, however, the results indicate the possible existence of an anomaly of the opposite kind - a "high price effect". This supports the view that the JSE is an abnormal market in that share prices are driven by institutional demand. In view of the evidence against the misspecification of the CAPM, this anomaly is ascribed to market inefficiencies.

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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LIFE'S TOO SHORT TO MAKE THE WRONG CHOICE

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Professor Ronnie Bethlehem : An obituary

Members of the Investment Analysts' Society of Southern Africa owe the late Ronnie Bethlehem a special debt of gratitude.

He first became involved in our affairs in 1968, before the Society was even established, when he approached David Milton and myself to participate in the drawing up of its prospective constitution. He was already a member of the British Society (now part of the IIMR) and had formed a clear picture of the objectives that he felt we should share with it. These included providing a forum for management to communicate with analysts (and, through them, with the general body of investors), raising the standards of investment analysis in this country and participating with our sister societies throughout the world in internationalising our ideas and concepts.

The Society was formally established in March 1969, and the first challenge that confronted it was to survive the disenchantment of many investors with professional investment advisors after May 1969, when the share market underwent a spectacular collapse. Ronnie Bethlehem was undaunted, not only insisting that the setback was temporary (and how right he was!) but already formulating plans for his second major contribution to the Society, the establishment of this Journal. He became its founding Editor, brought two of the country's great universities into its editorial and financial processes and remained its Editor until his death. Every issue, including even this posthumous one, has carried his imprint.

His third great contribution was the annual Awards Dinner for Excellence of Corporate Reporting, which has now become a major event in South Africa's financial calendar. His was the concept and the format to which we still adhere today. The speeches, the basis of the awards, the festive atmosphere and even the much-treasured Squirrels were all Ronnie's ideas. He even supervised every detail of the design and manufacture of these statuettes.

It is difficult to believe he has gone forever. We shall all miss him. I still have the strange feeling I should telephone him about the lunch I owe him. How could one realise how little time he had left for his friendships to be pursued? It is one of the catastrophes of the New South Africa, for which he had so much hope, that he should have become one of the victims of the crime and lawlessness that now afflict it.

Our deepest sympathies go out to his widow, Paulette, and all his family.

JOHN ROGERS
MEMBER OF THE EXECUTIVE COMMITTEE

Corporate and institutional tribute

We wish to record our deep sorrow and regret at the tragic and untimely death of Professor Ronnie Bethlehem, Editor of the Journal. At the same time we wish to express our grateful thanks for the enormous contribution he has made to the Journal since its inception.

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L Vanden Baviere and JU de Villiers*

Share volatility after the introduction of index futures

1. INTRODUCTION

This paper studies the effect of the listing of equity futures contracts on the South African Futures Exchange (Safex), on the volatility of the index constituents, listed on the Johannesburg Stock Exchange (JSE).

There is a common belief that trading activity in equity index futures can lead to excessive volatility in spot equity markets. In a survey undertaken among its members by the Federation Internationale des Bourses de Valeurs (FIBV), respondents complained about "inter-market vibration transmittal" which causes a "transmission of price volatility from index futures to the underlying equity markets" (FIBV, 1993:1). From the survey, the FIBV concludes that the price volatility of the futures market is inevitably transmitted to the stock market, and that this exacerbates volatility in the stock market (FIBV, 1993:4).

In similar vein, Shad (1991:16) refers to the "multibillions of dollars of transactions" on the derivative markets which "lead ... the equity market through its violent gyrations", and have "escalated the leverage and volatility of the markets to precipitous unacceptable levels".

The Stals Committee was established to investigate the formalising of futures trade in South Africa. In its report, the Stals Committee (1988:43) states that an index futures market could adversely affect the level of stability in equity markets if futures trading encourages destabilising speculation in futures prices, and index arbitrage transmits these destabilising impulses to the spot price. The Committee believes, however, that speculation in general is not destabilising, and concludes that "there does not seem to be any evidence to support the view that futures trading has a generally destabilising influence on the equity prices. Specific instances of a destabilising effect are a possibility" (Stals Committee, 1988:47).

This view is also held by Edwards (1989:374) who believes that, contrary to popular opinion, futures-related trading has enhanced liquidity and reduced equity market volatility. Similarly, Grossman (1988:292) believes that the lower transaction costs in the index futures markets have allowed institutions to trade more gradually than would be the case if the stock market were used directly. In the absence of an index futures market, institutions would face larger transaction costs. This will cause them to trade less frequently in larger amounts. The stock market would then bear the full brunt of any strategies without the cushion provided by the futures market.

The New York Stock Exchange (1993:2) believes that the lower transaction costs and greater leverage in futures markets mean that informed traders can better respond to perceived mispricing, thus reducing any noise component in prices. The introduction of a futures contract will therefore reduce spot price volatility.

The aim of this paper is to determine whether the establishment of Safex, and the start of trade in listed equity index futures on that exchange, has lead to an increase in the volatility of index constituents traded on the JSE. South African futures were traded in an informal market organised by Rand Merchant Bank since April 1987, but Safex was only established formally on 30 April 1990. Equity index futures were listed from the start.

This paper reports on research that measures the volatility of a sample of 37 index constituents from 1988 to 1994. We find no statistically significant increasing trend in volatility over this period. We also compare the volatility of index constituents with matched samples of non-constituents over the period 1989 to 1994, and find no statistically significant increasing trend in the relative volatility of the index constituents. The establishment of Safex and the listing of equity index futures did not have a statistically significant effect on the volatility of index constituents listed on the JSE.

The remainder of this paper is in five sections. The first section discusses previous research into the effect of the introduction of index futures on equity volatility. The research method of this paper is explained in the next section. This is followed by a section discussing the data used. The results of the study are presented in the section that follows. The last section presents the conclusions of the study.

2. PREVIOUS RESEARCH

Previous studies of the effect of the introduction of index futures contracts on the volatility of index constituents have focused on the introduction of an S&P 500-based futures contract in the United States.

*Respectively Department of Business Economics, University of the Witwatersrand, Private Bag 3, Wits 2050, Republic of South Africa and Department of Business Management, University of Stellenbosch, Private Bag X1, Matieland 7602, Republic of South Africa. The authors wish to thank I-Net for making its financial database available for this research.

Edwards (1988) compares the volatility of the S&P 500 index before and after the introduction of an S&P 500 future in 1982 and finds a small decline in the volatility of the S&P index for each year between 1983 and 1986. Harris (1989) compares the volatility of the S&P 500 stocks to matched non-S&P 500 stocks before and after the introduction of S&P 500 future. He finds that the S&P equities are more volatile. The differences in volatility are small, and Harris argues that they could be attributable to factors other the introduction of futures trading.

Damodoran (1990) finds that the daily variance of a portfolio of all the S&P 500 shares increased subsequent to the introduction of the S&P 500 futures contract. The increase was small (from a standard deviation of 1,9 per cent per day to one of 1,93 per cent), not statistically significant (t-statistic of 1,36) and almost fully attributable to changes in the systematic risk of the portfolio of over the period.

Empirical research has found no significant increase in the volatility of S&P 500 constituents on the introduction of an S&P 500 futures contract. This paper aims to determine whether a similar situation applied to the index constituents on the JSE when equity index futures were first listed on Safex. The method is discussed in the section that follows.

3. RESEARCH METHOD

An informal futures market existed in South Africa since April 1987. This was organised by Rand Merchant Bank, who guaranteed all trades and performed all clearing functions.

Safex formally opened on 30 April 1990, with three equity index futures listed on the exchange. These were contracts based on the JSE Actuaries All Share Index, the JSE Actuaries Gold Index, and the JSE Actuaries Industrial Index.

This paper aims to establish whether the listing of the index futures on Safex in April 1990 increased the volatility of the index constituents listed on the JSE.

We undertake three tests to determine whether the volatility of index constituents increased. The first test considers the volatility of a sample of index constituents over the period January 1988 to December 1994. We calculate daily log returns for each share using equation (1) below:

$$R_t = \ln(P_t/P_{t-1}) \quad \ldots (1)$$

where:

R_t = log return in period t

P_t = share price at the end of period t

P_{t-1} = share price at the end of period (t-1), which is also the share price at the beginning of period t

Equation (1) does not account for dividends paid out during the period, and the returns used in this study therefore exclude dividends. The tests used in this study all try to determine whether volatility increased over the period. Leaving out dividends should have a similar effect before and after the introduction of futures contracts, and the results of this research should therefore not be influenced by this simplification in the calculations.

We calculate the variance of daily log returns on an annual basis for all the shares. This figure is standardised by dividing by the average share variance over the seven-year period. This variance ratio is then used in the subsequent analysis.

The annual variance ratio for individual shares is averaged over the 37 shares in the sample. If the volatility of the shares increased on the introduction of futures, the average annual variance ratio would have increased over the period of the study. We use a simple linear regression of the average ratio on time to determine whether there was an upward trend in volatility for the shares in the sample. If volatility increased, the estimated coefficient of time in this regression would be greater than zero. A coefficient statistically significantly larger than zero would therefore lead to rejection of the null hypothesis (that volatility was unaffected by the futures listing) and acceptance of the alternative (that volatility increased).

The first test would indicate whether the volatility of index constituents increased over the period or not. It is obvious that volatility could be influenced by factors other than the futures listing, and any finding of this test could not be conclusive. Controlling for additional factors that may also affect equity markets is difficult, and according to Ely (1991:392) not analytically possible. In an attempt to eliminate the effects of factors that influence the general volatility of shares, we also conduct tests comparing the volatility of index constituents to that of non-constituents.

The second test consists of comparing the volatility of index constituents to a matched sample of large capitalisation shares that do not form part of the index. In compiling the index, the JSE does not include the shares of an operating company as well as the shares of another company that is purely or largely its holding company. If both are eligible for inclusion, in general only the operating company is included. Holding companies may be selected when they appear more appropriate (JSE, 1993:3).

There are consequently a number of large capitalisation JSE shares not included in the index, and their volatility can be compared to that of the index constituents.

We construct a matched sample of index constituents and non-constituents. We then calculate the annual variance of the log returns (equation (1)) of each share in the sample. We calculate the ratio of the variance of index constituent to non-constituent for each pair, and the annual average over all the pairs. We again use a simple linear regression of the average ratio over time to test for a trend in the relative volatility of index constituents. If relative volatility increased, the estimated coefficient of time in this regression would be greater than zero. A coefficient statistically significantly larger than zero would therefore lead to rejection of the null hypothesis (that volatility of index constituents and non-constituents was similarly affected by the index futures listing) and acceptance of the alternative (that relative volatility of the index constituents increased).

The third test is similar to the second and also tests whether the volatility of index constituents increased relative to that of non-constituents. For the third test, the matched pairs consist of smaller index constituents, just large enough to be included in the index. These are matched with non-constituents just too small to be included in the index. This is done to produce pairs of roughly similar size. We also attempt to match shares in the same sector and in a similar line of business.

Again, as in the second test, we calculate the average ratio of constituent variance to non-constituent variance. We use a simple linear regression of this ratio over time to test for a trend in the relative volatility of index constituents.

4. DATA

Data for the research consist of daily share prices obtained from the I-Net financial database.

The sample of shares for the first test are selected from the top 40 JSE shares in terms of market capitalisation. GENCOR and BARLOWS are excluded from the sample because the authors believe that the unbundling of these groups that took place during the study period could have lead to distorting volatility shocks. LIBSIL is excluded from the sample due to a lack of available data over a substantial portion of the period analysed.

The following 37 shares (JSE short names) are included in the sample for the first test:

ABSA	AMCOAL	AMGOLD	AMIC
ANGLOS	AVI	CGSMITH	DEBEERS
DRIES	EDGARS	FIRSTBK	FOSCHINI
FREGOLD	IMPLATS	ISCOR	JCI
KLOOF	LIBERTY	MALBAK	MINORCO
NAMPAK	NEDCOR	PREMGRP	REMGRO
RICHEMONT	RUSPLAT	SABREW	SAFREN
SAMANCOR	SAPPI	SASOL	SOTHERN
STANBIC	TIGOATS	VREEFS	WESTDP
WOOLTRU			

The daily closing prices for each of the companies included in the sample are analysed over seven years from 2 January 1988 to 30 December 1994.

The sample of shares for the second test consists of 16 matched pairs of shares. Each pair consists of a company included in the JSE Actuaries Indices and a company excluded from the JSE Actuaries Indices due to the fact that it is purely or largely a holding company of the other. Some of the pairs selected have a pure operating company to holding company relationship. For others, the relationship between the indexed company and the non-indexed company in terms of ownership is not as strong.

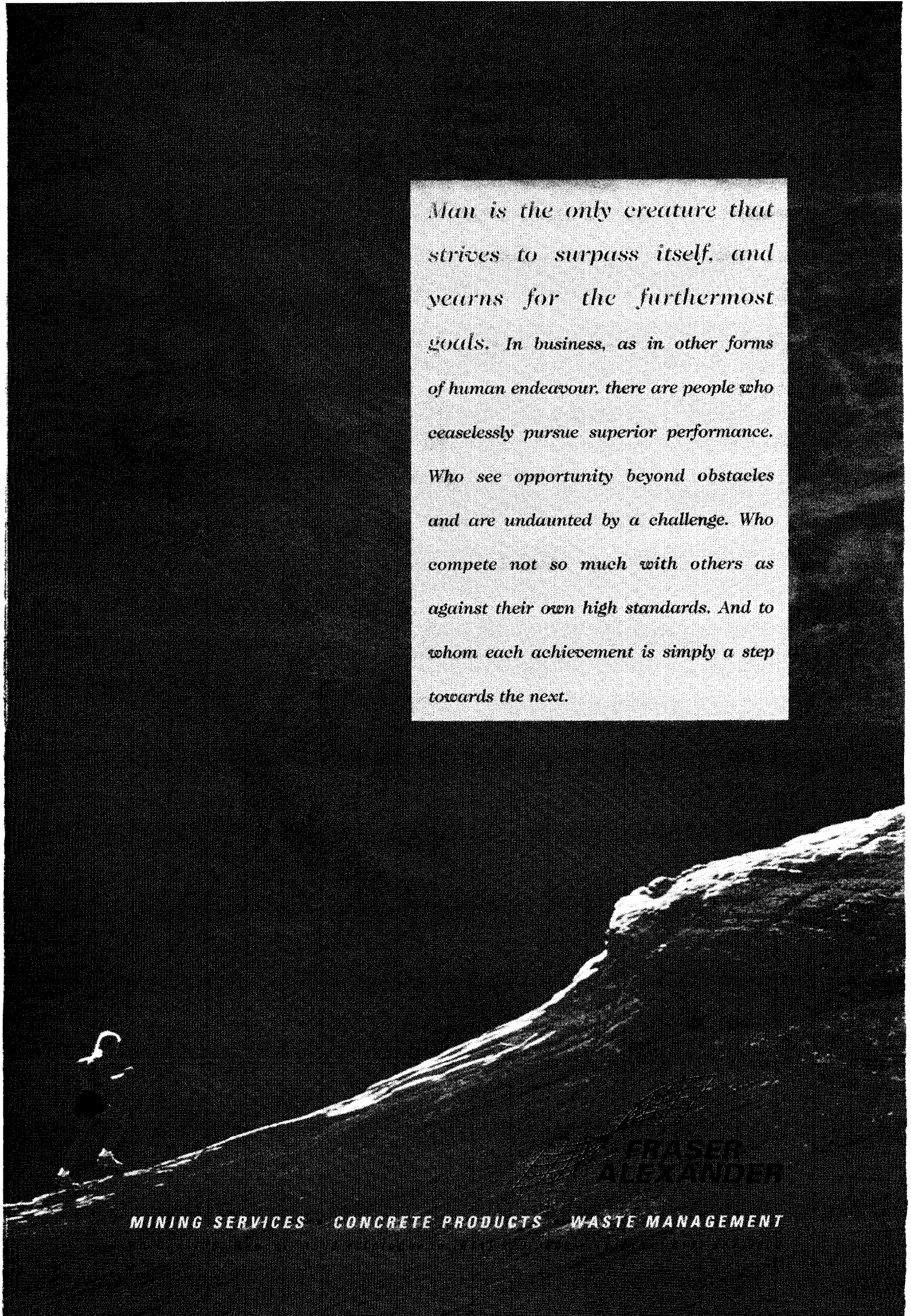
The following 16 pairs of companies (index constituent followed by non-constituent, JSE short names) are included in the sample for the second test:

ALTECH – ALTRON	AVI – AVHOLD
CONFRAM – FRAME	DEBEERS – ANAMINT
DRIES – GFSA	FOSCHINI – LEFIC
HLH – HUNTCOR	KERSAF – SUNBOP
LIBERTY – LIBHOLD	PEPKOR – PEPGRO
PICK'NPAY – PIKWIK	REMGRO – REMBBEH
RUSPLAT – LYDPLAT	SABREW – BEVCON
TIGOATS – CGSFOOD	TOYOTA - WESCOB

The daily closing prices of the shares included in this sample are analysed over six years from 3 January 1989 to 30 December 1994.

