The Investment Analysts Journal

Number 42 – Summer 1995/96

Die Beleggingsontleders Tydskrif

Nommer 42 – Somer 1995/96

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This issue in brief

The reaction of bank share prices on the Johannesburg Stock Exchange to increased capital requirements
Capital adequacy requirements have been implemented by the authorities in South Africa to regulate the banking industry. This paper examines the market reaction of the announcement which mandated increased capital requirements in terms of the Deposit-taking Institutions Act of 1990. The announcement of the regulatory change was viewed by investors on the JSE as generally unfavourable. Furthermore, those banks with capital levels which are deficient relative to the mandated levels suffered the largest relative losses. Capital regulation is not the best method of regulating the banking industry. It is suggested that increased use of financial disclosure and market data may be more effective.

Equity Instruments
The issues surrounding the choice of a specific instrument in a rights issue are unclear. There are essentially three different classes of equity instruments; ordinary shares, preference shares and convertible debentures. This paper discusses the merits of each of these instruments with regard to taxation effects, pricing, tradeability, timing and underwriting. The paper suggests that there are no significant differences between a rights issue of preference shares over ordinary shares, but that significant advantages are available through the issue of convertible debentures to shareholders who have lower marginal tax rates than the issuing company. Finally, the advantages and disadvantages of a scrip dividend are examined.

Key words: Preference share; convertible debenture; ordinary share; rights issue; equity instruments; scrip dividend

The efficiency of the South African Capital Market

There is, of course, a huge international literature regarding the Efficiency of asset markets, generally, and on share market efficiency, particularly. This literature is not confined to 'large' markets, but includes a number of examinations of 'small and/or 'thinly capitalized' markets. In addition to this international literature, there are a significant number of studies of the efficiency of the S.A. share market. It is not too much to suggest that this literature, taken as a whole, indicates that a large number of share markets, including those in 'small' markets, are at least weak-form efficient. Or, as Jensen has said, "there is no other proposition in economics which has more empirical evidence supporting it than the efficient markets hypotheses."

The share market reaction to earnings announcements – a test of the efficiency of the Johannesburg Stock Exchange
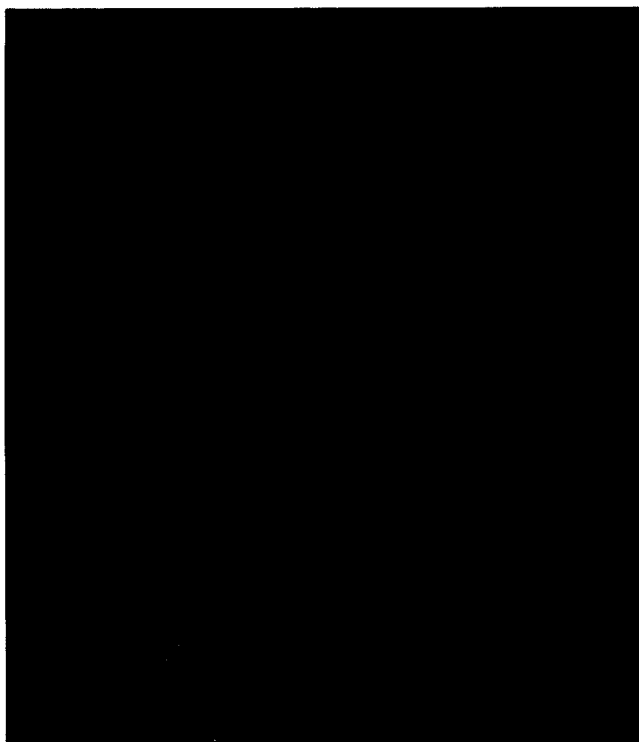
The results of this investigation provide strong evidence of investor overreaction to earnings announcement on the JSE during the period 1975-1989. A simple strategy of buying the shares of companies reporting negative earnings would have generated, on average, a positive abnormal return of 12,5% during the year following the negative earnings. It was also observed that companies reporting negative earnings experience considerably larger earnings gains (recoveries) in the first and second year following the test year than do companies not announcing negative earnings. The observed negative earnings effect exists independently of any small-firm effect