The sample of shares for the third test also consists of 16 matched pairs of shares. Each pair consists of a company included in the JSE Actuaries Indices and a company excluded from the JSE Actuaries Indices due to the fact that it has too low a market capitalisation to qualify for inclusion in the index. (At the time of the research, the indices were made up from the largest market capitalisation shares to include 80 per cent of the shares by market capitalisation. They have since been expanded to include the smaller market capitalisation shares as well. In addition, new indices were introduced based on an even smaller number of high capitalisation shares. Futures contracts based on the new indices were listed on Safex in March 1996.)

The index constituents for this sample of matched pairs are selected from the smaller capitalisation constituents. The non-constituents are selected from the higher capitalisation non-constituents. We thus attempt to ensure that the size of firms in the matched pairs was not too dissimilar. We also try to match shares in the same sector and in a similar line of business.


Man is the only creature that strives to surpass itself, and yearns for the furthermost goals. In business, as in other forms of human endeavour, there are people who ceaselessly pursue superior performance. Who see opportunity beyond obstacles and are undaunted by a challenge. Who compete not so much with others as against their own high standards. And to whom each achievement is simply a step towards the next.
FRASER ALEXANDER
MINING SERVICES · CONCRETE PRODUCTS · WASTE MANAGEMENT

The following 16 pairs of companies (index constituent followed by non-constituent, JSE short names) are included in the sample for the third test:

ABSA – INVESTEC	AMGOLD – MIDWITS
CNAGALO – WALTONS	CONSOL – HOLDAIN
CTP – CAXTON	ERGO – DEELKRL
ETCONS – EDAGGA	GENTYRE – METAIR
GRINAKR – EVERITE	HARTIES – WESWITS
HIVELD – CMI	KINROSS – UNISEL
MALBAK – M&R	ORYX – STHELENA
STANDARD METKOR	WINKELS – BUFFELS

The daily closing prices of the shares included in this sample are analysed over six years from 3 January 1989 to 30 December 1994.

The results of the three tests are discussed in the section below.

5. RESULTS

5.1 Volatility of index constituents

We calculate the annual volatility (variance of daily log returns) of each of the 37 index constituents for each of the years 1988 to 1994, as well as the average for each share over the total period. If the introduction of index futures increased volatility of the index constituents, the ratio of annual to average volatility would show an increasing trend over the period.

The average ratios (over the 37 index constituents) are:

1988	0,9647
1989	1,0911
1990	1,0988
1991	0,9907
1992	0,7088
1993	1,0250
1994	1,1212

A simple linear regression of the average ratio on time shows a coefficient of time (year) of -0,0019 (t = -0.0644), which is not statistically significantly different from zero. The null hypothesis is therefore accepted that there has been no upward trend in volatility over this period.

5.2 Relative volatility of constituents and holding company or pyramid non-constituents

We also calculate the annual volatility of index constituents paired with shares of holding companies or pyramids excluded from the index for that reason. If the introduction of index futures increased volatility of the index constituents, the ratio of constituent to non-constituent volatility would show an increasing trend over the period.

The average ratios (over the 16 pairs of shares) are:

1989	1,0148
1990	1,0256
1991	1,0545
1992	1,2796
1993	1,7565
1994	1,0334

Inspection of the average ratios presented above shows large ratios in 1992 and 1993, with a return to the normal range in 1994. A simple linear regression of the average ratio on time shows a coefficient of time (year) of 0,0717 (t = 1,0301), which is not statistically significantly different from zero. On this basis, the null hypothesis has to be accepted that there has been no upward trend in volatility over this period.

If 1994 (the year in which volatility appears to have returned to normal after two years at higher levels) is excluded from this analysis, then the average ratio on time shows a coefficient of time (year) of 0,1737 (t = 3,0614), which is statistically significantly different from zero.

The high average ratio in 1993 deserves further scrutiny. An examination of the ratios for individual pairs of shares reveals that the high 1993 value was the result of two outliers. These were a ratio of 4,4734 for the Toyota/Wesco pairing, and a ratio of 7,4077 for the Confram/Frame pairing. It was not evident from our data why these were so high during the period. When these two pairs are excluded from the sample, the average ratios (over the remaining 14 pairs of shares) are:

1989	0,9971
1990	1,0572
1991	1,0371
1992	1,0309
1993	1,0968
1994	0,9160

A simple linear regression of the average ratio on time shows a coefficient of time (year) of -0,0084 (t = -0.5253), which is not statistically significantly different from zero. On this basis, the null hypothesis has to be accepted that there has been no upward trend in volatility over this period.

Despite the high level in 1993, it does not appear as if there has been a general increase in the level of index constituents relative to the non-constituents since the introduction of the index futures contract. The ratio returns to a level of less than one in 1994, and even when including the high 1993 figure, there is still not a statistically significant positive trend in volatility over the period. The high 1993 figure seems to be an outlier explained by two high share volatilities. We fail to reject the null hypothesis, accepting that the volatility of index constituents has not increased over this period relative to that of non-constituents.

5.3 Relative volatility of small capitalisation constituents and large capitalisation non-constituents

We also calculate the annual volatility of small capitalisation index constituents paired with non-constituent shares that were just too small to be included in the index. If the introduction of index futures increased the volatility of the index constituents, the ratio of constituent to non-constituent volatility would show an increasing trend over the period.
The average ratios (over the 16 pairs of shares) are:

1989	0,7438
1990	0,9141
1991	0,9853
1992	1,0736
1993	0,9690
1994	0,9255

A simple linear regression of the average ratio on time shows a coefficient of time (year) of 0,0332 (t = 1,3761), which is not statistically significantly different from zero. On this basis, the null hypothesis has to be accepted that there has been no upward trend in the volatility of index constituents over this period.

6. CONCLUSIONS

The aim of this paper is to determine whether the establishment of Safex and the start of trade in listed equity index futures on that exchange has lead to an increase in the volatility of index constituents traded on the JSE.

When considering the volatility of a sample of 37 index constituents from 1988 to 1994, we find no statistically significant increasing trend in volatility over this period. Similarly, we find no statistically significant increasing trend in the volatility of the index constituents relative to that of non-constituents over the period 1989 to 1994.

Contrary to popular opinion but consistent with the findings of research in the United States, we therefore conclude that the establishment of Safex and the listing of equity index contracts did not have an adverse effect on the volatility of index constituents on the JSE.

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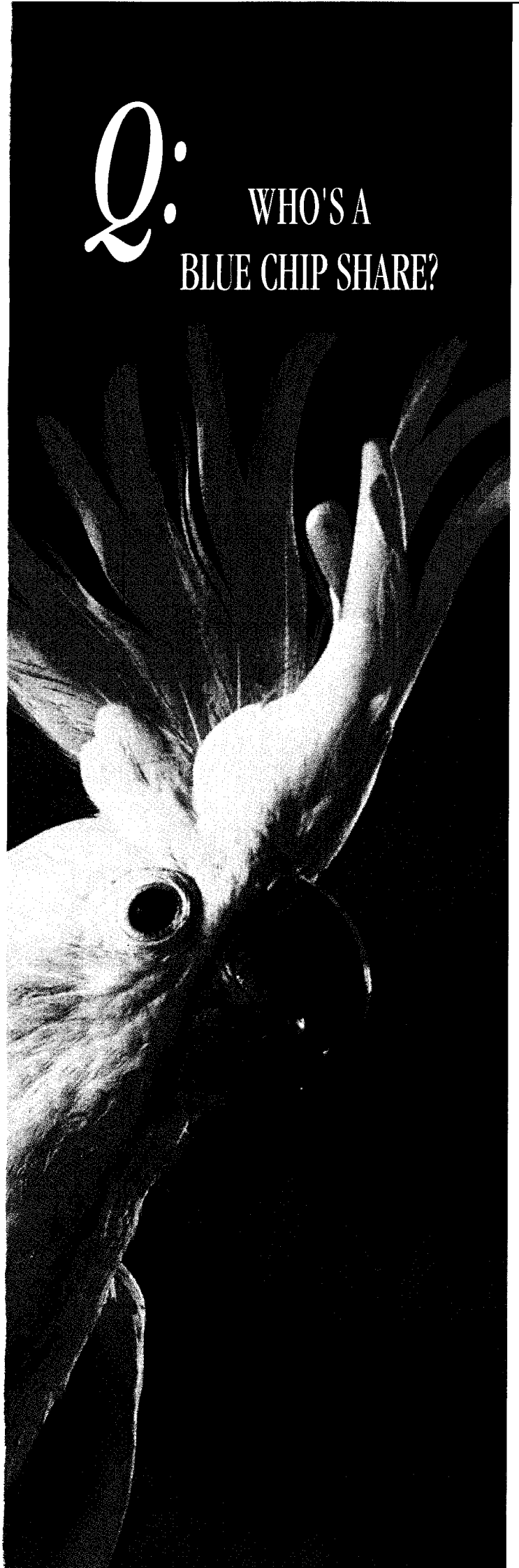

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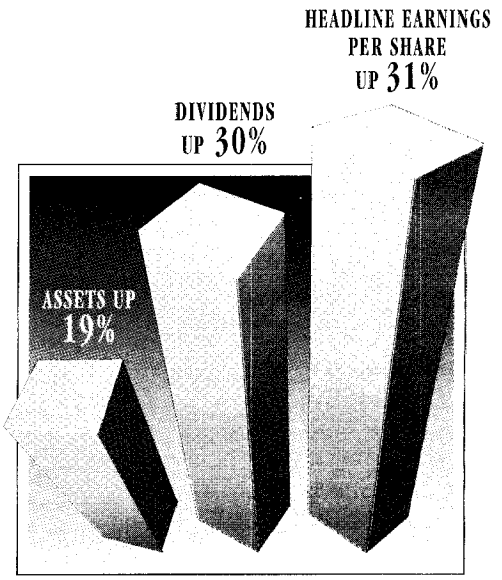

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H Kenney*

Are financial markets different?

1. INTRODUCTION

Financial markets are different from other markets. Or so we have heard nearly as regularly as we have about sexual scandals in the British Royal Family.

The argument goes that even if the general case for the non-regulation or deregulation of markets is by now pretty unexceptionable, financial markets have special features which demand at least some state intervention. These characteristics are supposed to reside primarily in the pervasive role of information in the working of financial markets. Information is incomplete and, when it is available, is subject to asymmetry between suppliers and users. Potential investors have difficulty in distinguishing between firms which are good and bad credit risks. Nor do they have the incentive to make the socially optimal amount of investment in acquiring information. Monitoring the solvency of a financial institution has public good characteristics: once information has become available to one depositor others can also acquire it at low cost. Hence information is liable to be undersupplied. Self-interested individuals will naturally enough only consider their own benefit and not that of society as a whole.

These are familiar arguments, widely accepted not just by those who make a living from regulating but by many economists. Yet on closer investigation the case for the special nature of financial markets is perhaps not as conclusive as the apparent consensus would suggest.

That regulation is something to be avoided, if at all possible, is a relatively recent belief amongst economists. Before 1960 the prevailing economic orthodoxy was to ascribe all kinds of superior properties to governments when it came to directing the economy. As James Buchanan has observed, writing about the emergence of macroeconomic targeting since the 1930s and the boost it gave to public intervention in economic affairs, "By some implicit extension of the model of individual choice behavior, constrained only by external forces, governments came to be viewed romantically and were deemed capable of achieving 'good' as defined for them by the economists and other social philosophers. Microeconomists had long been ready at hand to profer policy advice to governments concerning ways and means to promote greater overall efficiency in the economy" (1991:8).

2. THE COASE THEOREM

The first break with the conventional belief came with the publication of "The Problem of Social Cost" by Ronald Coase in 1960. Before then the standard justification of economists for government intervention was based on the notions of market failure and externalities, deriving all the way from Pigou. Coase argued that it was not so simple: as long as legal entitlements or property rights were well defined, and the costs of transacting were zero, then market forces would ensure an efficient allocation of resources. As legal entitlements could be bought and sold the parties to a transaction would have an incentive to arrive at mutually beneficial outcomes. As there were gains from trade, they would bargain their way to efficiency. This was the Coase Theorem.

But transaction costs, viz., the costs of doing business, entering into contracts and enforcing them, are usually significant. This was the state of affairs which Coase himself found theoretically interesting, for the challenge then became the designing of institutions which would minimise the costs of transacting. It was "the real world of positive transaction costs" which posed the important problems, for then assignments of property rights would make a difference.

What follows from the Coase Theorem is that government intervention comes at a cost. "Market failure" is no automatic justification for governments to step in and do their omniscient thing. "Government failure" in all shapes and sizes stares us in the face every day. We ignore at our own peril the costs of intervention by politicians and bureaucrats who can be depended on to put their own interests first. Power, prestige and income, the record suggests, are important objectives for inhabitants of the public sector. And even when they do bother about the "public interest", identifying it is no simple thing, nor is it self-evident that public transport to the goal would be the least costly.

In fact, there are excellent grounds for believing the opposite. The price system, as economists of the Austrian school like Hayek have always emphasised, is a relatively cheap means of of producing and transmitting information. Regulators of course accept that markets are not producing enough or correct information. It follows that they have to know better than the market in arriving at the "right" amount of tax or subsidy required to eliminate an externality. In short, even if there are costs of using the market, so also will

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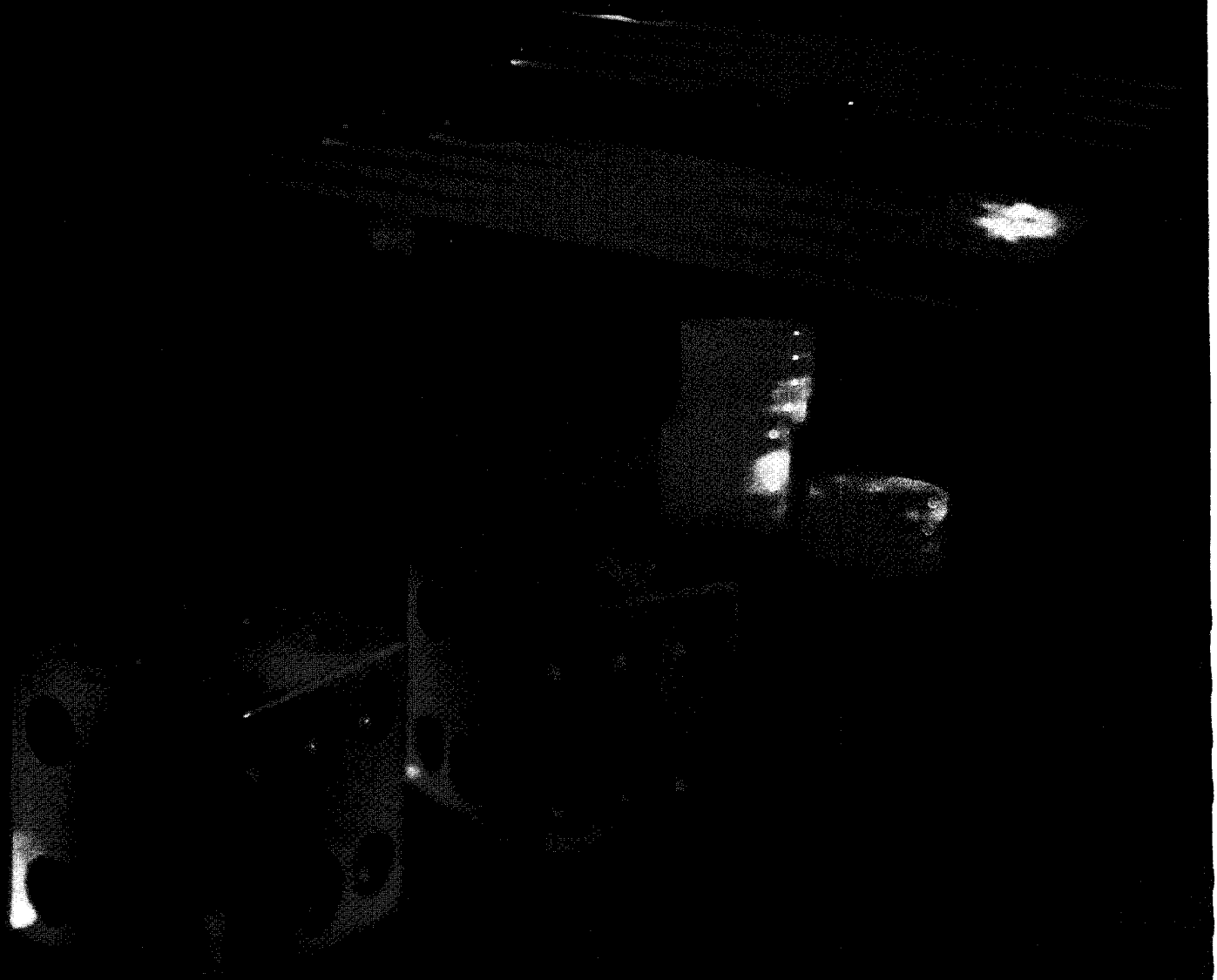

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there be costs of regulation and there is no reason to believe that they will be negligible.

3. STIGLER AND "CAPTURE"

The other classic work on the economics of regulation has been George Stigler's 1971 article on "The Theory of Economic Regulation". Stigler's main target was the long-held view that "Regulation is instituted primarily for the protection and benefit of the public at large or some large subclass of the public". He argued instead that regulation was a valuable commodity and that its allocation was determined by demand and supply, although his own emphasis was on the former. Stigler came up with a "capture" theory of regulation: "Regulation may be actively sought by an industry, or it may be thrust upon it". His central insight was "that, as a rule, regulation is acquired by the industry regulated and is designed and operated primarily for its benefit" (Stigler, 1988:209).

The assumption was that demanders of regulation attempted to use the coercive powers of the state to increase their wealth. Regulation was about redistribution. Stigler identified four main channels by which regulatory authorities used the powers of the state to benefit the industries they regulated: subsidies, price fixing, entry controls and restriction of substitute products.

In the Stigler model regulation in these forms tended to be captured by small producer groups because they were best placed to do so. The costs of information and coordination would be less and free riding would tend to be impracticable as shirking by individual members could not easily be concealed.

The driving force of this model of regulation was individual self-interest. After Stigler and the elaborations of his University of Chicago colleagues it came to seem plainly naive to explain regulation as the result of the efforts of a well-intentioned and well-informed state to correct the results of market failure.

Still, the economic theory of regulation has been better at destroying than at creating. In his Nobel Memorial Lecture in 1982 Stigler admitted that its "explanatory triumphs have not been overwhelming, and indeed the theory itself is still relatively primitive" (Leube and Moore, 1986:145). It has had its empirical successes, but there have been areas which still need to be plausibly explained. In particular, as Stigler asserted, there is "the policy which not only lacks important beneficiaries but persists". He cited the regulation of drugs in the United States, which, on all the evidence, injured consumers and conferred no offsetting benefit for the pharmaceutical firms supplying the drugs. Yet the long and costly review process for new drugs has persisted since it initiation in 1962: "it is evidence either of the slowness with which complex programs are appraised by the community, or of the incompleteness of our understanding of the policy" (Stigler, 1988:xv).

Whatever the gaps still to be filled, we can reach a few conclusions. Even if we accept that markets should on occasion "fail", there are cogent reasons why governments should fail in a bigger way, why non-market failure should be more acute than market failure. It has to do with the strategic placing of those who demand and supply regulation, as has been theoretically argued and empirically documented by the Chicago School, often resulting in gains for themselves but losses for society. There are also the difficulties in defining and measuring non-market output, as well as the problems in evaluating performance in ways comparable to the profit-and-loss statements associated with markets. In short, economists have come to accept that regulation is by and large a bad thing and that the onus is on governments to justify controls on capitalist acts between consenting adults.

4. THE "SPECIAL" NATURE OF FINANCIAL MARKETS

But there is an exception, so it is widely held. Financial markets are supposed to be different from other markets, so different in fact that they need regulation, even if other markets do not. As a well-known commentator, Llewellyn (1991:65), has summed up the conventional wisdom on these matters, "it is recognised that financial markets have their own unique characteristics, and that participants in these markets differ from participants in other markets in so far as they also have a duty to further the achievement of an appropriate degree of 'social efficiency'. Accordingly the working of the financial market as a whole should facilitate rather than impede the efficient operation of the financial system".

One of America's leading economists and former Chairman of the Council of Economic Advisers, Joseph Stiglitz (1994:20), recently expressed his substantial disagreement with the claim that "market liberalization will enable the financial system to perform its main function of allocating scarce capital more efficiently and will thus benefit the rest of the economy". He argued that "much of the rationale for liberalizing financial markets is based neither on a sound economic understanding of how these markets work nor on the potential scope for government intervention... Often, too, it lacks an understanding of the historical events and political forces that have led governments to assume their present role. Instead, it is based on an ideological commitment to an idealized conception of markets that is grounded neither in fact nor in economic theory".

Stiglitz (1994:20) went on to argue, like Llewellyn, that "financial markets are markedly different from other markets; that market failures are likely to be more

pervasive in these markets; and that there exist forms of government intervention that will not only make these markets function better but will also improve the performance of the economy".

The crux of the argument that financial markets are a special case is that they, more than other markets, suffer from imperfect information. As Stiglitz (1994:23-4) put it, "economies with imperfect information or incomplete markets are, in general, not constrained Pareto efficient; there are feasible government interventions that can make all individuals better off. Thus not only is there no presumption that competitive markets are efficient, but there is a presumption that they are inefficient. Moreover, even with no other barriers to entry, in the presence of costly information there is a presumption that markets will not, in general, be fully competitive".

What is so special about information? "Information", Stiglitz (1994:24) told us, "differs from conventional commodities in several important ways". Firstly, it is, "in a fundamental sense, a public good". The essential features of a pure public good are that consumption of the good by one individual does not detract from that by another and that it is impossible, or nearly so, to exclude anyone from enjoying that good. In competitive market economies the supply of public goods will be insufficient. "Because of the difficulties of appropriating the returns from information, there are often externalities associated with its acquisition. Others benefit from the information acquired by the individual".

Individual depositors will then have little incentive to make the socially optimal amount of investment in acquiring information. Once the information has become available to one depositor it can be made available to others at low cost. The public good features of information make it a commodity which is liable to be undersupplied.

There was another reason why financial markets were specially prone to market failure. Spending on information could be seen as a fixed cost: it did not need to increase with the amount of lending. "Because of the fixed-cost nature of information, markets that are information-intensive are likely to be imperfectly competitive" (1994:24). However, we were told, if perfect competition was absent, markets would not generally be efficient. As financial markets were especially prone to informational inefficiencies it followed that they "are likely not only to differ from markets for conventional goods and services but to differ in ways that suggest that market failure will be particularly endemic in financial markets" (1994:24).

The argument then was fairly straightforward; it hinged on the presence of costly information, which was incompatible with perfect competition. As financial markets were essentially concerned with the production, use and processing of information they were somewhat different from other markets. As information was a public good, which was undersupplied in competitive market economies, financial markets were too important to be left to private enterprise. There was a crucial role for government intervention, which could, in principle, make all individuals better off. Ultimately, it appeared, the absence of perfect competition was taken as proof of market failure.

If we accept this argument then we can also identify a variety of failures peculiar to financial markets. For one, the managers of financial institutions are liable to escape adequate monitoring as individual shareholders will not themselves derive all the benefits from their efforts to enhance the value of the shares of the firm. We are back with the familiar public goods problem.

Perhaps the most commonly cited "failure" associated with financial markets, bringing with it loud demands for government intervention, is the possibility of systemic disruption of the financial system. The failure of only one financial institution can have huge adverse consequences for other financial institutions. As Llewellyn (1991:65) saw it, "the securing of the stability of the financial system, i.e. the safety and soundness of the system" was a regulatory objective "of particular relevance", especially "the maintenance of the integrity of the payments system". He was supported by Stiglitz (1994:26), who claimed that the "macroeconomic consequences of disruptions of the financial system provide one of the more important rationales for government intervention".

Popular as it is, the argument should still not be seen as too persuasive. Typically, it is banks which are at the focus of such reasonings, because of their role in the payments mechanism. Individual banks are subject, it is supposed, to "contagious runs" which place the whole financial system at risk. If one bank fails because it cannot satisfy its depositors it is liable to infect other banks. One bad apple can ruin the whole basket. The Great Crash of 1929 in the United States is the classic example.

Yet this is not necessarily so. During the years of the American great depression "gold, coins and notes were a much more viable alternative to bank deposits than today", as Gowland (1990:13) has pointed out. "Now a run on one institution is likely to help other institutions which are perceived to be safer; thus a run on Bank A is likely to help other banks". And even if contagious runs were likely, banks are not particularly special. Gowland cited the food panics of 1988-9 in Britain, where the problems of one firm damaged the markets of others producing the same product.

Then it is also not obvious what "system" is involved when alarms about systemic failure are doing the rounds. "It is clear that it is not the financial system as a whole. For example, banking is only a part of the system, but the collapse of the banking sub-system is certainly something that the adherents of this approach would seek to avoid. However, it is possible to divide the financial market into so many sub-categories that the concept again becomes operationally meaningless" (Gowland:1990:47). In brief, promoting the stability of financial markets is no doubt a worthy objective, but how to set about it is far from obvious.

There is however another consideration: What do governments actually do when a major financial institution faces collapse? As Stiglitz (1994:27) argued, they "cannot sit idly by" when this is happening. "Moreover, both banks and investors know that the government will step in because it cannot commit itself *not* to intervene in the economy".

The government thus acts as an insurer, which brings with it moral hazard problems. When banks know that they are protected against bankruptcy they are bound to take greater risks than they otherwise would have. Stiglitz (1994:27) concluded: "Once we recognize the role of government as an insurer (willing or unwilling), financial market regulations can be seen from a new perspective, as akin to the regulations an insurance company imposes. The effects of some versions of financial market liberalization are similar to an insurance company's deciding to abandon fire codes, with similar disastrous consequences".

This argument however misses the point completely. Once the government has decided to act as insurer of the banking system, its decision to cease doing so could have well have unpleasant economic effects. Yet it begs the question about the initial decision to become an insurer. The fact that a government might have been "forced" by rent-seeking pressures from interest groups to behave in this manner does not therefore make it desirable from the point of view of the overall performance of the economy. Stiglitz has in fact committed the elementary philosophic fallacy of deducing an "ought" from an "is", of believing that the mere existence of a particular state of affairs somehow makes it desirable. A more appropriate response would be to find ways of reducing the potency of rent-seeking, closely connected as it is with the preponderance of government in economic affairs.

Regulators may reply that this is all good and well, but how do you protect the little old lady who has put her life savings in an institution which may not be financially viable? Even when she has information she may not know what to do with it, i.e. her ability to process the information at her disposal is severely limited. Of course, this is not a genuine case of market failure, but it has not prevented governments from attempting to protect investors against their own weaknesses, especially by way of disclosure requirements.

Yet it is not so obvious that official efforts to help investors make optimal decisions are particularly useful. As Stiglitz (1994:31) himself pointed out, "When someone buys shares, she or he is probably more optimistic than the seller. What information should traders be required to disclose?". The conclusion is then also fairly obvious. Hitting on the "right" level of disclosure is precarious. State intervention may improve matters or it may not. "Let the buyer beware" may be the best rule in a situation of costly information and different subjective appraisals of future outcomes.

There is a basic flaw in the arguments which hold that financial markets are somehow different from other markets because they are especially information-intensive, resulting in supposed market imperfections and the undersupply of a commodity which has marked public good characteristics. The essential point was made by Harold Demsetz (1969:3) more than a quarter of a century ago: "Knowledge cannot be disseminated nor can monopolistic elements be eliminated without cost. Complete absence of imperfections is consistent with efficiency only if the cost of accomplishing this objective is zero. Viewed this way, perfect competition is not clearly a good basis for forming public policy. Perfect competition is a sufficient condition for efficiency only in the sense that if the conditions required by perfect competition actually prevailed, then we would expect efficiency. Perfect competition does not tell us what to do if monopoly and ignorance are present unless we are willing to add the special assumption that it is costless to administer and police them out of existence".

It is, in short, one thing to treat perfect competition as a tool of economic analysis which can be useful "precisely because of its power to abstract from nonessentials" (*op. cit.*). It is quite another to treat it as a normative benchmark for the making of economic policy. This only makes sense when it is costless to transact, which of course was the point made long ago by Coase and typically ignored by regulators and apologists for regulation. In a world of positive transaction costs the question becomes, in economic terms: Which institutions are best designed to achieve efficiency?

In principle, government action may in specific circumstances improve efficiency, i.e. result in lower total costs than would have occurred in the absence of such intervention. This however should be demonstrated and not assumed. Certainly, Stiglitz's own suggestions for intervention to correct the many market failures he believed he identified do not appear too plausible.

For example, he proposed a number of intrusive interventions which did not appear fully to take into

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consideration the obvious risk of government failure. In particular, Stiglitz was (and is) an enthusiast for policies of financial repression which aimed at keeping down the cost of capital. Higher interest rates, it was supposed, adversely affected incentives. Also, a lower cost of capital would increase a firm's equity capital, which had several alleged advantages over loan capital, like a reduced prospect of bankruptcy and a greater likelihood of good project selection when firms had their own capital at stake.

Stiglitz (1994:5) concluded: "In most of the rapidly growing economies of East Asia government has taken an active role in creating financial institutions, in regulating them, and in directing credit, both in ways that enhance the stability of the economy and the solvency of the financial institutions and in ways that enhance growth prospects".

The best response to this line of argument has been that of the Colombian commentator on Stiglitz's address, viz., that "the kind of intervention that so lures Stiglitz has already been tried extensively. It has been mildly successful in East Asia but nowhere else; rather, it has led everywhere to a burst of corruption and other undesirable effects. Remedying the ill effects has not been easy" (Jaramillo-Vallejo, 1994:53).

5. EFFICIENT MARKETS

More than 30 years ago George Stigler (1994:124) found that in the United States the Securities and Exchange Commission's disclosure rules governing new issues of shares did not improve the quality of such issues: "grave doubts exist whether if account is taken of costs of regulation, the SEC has saved the purchasers of new issues one dollar". He went further: "So far as the efficiency and growth of the American economy are concerned, efficient capital markets are even more important than the protection of investors - in fact efficient capital markets *are* the major protection of investors".

It is not evident that, given the costs, the demands for investor protection are particularly well-taken, based as they seem to be on the assumption that capital markets are not efficient. This runs counter to fairly substantial evidence that they are, viz., that in competitive markets share prices fully and correctly reflect all relevant information. If the efficient market hypothesis is correct it follows that investors cannot consistently make abnormal profits on the stock market by studying historical prices or publicly available information.

There have been objections to the efficient market hypothesis. Information supposedly does not spread as fast as the EMH alleges. Public information may be misinterpreted, so that share prices do not always reflect the true market value of a company's shares. This however is to confuse efficient markets with perfect markets.

It is true that the semi-strong version of the EMH, that "current stock prices reflect not only historical information but also all publicly available information relevant to a company's securities" (Malkiel: 120), has been confronted with apparently contradictory evidence. Yet at present the anomalies do not appear so conclusive as to lead to the abandonment of the hypothesis. As Malkiel (1987:121-122) has put it, "it remains to be seen how robust these anomalies are as compared with the vast body of evidence supporting the semi-strong EMH. The evidence in favour of the market's rapid adjustment to new information is sufficiently pervasive that it is now a generally, if not universally, accepted tenet of financial econometric research". Certainly, the few apparent exceptions do not constitute a powerful argument for the regulation of financial markets.

It is also for this reason that proposals made in South Africa by the Financial Services Board for the compulsory disclosure of information are not especially persuasive. If information does not get around as quickly in the market-place as the EMH suggests then there could be a case for sweeping publication prescriptions. But the evidence points in the other direction. Citing the presence of crooked operators who have managed to relieve investors of their funds is not a substitute for the appropriate costing of any proposed regulation. It also applies to the supposed need to ensure that investors take "informed rational investment decisions" and that the "possibility of exploitation of the investor" be reduced (Van Zyl (1992:196-197). Criteria such as these would be compatible with virtually any kind of intervention. They are in fact likely to reflect the occupational failing of the regulator, viz., over-regulation.

Now it may be objected that financial markets may not have been so very different from other markets - until recently. We have been hearing much about the risks associated with financial derivatives, especially after the recent Barings disaster. The growing size of derivatives markets has led to concern that they may undermine the stability and efficiency of global financial markets. Linked to this is the complexity of some derivative instruments, which has encouraged fears that miscalculation or hidden flaws in the operation of these markets could result in a systemic crisis in financial markets.

Such apprehensions have resulted in demands for the regulation of the derivatives markets in general and in particular of the over-the-counter (OTC) derivatives market, of which the largest component is interest rate and currency swaps. Thus, the General Accounting Office in the United States has argued that OTC derivatives could pose a systemic risk to financial markets if a major OTC dealer were to default on its

contractual obligations. The GAO Report has stressed the high level of concentration among derivatives dealers and the multiple domestic and international linkages among them, all heightening the fear of systemic collapse. So there have been demands for closer regulation of derivatives dealers, especially those affiliated with securities and insurance and who are not subject to the official capital adequacy standards which apply to bank OTC derivatives dealers.

It is not however evident that these concerns are well-founded. The Financial Economists Roundtable recently concluded that derivatives serve a highly useful risk-management role for both financial and non-financial firms, that there was no evidence that nonbank derivative dealers pose a significant threat to the financial system and that demands for federal "prudential" regulation were unwarranted.

The Roundtable (1994:8) further concluded that, "although some major end-users, mutual funds, hedge funds, securities firms, and even banks have incurred derivatives-related losses, most of these losses have been due to inadequate risk-management systems and poor operations control and supervision. These losses have not threatened the stability and efficiency of financial markets; and, by encouraging the development of better risk-management and operational controls, they have had a salutary effect. The best discipline against systemic risk in any market, including derivatives, is to foster a market in which participants have an incentive to manage themselves prudently and can respond quickly and innovatively to market conditions".

Ultimately the onus must be on the regulators to show that the social benefits of their activities are likely to exceed the social costs. It is certainly possible, in principle, that regulation can improve social welfare. The evidence we have of the history of regulation suggests however that this is not likely to happen often, for reasons deep-rooted in human nature and in the working of competitive markets. Nor does the evidence show that they are in particular need of regulation. They are not alone in being subject to information asymmetry, their exposure to "systemic risk" is problematic. Those who aspire to regulate financial markets will have to provide arguments of more substance than they have done up till now.

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WG Klerck and AC Maritz*

A test of Graham's stock selection criteria on industrial shares traded on the JSE

1. INTRODUCTION

Benjamin Graham was one of the most influential financial analysts in the United States of America. He believed in value investing, whereby he proposed that investors should purchase only those stocks that are worth significantly more than they cost. Shortly after his death an article was published in FORBES, in which he had listed ten criteria which investors could use to identify undervalued stocks (Rea, 1977; Oppenheimer, 1984).

Various tests of these criteria have been carried out in the United States of America. Portfolios set up using these criteria have exhibited superior performance compared to the relevant indices of the stock exchanges they were drawn from. This was true for *ex post* and *ex ante* tests, and remained true after the publication of the articles (Oppenheimer, 1984).

The applicability of certain combinations of Benjamin Graham's stock selection criteria were tested on the Industrial securities market in South Africa.

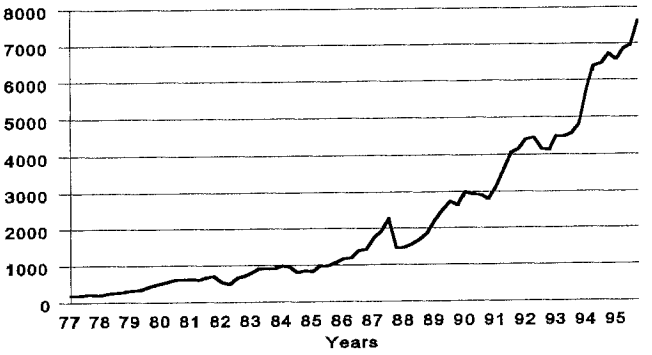
Evidence that making use of Graham's stock selection criteria to determine a portfolio, would provide one which yielded abnormal positive returns would suggest, at least, that pockets of inefficiency existed in the overall efficient market, as represented by the industrial shares traded on the JSE.

It would also provide "defensive investors" (according to Graham's definitions, those individuals without the time expertise or temperament for aggressive investment (Oppenheimer, 1981:341)), with an opportunity to establish a portfolio that could prospectively yield abnormal positive results.

An 'abnormal' return is defined in this context as the difference between the actual return and the expected return, where the expected return is dependent upon the risk of the security or portfolio and the two parameter asset pricing model (Oppenheimer and Schlarbaum, 1981:341)

The market did experience 'bull' and 'bear' phases during the period investigated, which was from 1977 to 1994, and can be seen in Figure 1, which depicts the Industrial Index for this period. Abnormal positive returns would thus not be purely as a result of either an upward or downward trend in the market.

Figure 1: Industrial Index 1977-1995



2. BENJAMIN GRAHAM'S STOCK SELECTION CRITERIA

The ten criteria developed by Benjamin Graham are listed in Table 1 (Oppenheimer, 1984:69, Rea, 1977)

According to Graham and Rea, the first five criteria measure 'reward', and are sensitive to price and earnings changes. The focus in this first group of five criteria is on stock price, earnings and dividends.

The second group of five criteria offers a measure of 'risk' and does not change rapidly with changes in price and earnings. The criteria numbered 6,7 and 8 represent the financial soundness of companies, and Graham and Rea's research showed that financial soundness was relatively much more important than earnings growth, and stability in that growth (Rea, 1977).

Selection, by using the criteria, is based on the concept of maximising the 'reward' to 'risk' ratio of the stocks selected. (Oppenheimer, 1984, Rea, 1977). To qualify for inclusion in a portfolio, a stock would need to meet at least one reward criterion, and one risk criterion.

Graham believed in 'value' investing, and based his advice on the belief that "a security's value and subsequent performance depend on acceptable operating performance and a solid (conservative) financial condition" (Oppenheimer, 1984).

Application of the criteria was thus intended to lead to the inclusion into the portfolio of undervalued, low risk stocks.

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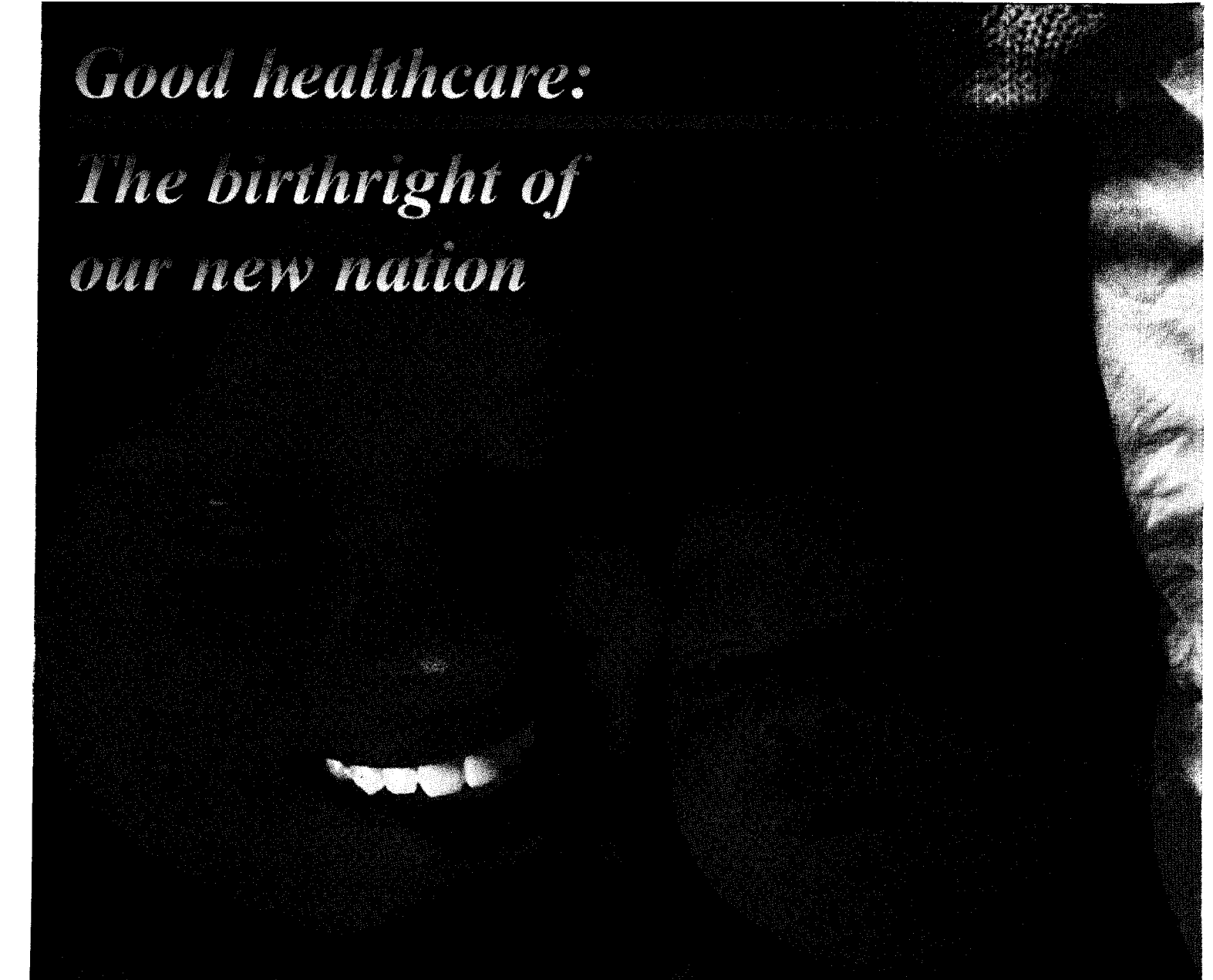

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Table 1: Graham's stock selection criteria

No	Description of ciriteria
1	An earnings-to-price yield at least twice the AAA bond yield.
2	A price-earnings ratio less than 40 percent of the highest price-earnings ratio the stock had over the past five years.
3	A dividend yield of at least two-thirds the AAA bond yield.
4	Stock price below two-thirds of tangible book value per share.
5	Stock price below two thirds "net current asset value".
6	Total debt less than book value.
7	Current ratio greater than two.
8	Total debt less than twice "net current asset value".
9	Earnings growth of prior 10 years at least at a 7 percent, annual (compound) rate.
10	Stability of growth of earnings in that no more than two declines of 5 percent or more in year end earnings in the prior 10 years are permissible.

During portfolio simulation, all the criteria are not applied simultaneously, and only certain combinations of criteria are used as filters, in order to determine which stocks are included in the portfolios, and which are excluded. This is mainly due to the fact that if all the criteria are applied simultaneously, no stocks qualify for the portfolio.

If combinations of the criteria are used, the question arises as to which combinations to use. Rea and Graham admitted that using all ten criteria was too complex. Graham found that the earnings yield and dividend yield criteria (i.e. the criteria numbered 1 and 3), were by far the most important performance criteria of the first five (Rea, 1977:70).

Graham's research also indicated that the use of only two criteria would yield a portfolio which would perform almost as well as a portfolio based on all ten criteria. These two criteria were that the total debt be less than the equity (criteria 6), and that the earnings yield be at least twice the average Triple-A bond yield, (criteria number 1) (Rea, 1977: 70).

Blustein (1977) suggested that the criteria numbered 1,3 and 6 were the most useful and profitable.

Because of the above reasons, it was decided to use combinations of the criteria numbered 1,3 and 6 to set up screens. An additional limitation was that in order for a stock to qualify for inclusion, it needed to pass at least one of the first five criteria, as well as at least one of the second set of five criteria. This would enable the 'return' versus 'risk' of the stock to be evaluated (Oppenheimer, 1984).

The combinations of criteria researched to create portfolios are thus: (1 and 6), (3 and 6), and (1,3 and 6).

The first criterion is: 'An earnings-to-price yield at least twice the AAA bond yield'. The RSA-long term gilt, was used as an equivalent for the American AAA bond yield.

The criterion 1 used was thus represented as : An earnings-to-price yield at least twice the RSA-long term gilt yield.

The third criterion is stated as: A dividend yield of at least two-thirds the AAA bond yield. The RSA-long term gilt was again used as an equivalent for the American AAA bond yield.

Criterion 3 is thus formulated as follows: A dividend yield of at least two thirds the RSA-long term gilt.

The first of the five criteria addressing risk, states that total debt be less than book value. For criterion 6, the definition for book value used is: the sum of assets valued at their original costs minus accumulated depreciation, minus all borrowed capital, minus preferred stockholder's claims.

3. METHODOLOGY AND PERFORMANCE EVALUATION

The available data was strained through appropriate filters in order to determine which companies, per year, passed the combinations of criteria (or screens) as stipulated for each of the portfolios indicated above. The outcome of this process was a list of company names, per year, from 1977 to 1994 that passed the screens stipulated for each portfolio. The number of companies that passed these screens, per year, are indicated in Table 2. The results are based on information available on 31 December of each year indicated.

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Because of the small number of companies that passed the criteria, all the companies that passed the screens were included in the portfolios.

During the simulation of an investor's experience, equally weighted portfolios of these stocks were purchased on the last day of March of the year following the screen. This would allow the hypothetical investor enough time to collect and analyse the data available on the 31st of December of the previous year, and to arrange for the purchase of the shares. All stocks in the portfolio were held for two years and then sold.

Table 2: Number of companies meeting specific screens

Screen criteria / Screen date	(1) & (6)	(3) & (6)	(1), (3) & (6)
1977	20	28	20
1978	23	36	20
1979	22	33	18
1980	12	14	6
1981	10	16	8
1982	13	22	11
1983	2	1	0
1984	3	1	1
1985	0	1	0
1986	2	4	0
1987	1	3	1
1988	5	5	2
1989	4	11	3
1990	6	8	3
1991	4	5	2
1992	8	21	6
1993	7	24	5
1994	3	6	1
1995	3	11	1

The first screening took place at the end of December 1977, and the first shares were purchased on 31 March 1978. The last shares were purchased on the 31st of March 1993 and were sold again on the 31st of March 1995. The performances of the portfolios were then evaluated.

The performance of the portfolios could not be compared directly to that of the Industrial Index, because the risk of the portfolios vary from that of the Industrial Index, and the expected portfolio returns should be adjusted, to compensate for the different risks associated with the portfolios.

The portfolio returns were evaluated using the method of analysis first introduced by Jensen (1968). The evaluation model is:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p(R_{mt} - R_{ft}) + e_{pt}$$

R_{pt} = the month t (t = 1,...,24) return earned by a portfolio of stocks meeting the screening criteria and purchased in month 0;

R_{ft} = the "risk-free" rate of return in month t;

R_{mt} = the rate of return on the market portfolio;

β_p = $\text{cov}(R_{pt},R_{mt})/\sigma^2(R_{mt})$, or the portfolio p's risk relative to the market portfolio;

e_{pt} = an error term assumed to have expected value of zero and to be serially uncorrelated; and

α_p = a measure of monthly abnormal performance for the portfolio evaluated.

The above equation indicates that the realised portfolio return in excess of the risk-free rate is a linear function of three terms - a premium for accepting risk (namely the product of the portfolio risk and the market's return in excess of the risk-free rate), a random error term (with expected value of zero) and an estimate of portfolio performance not accounted for by either portfolio risk or market return.

It is this last parameter α_p which provides a measure of the ability of the criteria to select portfolios which provide abnormal positive returns. If α_p is significantly larger than zero, it can be concluded that the risk adjusted returns of portfolio p exceed what the asset pricing model predict them to be.

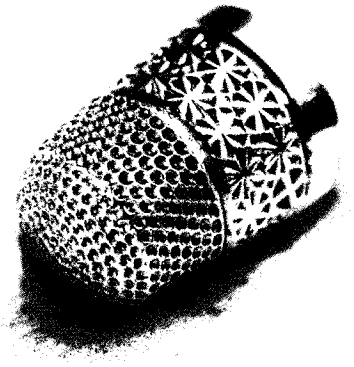
4. FINDINGS

Criteria (1) & (6)

The mean monthly return, over the sixteen year period for the portfolios was 2,61 per cent with a standard deviation of 1,65.

The mean monthly return for the Industrial index over the same period was 1,68 per cent, with a standard deviation of 1,05.

Risk adjustment was done by using regression analysis to obtain the parameters for equation (1), as discussed above. The mean monthly returns of the portfolio and index, as well as the risk adjusted



Don't avoid risk, manage it.

performance of the portfolio, over the sixteen two-year holding periods, from March 1978 to March 1995 are shown in Table 3 below.

Table 3: Raw and risk adjusted returns for portfolio based on criteria (1) and (6)

Raw returns		Risk adjusted measures				
Rpt (%)	Rmt (%)	α (%)	t(α)	β	t(β)	R^2
2,61	1,68	1,01	2,33	0,87	2,74	0,349

The portfolio based on Graham's criteria (1) and (6) exhibits abnormal positive returns at the 5 per cent level of significance. This is also true at the 2,5 per cent level, but is no longer true at the 1 per cent level.

Criteria (3) & (6)

The mean monthly compound return for the portfolio was 2,42 per cent, with a standard deviation of 1,76.

The mean monthly return for the Industrial index over the same period was 1,68 per cent, with a standard deviation of 1,05.

The mean monthly returns of the portfolio and index, as well as the risk adjusted performance of the portfolio, over the sixteen two-year holding periods, from March 1978 to March 1995 are shown in Table 4 below.

Table 4: Raw and risk adjusted returns for portfolio based on criteria (3) and (6)

Raw returns		Risk adjusted measures				
Rpt (%)	Rmt (%)	α (%)	t (α)	β	t (β)	R^2
2,42	1,68	0,81	1,73	0,89	2,62	0,329

Following the same process as for criteria (1) & (6) above, to determine the significance of the difference between the risk adjusted portfolio return, and the market, it was found that the difference between the two was significant at the 10 per cent level, but no longer at the 5 per cent level.

Criteria (1), (3) & (6)

The mean monthly compound return for the portfolio was 2,66 per cent, with a standard deviation of 2,23.

The mean monthly compound return for the Industrial index over the same period was 1,68 per cent, with a standard deviation of 1,05.

The mean monthly returns of the portfolio and index, as well as the risk adjusted performance of the portfolio, over the sixteen two-year holding periods, from March 1978 to March 1995 are shown in Table 5 below.

Table 5: Raw and risk adjusted returns for portfolio based on criteria (1), (3) and (6)

Raw returns		Risk adjusted measures				
Rpt (%)	Rmt (%)	α (%)	t (α)	β	t (β)	R^2
2,66	1,68	1,03	1,65	0,92	2,03	0,227

At the 10 per cent level of significance, the portfolio based on Graham's criteria (1), (3) and (6) exhibits positive abnormal returns. This is not true at the 5 per cent level of significance.

Stability of portfolio returns

The mean compound monthly return of the Industrial index over the period covered by the research is 1,68 per cent. The standard deviation of returns for this population of shares is 1,05 per cent. The smallest standard deviation exhibited by one of the portfolios over the same period is 1,65 (portfolio based on criteria (1) & (6)). The largest is 2,23, for the portfolio based on criteria (1), (3) & (6).

The standard deviations of the mean monthly compound returns of the portfolios are large in comparison to that of the Industrial index. The variability of the returns of the individual investment periods can clearly be seen in graphical form in Figures 2, 3 and 4.

Diversification

It is evident from Table 2 that for numerous two year periods, the portfolios contained fewer than six companies. The screens used to set up the portfolios have thus limited the amount of stocks that pass the associated criteria, and diversification is subsequently insufficient for many of the investment periods. This is partly responsible for the high standard deviation

figures for the monthly compound returns of the portfolios, and for the excess returns not being stable over time.

The portfolio returns are also seen to be generally below that of the market during the period 1985 to 1989, a period when the criteria allowed investment in less than five companies.

Figure 2 : Criteria (1) & (6)

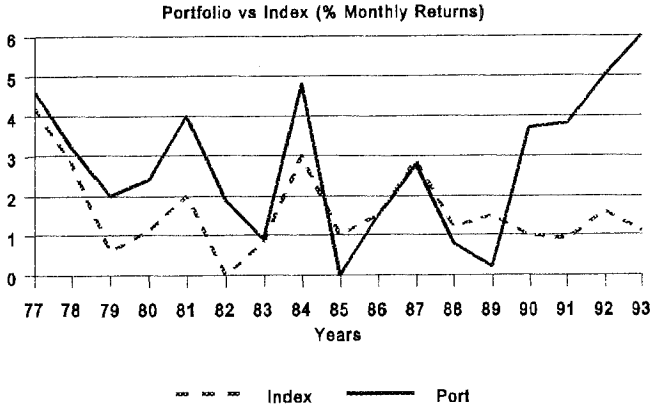


Figure 3 : Criteria (3) & (6)

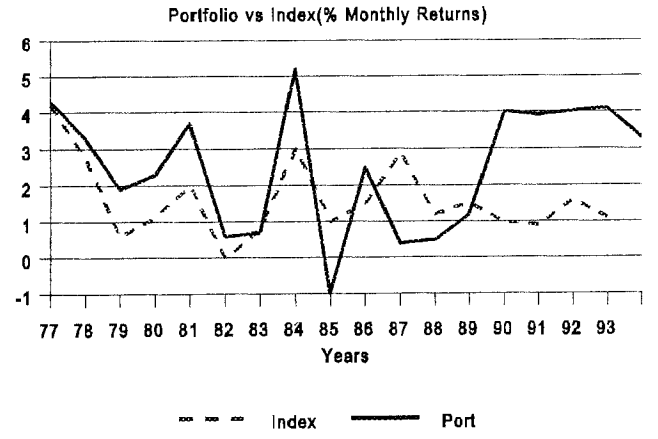
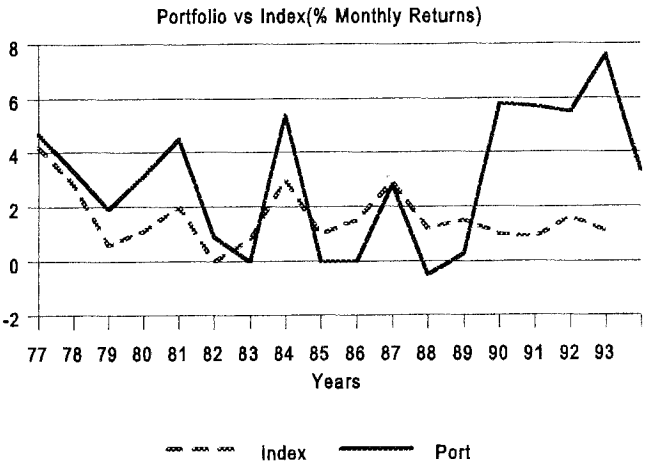


Figure 4 : Criteria (1) ,(3) & (6)



5. CONCLUSION

The results of this research indicate that an investor who made use of the combinations of Graham's criteria investigated to create a portfolio, would have achieved results better than that of the Industrial index, during the period 1977 to 1994. Not all the individual investments would have been profitable, and the overall results were also negative occasionally (for certain investment periods). However, over the longer term, at the 10 per cent level of significance, all of the portfolios investigated provided risk adjusted returns significantly above that which the asset pricing model suggests that they should have.

Mean compound monthly rates of return exceeded those of the Industrial index by between 0,74 per cent and 0,98 per cent, (or annually by between 9 per cent and 12 per cent), when a frictionless market situation was investigated. Taking transaction costs and taxes into account would affect the results.

However, indications are that during the periods researched, there were undervalued industrial stocks present on the Johannesburg Stock Exchange, and that a conscientious investor, who made use of the screens investigated, could have achieved above market returns.

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The low price effect on the Johannesburg Stock Exchange

1. INTRODUCTION

Research in several financial markets has shown that low priced shares significantly outperform high priced shares on a risk-adjusted return basis. This phenomenon is referred to as the "low price effect". Furthermore, this effect has been shown to exist over and above the "small business effect" and the "earnings yield" effect.

The existence of the low price effect was alluded to in research performed in 1981 on the JSE covering the period 1968 to 1979 by Affleck-Graves, Gilbertson and Money (1982). This study attempts to extend this work, to determine whether or not the low price effect existed on the JSE during the period 1 November 1983 to 31 October 1993.

2. LITERATURE REVIEW

2.1 International evidence

Louis H. Fritzmeier (1936) is credited with the classic paper on the subject of price-level performance of stocks. Not only were low price stocks found to outperform high price shares, they were also found to exhibit greater price variability.

However, Clendenin (1951) and Allison and Heins (1966) in their studies indicated that low-priced common stocks of a given "quality", as perceived by investors, did not tend to fluctuate more than stocks in general of like quality and therefore concluded that variability was not a function of price but of the investment quality of the firm. Price variability which characterises low priced shares should therefore be attributed to their speculative quality, not to the fact that they are low priced.

Pinches and Simon (1972) analysed alternative portfolio accumulation strategies employing low-priced common stock traded on the American Stock Exchange (AMEX). Annual and holding period returns for most periods and portfolios were found to be unusually high.

Blume and Husic (1973) used modern portfolio theory to confirm Fritzmeier's (1936) original study and showed that average realised rates of return were negatively correlated with price level. Furthermore, the study showed that beta tended to change over time as a function of price level; price level decreases pre-empted beta increases.

Bar-Yosef and Brown (1979), however, found that the negative correlation held only for shares which had not split. This result was confirmed by Strong (1983), who showed that the average price range of split securities did not vary predictably by price group but that there was an inverse relationship between price and range for non-split securities. Likewise, Dubofsky and French (1988) reported on findings by Drzycimski and Reilly (1976) who examined thirteen different measures of stock price variability before and after two-for-one-stock splits during the period 1960 to 1975. They concluded that the hypothesis of equal price volatility was supported for the two samples (before and after the split), but the evidence was "clearly not one-sided".

Bachrach and Galai (1979) compared risk and return characteristics of shares under and over $20 per share. They found that only part of the relatively high average rate of return for the low priced portfolios was attributable to systematic risk. They concluded that either the market was inefficient or that price was a surrogate for an unspecified economic factor.

Edmister and Greene (1980) classified stocks into 60 price categories and showed that low priced shares outperformed both the average and high priced stocks after employing various risk adjustment methods.

Christie (1982) contended that the increased volatility in share price for the lower priced shares was attributable to variances in equity value being strongly positively correlated to financial leverage. However, only between 5% and 31% of the variation in returns was explained by financial leverage, depending on the method used to test the relationship.

Dubofsky and French (1988) took up Christie's (1982) theory and provided evidence that the variance of low priced share returns exceeded that of high priced shares even without differences in financial leverage in the low priced shares. This was accomplished by examining variances of stock returns 30 days before and 30 days after stock splits.

Stoll and Whaley (1983) placed NYSE stocks into ten portfolios according to their market values and found a monotonic increase in mean price per share and monotonic decrease in the variance of monthly portfolio returns as the portfolios increased in average market value.

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Goodman and Peavy (1986) confirmed the presence of the low price anomaly and showed that this low price effect existed over and above that of the size effect and the earnings yield effect. They found that although these factors were highly correlated to each other, in extreme cases (i.e. low price, high e/p and small market value) there was an additive effect on return.

Branch and Chang (1990) explored the role of share price in identifying shares that were particularly likely to outperform the market in January. They found that low priced shares that exhibited poor December performance were likely to show a marked improvement in January. Similar results were obtained with or without risk adjustment.

2.2 The low price effect on the JSE

Affleck-Graves *et al.* (1982) studied the low price effect on sample data over the period 1968 to 1979. They observed the returns for portfolios made up of shares priced below 30c with a holding period of one year and compared the performance of these shares to the JSE Actuaries All Share Index (ASI). They used Sharpe's reward-to-variability ratio in order to compare the risk adjusted returns of the different portfolios and found that there was indeed a superior performance attached to low price shares but that the super-low priced shares (0 to 19 cents) did not perform as well as the ASI.

2.3 Related anomalies on the JSE

Affleck-Graves and Bradfield (1991) found that firm size, liquidity, and dividend yield did not influence asset pricing on the JSE. This implies that investors should not expect to earn abnormal returns by investing in small companies, high dividend yield shares or less liquid shares.

Similarly, Affleck-Graves, De Villiers, Lowings and Pettit (1986) and Page and Palmer (1991) found no evidence of a small business effect. Affleck-Graves *et al.* (1986) did however, indicate the possible existence of a large business effect as opposed to a small business effect. Page and Palmer (1991) did not support such a finding but their research did find a significant E/P effect. This was attributed to market inefficiencies rather than model misspecification.

3. HYPOTHESES

In an effort to determine whether or not the low price effect existed on the JSE during the research period, the following hypothesis was formulated:

H_0: There is no association between share price and risk adjusted return.

H_A: There is a negative association between share price and risk adjusted return.

If the null hypothesis is rejected then it becomes necessary to identify the nature of the association between share price and risk adjusted return in order to determine the direction of the price effect. This study, in line with previous research, attempts to identify a low price effect i.e. a low share price results in a higher than expected risk adjusted return.

4. RESEARCH METHODOLOGY

4.1 Assumptions

This research is conducted along the lines of the mean-variance approach to portfolio management. Elton and Gruber (1987:204) note that this approach holds "when investors are expected utility maximizers, prefer more to less, are risk averse, and either (1) security returns are normally distributed or (2) utility functions are quadratic."

Further assumptions underlying this study are:

- there are no transaction costs - given the size of transaction costs they are probably of minor importance;
- there is no tax or levy charged on share transactions or dividend income;
- single unit shares can be bought and sold in the market without adversely affecting the return realised; and
- the closing monthly share prices on which return calculations are based were recorded on the last day of the month.

4.2 Population and sample

The data for this study was compiled from the Intelligent Network (Pty) Ltd. (INet) database of share prices and the JSE Monthly Bulletin. The JSE Actuaries Industrial Index, as well as the 90 day Bankers Acceptance (BA) rate, were also drawn from INet. The monthly treasury bill rate was drawn from the Quarterly South African Reserve Bank Bulletin.

The research period was arbitrarily selected as 1 November 1983 through to 31 October 1993. This resulted in 10 review periods of 1 year each. Calculating the average monthly risk adjusted returns for each portfolio and for each review period yielded a 10 point time series which was considered to be acceptable for the purpose of hypothesis testing.

Monthly closing share prices were used, as this data was more readily available than weekly or daily share prices. This also reduced the problem of autocorrelation inherent in short-interval share prices,

a problem which is especially severe in illiquid markets such as the JSE (Roll, 1981).

A characteristic of the JSE is the dominance of the mining and mining-financial shares which comprise a substantial portion of market capitalisation. Therefore, as in Affleck-Graves *et al.* (1986), only shares from the industrial sector were included and, accordingly, the JSE Actuaries Industrial Index was used as a market proxy. In order to eliminate any undue risk, shares listed in the Development and Venture Capital sectors, as well as cash shells, were excluded.

If a company's listing changed from one sector to another during the review period, then such a change was disregarded in order to simplify the analysis. Only the company's sectoral status as at 31 October was taken into consideration. Furthermore, only ordinary shares of listed companies were included. Preference shares, debentures and ordinary shares with special voting powers were excluded.

As the annual data sets varied in size from 300 to 500 shares over the ten year period and in view of the large amount of manual data capturing required, a sampling procedure was employed was to bring the data sets down to a manageable size. In order to equalise the representation of lower priced shares to higher priced shares, each annual data set was ranked according to share price and divided into quintiles. One hundred shares were then selected from each data set as follows: the twenty lowest priced shares of the first four quintiles were selected and the twenty highest priced shares of the quintile containing the highest priced shares. This ensured that the performance of a portfolio of the lowest priced shares could be compared to the performance of a portfolio of the highest priced shares.

The sample was grouped into portfolios in an attempt to reduce measurement error. However, the portfolios had to be kept as small as possible in order to minimise the spread of share prices within the portfolios. Each strata of 20 shares sampled thus became a portfolio, resulting in 5 portfolios. The portfolio size was similar to those of Affleck-Graves *et al.* (1986) and Page and Palmer (1991), who considered portfolios of this size to be well diversified.

In order to determine whether or not a share is classified as a low priced share many researchers define a cut-off price below which a share is classified as "low priced". This is a subjective decision and different researchers have arbitrarily selected different prices. In the study performed by Affleck-Graves *et al.* (1982) 30 cents was chosen as the cut-off point. Other researchers have used 100 cents (Spira, 1993) and 150 cents (Glaser, 1987). However, in this instance, there was no need to make a subjective decision as the stratified sampling process resulted in 5 strata of 20 shares each. This alternative approach has been followed by many researchers, including Goodman and Peavy (1986).

The portfolios were reconstructed from the entire population of listed ordinary shares at the beginning of every year and shares were reallocated to different quintiles in the data set according to their share price as at 1 November. This procedure ensured that:

- the portfolios retained their character;
- the shares were evenly balanced in terms of value over the portfolios during each review period; and
- there was no need to address the problem associated with the impact of inflation on portfolio barriers. Affleck-Graves *et al.* (1982) acknowledged the problem of inflation moving barriers of categories but felt that such added complexity would not materially affect the end result.

Portfolios were equally weighted, assuming an investment of R100 in each share. A "share" portfolio monitored the capital gains/losses of the shares, and for each portfolio a "cash" portfolio was constructed to take into account any incoming cash flows resulting from the investments.

Dividends for the sample data were extracted from the JSE Monthly Bulletin and recorded in the cash portfolios in which the last day to register (LDR) fell. All cash was reinvested every month at a monthly short term interest rate; the 90 day BA rate was used for this purpose.

Many share prices needed to be adjusted for events which occurred during the review period and gave rise to incorrect performance figures. These adjustments were obtained from the notes at the back of the JSE Monthly Bulletins, and dealt with as described below.

Wherever a share offer was made it was assumed that the shares were taken up in preference to the cash alternative. As such, bonus shares and capitalisation shares were incorporated into the portfolio as well as any subsequent income arising from such shares. These shares were allocated into the portfolio based on the LDR.

Shares which were suspended for any period were reflected as having Nil returns for the period during which the shares were suspended. In instances where the company was in provisional liquidation or suspended by the JSE committee over the end of the review period the returns were adjusted to Nil in the month in which they were suspended. In these instances the investment was written off and considered irrecoverable. Suspended shares were not included for selection in the data set at the start of the new review period.

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Shares were delisted for various reasons, some of which attracted share offers and/or cash offers. Delistings for reasons such as bankruptcy attracted no offers of any kind. Where an offer was made to minorities the share offer was taken in preference to the cash offer but only if the shares offered were listed on the JSE. Such shares were then incorporated into the portfolio from which they arose in their correct ratios as well as any subsequent income arising from such shares. Where no offer of any kind was made, the share price was adjusted to Nil in the month in which the share was delisted and the investment was written off.

Where rights issues occurred the rights were sold and the cash recorded in the appropriate cash portfolio. The rights were considered to have been sold at the first **lowest** price recorded as a trade in the JSE Monthly Bulletin. This was done in order to be conservative, as by their nature, rights are poorly traded on the JSE. If no trade occurred, the right was considered to be valueless.

All offers of any kind to minority shareholders to buy out part or all of their share holding were ignored unless the share was to be delisted.

Reduction in share capital was usually achieved by the distribution of a special dividend or by an issue of shares of a subsidiary company. Where applicable, the shares were incorporated into the share portfolio and the subsequent income generated from such shares accounted for. Where a special dividend was paid, the income was treated as for ordinary dividends.

New listings during the review period were ignored in the construction of the data sets. These were only included into the data set at the commencement of the next review period, being the 31st October.

Share splits/consolidations were adjusted for by multiplying/dividing the recorded share price subsequent to the split/consolidation by the multiple of the split/consolidation. Similarly, dividends following the split/consolidation were adjusted accordingly.

Shares which changed name during the review period were followed to their new company. Sometimes such name changes went hand in hand with a change in capital structure, which was then treated as detailed above.

4.3 Measurement instruments

To facilitate the comparison of portfolio performance, the approach adopted by Affleck-Graves *et al.* (1986) was followed as closely as possible.

The monthly excess return of each portfolio was calculated as follows:

$$R_{P_{i,t}} = \ln\left(\frac{P_t}{P_{t-1}}\right) - R_{F,t}$$

where

$R_{P_{i,t}}$ = excess return for portfolio i for month t;
P_t = portfolio value at end of month t;
P_{t-1} = portfolio value at end of month t-1;
$R_{F,t}$ = monthly risk free rate of return;
portfolio value = the sum of the investments in each share in the portfolio,

where investments in a share consists of the capital investment as well as the cash investment generated by the sale of rights, dividends, and cash offers.

In order to eliminate any seasonal effects, the monthly returns for each portfolio were averaged across the review period so as to obtain a mean monthly excess return.

The returns earned in the different portfolios were adjusted for the underlying risk of each portfolio:

- Sharpe's reward-to-variability ratio (Sharpe, 1970) which uses the standard deviation as a measure of total risk; and
- Treynor's reward-to-risk ratio (Treynor, 1965) which uses beta as a measure of undiversifiable risk.

Bowie and Bradfield (1993) argue that one of the major considerations to be taken into account when estimating beta coefficients on the JSE is the bias caused by thin trading which results in an artificially increased risk adjusted return on the thinly traded portfolios. Measures which were used to otherwise limit the impact of thin trading were:

- a general rule was applied that all shares sampled which traded for less than 25% of the data points available were dropped from the sample;
- the bid/ask price was recorded as the market price as this was considered to be a better reflection of the true value of the share than the price at which the share last traded;
- for each portfolio, a single portfolio beta was calculated over the whole ten year period; and
- the betas used were portfolio betas which can be expected to be more stable than individual betas (Affleck-Graves *et al.*, 1986:193).

4.4 Analysis method

The output from the above calculations was a ten point time series of risk-adjusted returns for each of the five portfolios. In order to test the hypothesis it was necessary to determine whether the risk adjusted returns differed significantly across the various portfolios and the direction of any significant difference.

Reinganum (1981) averaged 14 years of average abnormal daily returns for each portfolio into one time series in order to test for a small size effect. His results can be interpreted as illustrating the average size effect over the 14 year period. On the other hand, Banz (1981) and Affleck-Graves, Barr and Bradfield (1986) tested for the significance of the difference in return between extreme portfolios. Other researchers, for example Cook and Rozeff (1984), used ANOVA to test for equality of the mean portfolio returns. However, Jaffe, Keim and Westerfield (1989:140) comment as follows:

> *"Such tests have shortcomings though. ANOVA may reject equality of mean returns even in the absence of a clear relation between returns and the ranking variables. Examining only the returns on the extreme portfolios ignores the information in the returns on the intermediate portfolios."*

Jaffe *et al.* (1989) used Seemingly Unrelated Regression (SUR) in their attempt to determine a significant relationship between excess returns and the size and E/P effect. Page and Palmer (1991) discarded this methodology as it was shown to cause an overestimation of excess returns especially for those firms that are thinly traded.

In order to determine whether the excess returns in their study could be explained by either size or earnings effects, Page and Palmer (1991) performed multiple regression using the portfolio average monthly excess returns as the dependent variable and the average E/P ratio and natural logarithm of the average firm market value as the independent variables.

In order to retain as much of the subtlety in the data as possible, this study used the non-parametric Wilcoxon signed-rank test to determine if there was a significant difference in the risk-adjusted returns between the individual portfolios. The results were then checked to determine the direction of the significant difference. The Wilcoxon signed-rank test was preferred to the technically superior paired t-test as a data series of 10 points was considered to be too small to adopt the assumptions associated with the t-test. The test was conducted at a 5% significance level.

5 RESEARCH FINDINGS

When constructing the data sets, the following problems were encountered with the INet database:

- All prices on INet had been historically adjusted for any share splits, consolidations, mergers, etc. As this research required actual share prices, all relevant share prices had to be adjusted accordingly to reflect the true share price.
- The database was found to be incomplete, especially in the earlier years. It is only in the last three years that the database was found to be complete. In an attempt to limit the survivor bias, shares that had been delisted over the period studied had to be reintroduced into the data set. These were identified by checking the October JSE Monthly Bulletins of each year for any missing companies which qualified for inclusion into the data set.
- INet defines the closing share price as the price at which the share last traded. However, in order to reflect the truest value of the share (especially in the illiquid trading conditions experienced on the JSE) it was important that the share price was adjusted to reflect the bid or ask prices.

As such, the JSE Monthly Bulletin was used to manually adjust share prices. Errors in capturing were carefully controlled by checking the data for all shares which recorded a monthly return which deviated more than 2 standard deviations from the mean.

5.1 Portfolio Betas

The standard OLS method was used to calculate a single portfolio beta over the ten year period for each portfolio. The results are as follows:

Portfolio	Portfolio beta
1*	0,83
2	0,63
3	0,58
4	0,76
5**	0,80

*lowest priced portfolio
**highest priced portfolio

It is interesting to note the curvilinear relationship between beta and the portfolio price level. Portfolio 3 has the lowest beta, and therefore the lowest risk. The two extreme portfolios are the riskiest, with the high priced portfolio being nearly as risky as the low priced portfolio.

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All the betas are less than 1, indicating that the portfolios are less risky than the market, a fact which is difficult to explain. This result is consistent with other research performed using the same method of beta estimation (for example: Johnson, 1990). Bradfield (1993:24) suggests that this is consistent with the components of the market index itself suffering from the effect of thin trading.

The main observations from these findings are that risk is being carried at both extremes of the price range and that there is, in fact, little difference in riskiness between the portfolios.

5.2 Risk adjusted returns

The risk adjusted mean excess returns for each portfolio are presented below in tabular form. It can be observed from Table 1 that, on average, the performance of the high priced portfolio (portfolio 5) is superior using both risk adjustment measures.

The ranking clearly shows a positive relationship between share price and risk adjusted return, with the exception of portfolio 4, the second highest priced portfolio.

Table 1: Risk adjusted returns

	Risk adjusted return									
	Portfolio 1		Portfolio 2		Portfolio 3		Portfolio 4		Portfolio 5	
	Sharpe	Treynor	Sharpe	Treynor	Sharpe	Treynor	Sharpe	Treynor	Sharpe	Treynor
1984	-0,3797	-0,0313	-0,3851	-0,0300	-0,2720	-0,0280	-0,2096	-0,0140	-0,0251	-0,0015
1985	-0,2451	-0,0196	-0,2116	-0,0221	-0,0084	-0,0009	-0,1206	-0,0079	0,0404	0,0029
1986	0,8207	0,0596	0,9421	0,0728	0,9527	0,0463	0,6785	0,0308	0,8389	0,0364
1987	0,3224	0,0412	0,6264	0,0690	0,6628	0,0924	0,4767	0,0532	0,3274	0,0328
1988	-0,4022	-0,0370	-0,3637	-0,0393	-0,2056	-0,0231	-0,1364	-0,0113	-0,2415	-0,0191
1989	-0,0524	-0,0039	-0,1195	-0,0096	-0,1548	-0,0100	0,1977	0,0150	0,5007	0,0292
1990	-0,7284	-0,0416	-0,7593	-0,0418	-0,3249	-0,0119	-0,1872	-0,0075	-0,0322	-0,0015
1991	-0,3167	-0,0185	-0,0138	-0,0008	0,3764	0,0250	-0,0122	-0,0006	0,8702	0,0475
1992	0,1987	0,0332	-0,1621	-0,0094	0,1258	0,0161	-1,0843	-0,0400	-0,0416	-0,0023
1993	0,1222	0,0305	0,4818	0,0342	-0,0918	-0,0051	0,2131	0,0080	0,2733	0,0101
Average	-0,0660	0,0013	0,0035	0,0023	0,0160	0,0101	-0,0184	0,0026	0,2511	0,0134

	Ranking from highest to lowest									
Sharpe	5		3		2		4		1	
Treynor		5		4		2		3		1

In 1991 portfolio 4 did not share in the upturn of the market as did the other portfolios. The subsequent correction in the market saw it record the worst performance figures of all the portfolios. In order to determine whether or not this was an outlier, it was necessary to look more closely at the sample drawn over those two periods.

In 1991 the performance was severely affected by holdings in: 1) the textile industry, through Frame Group Holdings, 2) Namibia, through Namibian Sea Products and Namibian Fishing, and 3) Cemenco. In 1992 the performance was affected by the weighting in two groups of related companies; the Berzack Group and African and Overseas, the major shareholder of Rex Trueform.

One could therefore conclude that in 1991 the portfolio performance was affected by industry sector related events whereas the 1992 portfolio was affected by a poor sample as a higher weighting was given to the performance of a single company which was effectively duplicated in the performance of the holding company.

5.3 The Wilcoxon signed-rank test

The Wilcoxon signed-rank test was applied to the above data to determine whether or not there was a significant association between risk adjusted return and share price and, if so, the nature of the association. The results of the tests are presented in the tables below.

Table 2: Wilcoxon signed-rank test (Sharpe's ratio)

Portfolio	1	2	3	4	5
1	-				
2	0,3329[1] <4;6>[2]	-			
3	0,0593 <3;7>	0,1141 <3;7>	-		
4	0,1394 <2;8>	0,9594 <3;7>	0,5751 <5;5>	-	
5	**0,0218** <1;9>	0,0926 <3;7>	0,2026 <4;6>	**0,0218** <2;8>	-

[1]The probability of the difference in risk adjusted return being zero. Using Sharpe's measure in Table 2 and Treynor's index in Table 3.
[2]The number of observations where the return of the portfolio in column 1 is lower; higher than the return of the portfolio in row 1.

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Table 3: Wilcoxon signed-rank test (Treynor's index)

Portfolio	1	2	3	4	5
1	-				
2	0,7213 <5;5>	-			
3	0,3329 <4;6>	0,3862 <3;7>	-		
4	0,7213 <3;7>	-0,9594 <5;5>	-0,4446 <5;5>	-	
5	0,2845 <4;6>	0,2411 <3;7>	0,3863 <3;7>	0,1194 <2;8>	-

(Probabilities indicating significant differences are shown in bold.)

One would expect to observe the association between share price and risk adjusted return strengthening as portfolio 1 is compared with portfolio 2, then 3 etc. This would be reflected in the probabilities decreasing going down each column of the matrix and increasing across each row. As the difference in share price between portfolios becomes bigger, any significant difference in the returns should become more obvious.

Disregarding the results for portfolio 4, a positive association becomes apparent using both performance measures, with Sharpe's ratio showing a clearer association than Treynor's index. However, Sharpe's ratio only shows a significant difference in returns between portfolios 1 and 5 at the 5% significance level.

Treynor's index does not show any significant association although a positive trend is noticeable. This trend is also substantiated by the number of observations which show the risk adjusted returns of the higher priced portfolios to be higher than the risk adjusted returns for the lower portfolios.

The overall lack of statistical significance could be due to the power of the Wilcoxon signed-rank test. A longer research period or more portfolios would have justified the use of a parametric test which may have produced a more refined result. Unfortunately, this proved to be impractical in view of the resources and time available.

5.4 Monthly excess portfolio returns

The table below lists the mean and median of the 120 monthly returns.

Table 4 clearly shows a positive trend in the association between return and share price and suggests that there is a high price effect as opposed to a low price effect. The median, unaffected by outliers, shows this relationship very clearly. Only portfolios 4 and 5 outperformed the index, in terms of the median.

Sharpe's ratio was also calculated over the whole 10 year period, i.e. the 120 monthly returns were used to calculate the standard deviation and mean (see Table 5).

The results are very similar to those in Table 1, and, with the exception of portfolio 4, the results show a strong high price effect.

Table 4: Mean and median of the 120 monthly excess returns

Monthly excess reuturn						
Portfolio	**1**	**2**	**3**	**4**	**5**	**Index**
Average	0,11%	0,15%	0,58%	0,33%	1,08%	0,37%
Median	-0,22%	0,25%	0,33%	1,06%	1,67%	1,00%

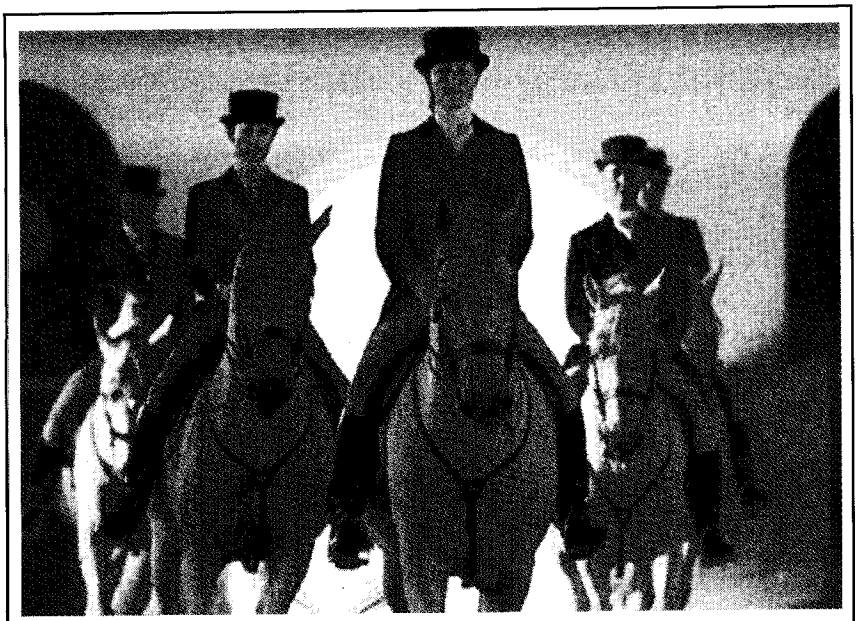
Table 5: Sharpe ratio for the 10 year investment period

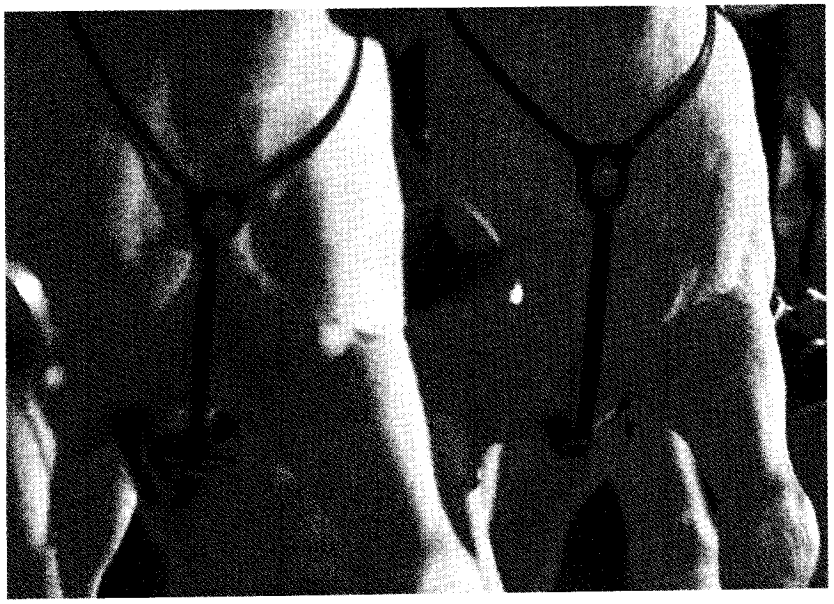
Nov 83 - Oct 93					
Portfolio	**1**	**2**	**3**	**4**	**5**
Mean excess return	0,0011	0,0015	0,0058	0,0014	0,0108
Std dev	0,1006	0,0561	0,0554	0,0535	0,0513
Sharpe's ratio	0,0105	0,0258	0,1056	0,0625	0,2097

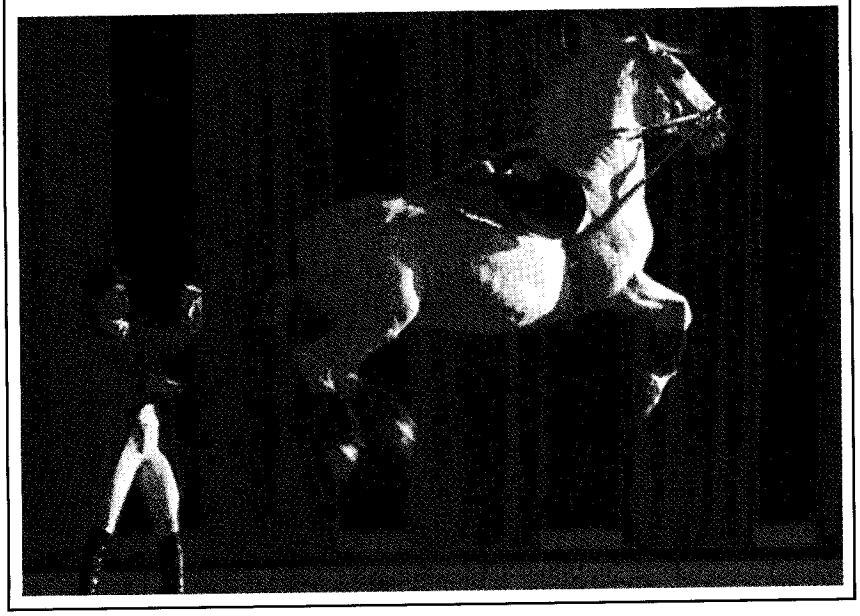
6. CONCLUSION

This study has shown, in contrast to studies on American stock exchanges, that the low price anomaly does not exist on the JSE. This conclusion also contrasts research done by Affleck-Graves *et al.* (1982) who showed that low priced shares recorded superior returns compared to the index. Their research used shares in all sectors of the JSE and was not restricted to industrial shares.

The findings of this research do indicate the possible presence of an anomaly of the opposite kind - the high price effect. However, the behaviour of this price effect was found to be inconsistent and dependent on the time horizon investigated - a strong average effect was found over the 10 year period, but when comparing a







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string of annual risk adjusted returns, the effect was statistically insignificant. Similar findings were made by Brown, Keim, Kleidon and Marsh (1983) in their research into the size effect on the NYSE.

Affleck-Graves *et al.* (1986:195) showed similar findings in their search for a size effect on the JSE over the period 1973 to 1982 using the same risk adjustment methods as this study. No small firm effect was found, and if anything, large firms appeared to provide superior investment performance on the JSE. They suggested the following possible causes of such a phenomenon:

- the dominance of institutional investors on the JSE;
- the inability of institutions to invest abroad;
- the extensive cross holdings on the JSE; and/or
- the relatively low turnover rate on the JSE when compared to other exchanges.

Although the relationship between high priced shares and high market capitalisation companies has not been established in this research and, therefore, cannot be statistically inferred, it would appear that a plausible relationship between the two exists since market capitalisation is a function of share price. If this is the case, then this study supports the suggestion that institutional investors dominate the JSE and that as a consequence of their inability to invest abroad the JSE is an abnormal market. Share prices are inflated because of a sloping demand curve and do not reflect the future value of cashflows.

Survivor bias is a crucial issue in this type of research and every effort was made to eliminate it. It is possible, however that the low price effect found in some other studies was purely a consequence of survivor bias.

This study attempted to minimise the impact of thin trading by using monthly data (thereby reducing the autocorrelation evident in short term data) and by adjusting prices for the bid-ask spread. Although this introduces a bid-ask bias, as defined by Jacobs and Levy (1989:39), it was thought preferable as the bid/ask price reflects a closer estimation of the true market value than the last trade price.

The impact of this study on investors is that they are advised to pick their penny shares with extreme care as they are likely to underperform the market rather than outperform the market. In fact, the lowest shares were the worst performers throughout the research except for the last two years, which appear to have been a penny share boom. There does, however, appear to be merit in adopting an investment strategy which includes only high price shares.

The presence of a high price effect would, as with the presence of a low price effect, indicate a market inefficiency or that the CAPM is misspecified. In view of the findings of Affleck-Graves and Bradfield (1991) that the CAPM is a good measure of asset pricing on the JSE, it is suggested that these findings support the theory that the JSE is market inefficient.

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Investment Basics: XXXV. AIMR's performance presentation standards: Gaining global acceptance

1. INTRODUCTION

The demand for uniformity of performance results provided by investment managers sparked the need for a universal set of reporting guidelines. The Association for Investment Management and Research (AIMR), an international organisation of investment professionals based in the U.S., has taken the lead in developing industry standards concerning the ethical presentation of performance results. After widespread North American acceptance, AIMR is now focusing on a separate set of global standards which can also be universally applied. AIMR's Performance Presentation Standards are gaining increased recognition and acceptance throughout the world.

2. WHY STANDARDS ARE NEEDED?

"Do your performance results adhere to AIMR Performance Presentation Standards?" That's the question clients and potential clients are asking asset money managers. Consultants are also increasingly adding that question to their list of screening criteria used in recommending clients to prospective investment managers.

Investors are becoming more conscious of how their money is being invested. They are constantly scrutinising the performance results of their portfolios in a constant search for adequate investment returns. Disparity in performance results presented by investment managers is what prompted the development of the AIMR Performance Presentation Standards (AIMR-PPS™).

The dynamics of issues arising in the industry create a need for flexible ethical guidelines that can be universally applied. The AIMR-PPS standards fulfil that need.

3. BACKGROUND OF THE AIMR-PPS STANDARDS

The AIMR Performance Presentation Standards were first introduced by the Financial Analyst Federation in the 1987 issue of the *Financial Analysts Journal.* The *Financial Analyst Journal* is one of the premier journals, dealing with current and leading issues on financial analysis. Since that time under the guidance of the AIMR Performance presentation Standards Implementation Committee, The AIMR-PPS standards have been reviewed extensively by leading investment professionals throughout the world and revised in response to their many comments and recommendations. However, the underlying principles of fair representation and full disclosure of performance results have remained the same.

The AIMR-PPS standards are the manifestation of a set of guiding ethical principles and should be interpreted as *minimum* standards for presenting investment performance. The AIMR-PPS standards have been designed to meet the following four goals:

- Achieve greater uniformity and comparability among such presentations.
- Improve the service offered to investment management clients.
- Enhance the professionalism of the industry
- Bolster the notion of self-regulation

Several of AIMR's PPS subcommittees have studied issues specific to the application of the AIMR-PPS standards that have arisen in the industry since the original standards were adopted effective January 1, 1993. These subcommittees have addressed issues in areas concerning international investing, the treatment of portfolios using leverage and/or derivatives, real estate, bank trust departments, venture and private placement securities, wrap fee accounts, calculation of after-tax return, and performance verification.

4. HIGHLIGHTS OF THE AIMR-PPS STANDARDS

The following list is an overview of the AIMR-PPS standards. The standards consist of several required and recommended guidelines for North American, as well as, non-North American portfolios.

1.1 Creation of composites

All of the manager's fee-paying discretionary portfolios must be included in at least one composite defined according to similar strategies or investment objectives. Composites must include new portfolios at the start of the next performance measurement period. They must also exclude terminated portfolios after the last full performance measurement period the portfolios were under management. Portfolios can not be switched from one composite to another unless documented changes in client guidelines make it appropriate.

1.2 Calculation of returns

Total return, including realised and unrealised gains plus income, must be used. Time-weighted rates of return must be used, as must accrual accounting for fixed income and all other securities which accrue income. Composites must be asset weighted using beginning-of-period weightings. Portfolios must be valued at least

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quarterly and periodic returns must be geometrically linked. Performance must be calculated after the deduction of fees.

1.3 Presentation of results

A ten-year performance record (or period since firm inception, if shorter) must be presented. Annual returns for all years must be presented. Composite results may not be restated following changes in a firm's organisation. Composites must include only assets under management and may not link simulated portfolios with actual performance. Performance results of a post firm or affiliation must not be used to represent the historical record of a new affiliation or new firm entity.

1.4 Disclosures

For all composites a performance presentation must disclose the availability of a complete list and description of the firm's composites. The number, size, and percent of total firm's assets each composite represents must be included and it must be disclosed whether performance results are calculated gross or net of fees. The existence should be stated of a minimum asset size below which portfolios are excluded from a composite. The use should be stated of a settlement date rather than trade date, as should be the use and extent of leverage including a description, frequency and characteristics of any derivatives used.

AIMR's PPS standards place an emphasis on the verification of performance results in order to substantiate claims of compliance by managers. The verification process is required to be performed by an independent third party. The process which consists of two levels of compliance focuses on verifying composites and an attestation, by the verifier, that the return calculations are appropriately represented. While specific composites from a company can achieve the second level of verification, compliance with AIMR-PPS standards must be firmwide.

The standards provide insight in how to solve some common problems that arise when performance results are reported. Three common issues are *representative accounts, survivorship basis, and portability of investment results.*

4.4.1 Representative accounts

When managers choose only their best performing portfolio to portray investment results, they are inaccurately representing their overall performance. The standards require all actual, fee-paying discretionary portfolios to be included in at least one composite. Composites are comprised of portfolios or asset classes which have a similar strategy or investment objective. Disclose the existence of a minimum asset size below which portfolios are excluded from a composite.

4.4.2 Survivorship basis

This issue deals with a manager's tendency to delete poor performing portfolios from composite results. According to the standards, terminated portfolios must be excluded from a composite for all periods after the last full reporting period they were in place, but included for all periods prior to termination. New portfolios added to a composite must be included after the start of the next performance measurement period or according to reasonable and consistently applied manager guidelines.

4.4.3 Portability of investment results

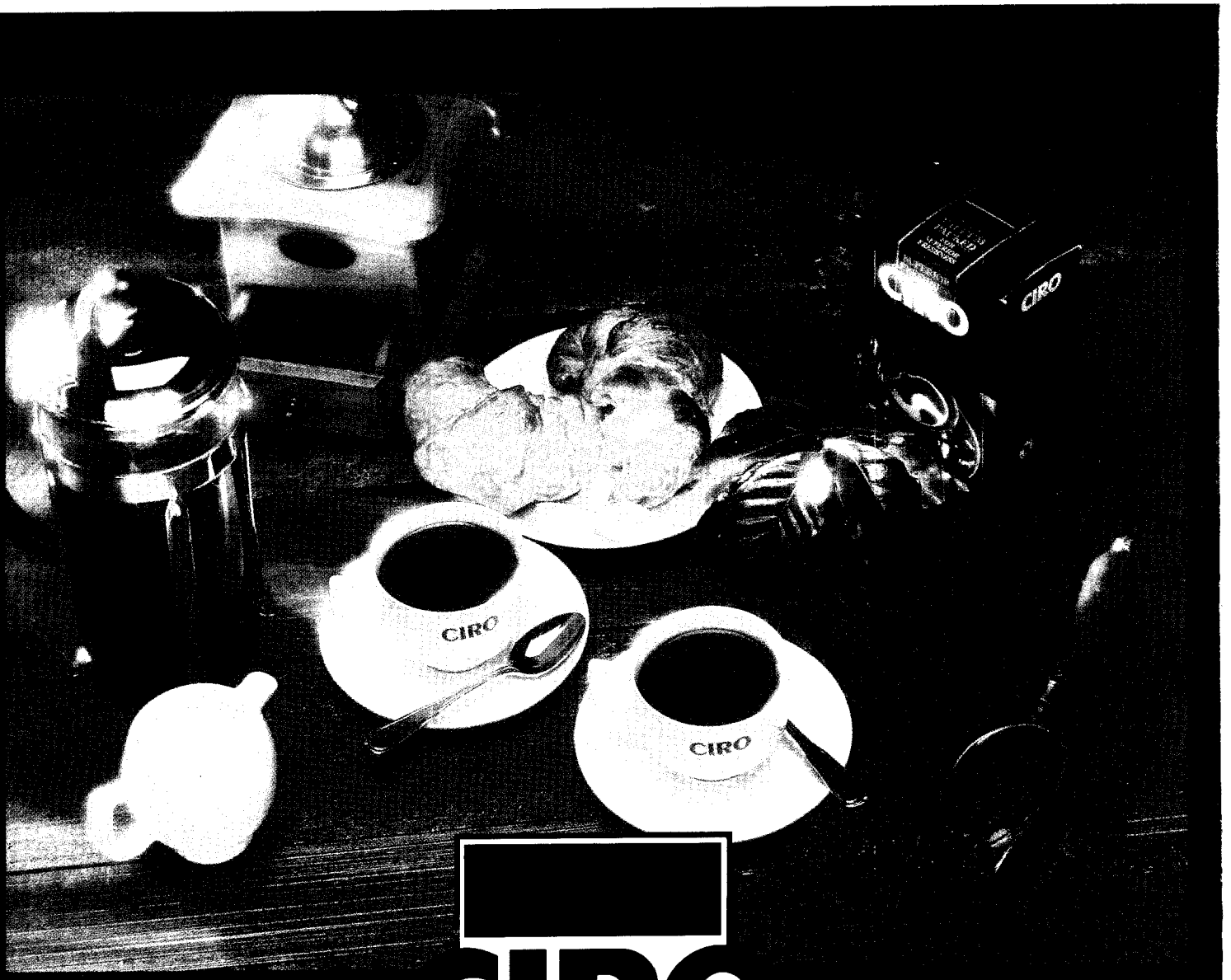
Changes in a firm's organisation must not lead to an altering of composite results. The standards state performance results are those of the firm, not the individual. Performance results can not be linked and used as historical performance results of a portfolio manager. Managers can only use performance results of a past affiliation as supplemental information.

The standards are not without controversy. A common compliant of the standards is that they are too difficult to interpret. Managers are offered too much discretion is another complaint.

The standards were not developed to be a rigid set of guidelines for a money manager to follow. Given the expansion of the standards into new areas of financial analysis (e.g., wrap fee portfolios, international portfolios, leverage, etc.), it would be impossible to address every issue in one complete publication since the industry is so dynamic. The AIMR-PPS standards recognise this limitation. Because the standards attempt to cover a broad range of issues concerning the investment industry, they are constructed to be a **general** set of ethical guidelines which promote full and fair disclosure of investment performance results.

4.5 Global efforts and impact

The adoption and implementation of the AIMR-PPS standards continues to expand on a global basis. Currently, the AIMR-PPS Implementation Committee and its subcommittees are examining the need for a separate global standards handbook. The global Performance Presentation Standards Subcommittee was formed in 1995 with the mission to encourage, through consensus building and education, worldwide adoption of a set of guiding ethical principles to present investment performance in a fair, comparable uniform format with full disclosure. Given the widespread acceptance of the AIMR-PPS standards as *the* industry standard in North America, the committee is now addressing the need to further establish uniform, ethical standards to present comparable results on a global basis. Countries which have already accepted standards almost identical to the AIMR-PPS standards are Switzerland and Canada.



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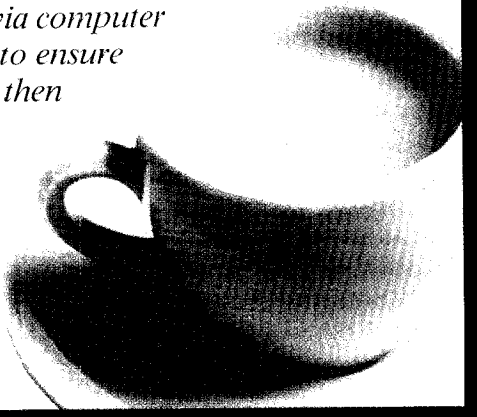

The Global PPS Subcommittee is comprised of leading professionals from thirteen countries representing investment management firms, consultants, banks, plan sponsors, European Federation of Financial Analysts Societies (EFFAS), Investment Analysts' Society of South Africa (IASSA), Brazilian Association of Capital Markets Analysts (ABAMEC), Asian Society of Financial analysts Federation, and Investment Management Regulatory Organisation Limited (IMRO). Countries and regions represented include: South Africa, United Kingdom, Germany, Switzerland, Netherlands, France, Japan, Hong Kong, Australia, New Zealand, South America, and North America.

In developing these principles, AIMR has recognised that global money managers face different challenges than domestic managers. Global money managers are faced with concerns of how to deal with exchange rates and base currencies, country weights, hedging, and varying local laws and regulations. The standards specifically address international concerns separately. They outlined as additional requirements and disclosures for international portfolios in an attempt to address potentially varying circumstances.

One particular concern of global managers is the AIMR-PPS standards do not require daily valuation of portfolios. Global managers would like to see this issue a requirement for compliance. currently the standards offer three examples of calculating time-weighted returns, with daily valuation listed as a *preferred* method.

AIMR has attempted to identify these differences and construct guidelines which can be applied in a global arena. The expertise and insight of the global PPS Subcommittee has been the guiding force in tackling issues concerning this diverse marketplace.

According to an intersect database survey of 128 non-North American managers at year-end 1994, eighty-six percent of those surveyed claimed to be in compliance. Forty-three percent had been verified or planned to be verified.

5. IS YOUR FIRM IN COMPLIANCE?

Given the growing worldwide acceptance of the AIMR-PPS standards, investment managers are taking a closer look at implementing the AIMR guidelines for performance presentation results. Is your firm going to be ready when the question is asked about compliance with AIMR-PPS standards?

If you are, congratulations! Your firm is on the forefront of an important development in the global investment industry.

If not, maybe your firm should consider reviewing the standards to see what the steps are needed to claim compliance with the AIMR-PPS standards. By joining the firms who are in compliance, your company will be among the group of proactive global investment managers who are on the brink of being a part of a worldwide approach to a universal set of uniform, ethical performance presentation guidelines.

WHERE TO RECEIVE INFORMATION

The following published materials are available as guidance for implementing the AIMR-PPS standards:

- *Performance presentation Standards Handbook* (AIMR, 1993)
- Questions and Answers clarifying the PPS, and
- Subcommittee Reports on the following PPS issues:

  International Portfolios
  Venture Capital and Private Placements
  Taxable Portfolios
  Leverage/Derivatives
  Wrap Fee Portfolios
  Verification

To obtain copies of any of these materials, you can contact:

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E vd M Smit, W van Rooyen
Aandeleopbrengste en reële ekonomiese aktiwiteit – Die Suid-Afrikaanse ondervinding

N Bhana
Window dressing by institutional investors on the Johannesburg Stock Exchange: An empirical analysis

W D Hamman
Investment basics XXIX. Cash Flow Statements: The importance of cash from activities

Issue Number 40, Summer 1994/95

N G Mohr, E vd M Smit
Minimum variance hedge ratio analysis for the South African share index futures market: Duration and expiration effects

D Taylor
Accounting rate of return revisited

D Hodge
Does the weight of funds support equity prices on the Johannesburg Stock Exchange?

M F Philpott, C Firer
Share price anomalies and the efficiency of the JSE

J Glansbeek, S Conway
Revision of index performance calculations

C Firer
Investment basics XXX. EVA™: The real key to creating value!

Issue Number 41, Winter 1995

H A Lambrechts
Money market Funds: The missing link in the South African unit trust industry?

E vd M Smit, C E du Plessis
Market timing and share returns

J U de Villiers
Inflation and price-earnings ratios

P D F Strydom
Liberalising foreign trade: The interaction between the real & monetary sectors

W D Hamman, A C Jordaan, E vd M Smit
Earnings changes: A random walk? Some South African evidence

C Firer
Investment basics XXXI. Substainable growth models

Issue Number 42, Summer 1995/96

J A Rogers
The IASSA and its financial environment

N Bhana
The reaction of bank share prices on the Johannesburg Stock Exchange to increased capital requirements

M Ward
Equity instruments

S H High, A M Honikman
The efficiency of the South African capital market

N Bhana
The share market reaction to earnings announcements – a test of the efficiency of the Johannesburg Stock Exchange

W D Hamman
Investment basics XXXII. Earnings growth for negative EPS

Issue Number 43, Winter 1996

D J Joubert
An underlying symmetry on price charts

F P Cilliers, E v d M Smit en D Kotze
Die modellering van heteroskedastisiteit in daaglikse Rand/Dollar wisselkoersbewegings: 1987-1992

M Bergesen, M Ward
Modellings systematic risk and return using accounting-based information

M Atkins, M Ward
The supply and demand effect of block transactions on share prices

W D Hamman
Investment basics XXXIII. Sustainable growth: A cash flow model

Issue Number 44, Summer 1996/7

R van der Merwe, E v d M Smit
The influence of political news events on share market activity in South Africa

C E Oldfield, M J Page
Assessing portfolio performance: The case of South African unit trusts

N Bhana
The effect of industrial strikes on the value of shares listed on the Johannesburg Stock Exchange

E v d M Smit, H Nienaber
Futures-trading activity and share price volatility in South Africa

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The determinants of the risk perceptions of investors

C Firer
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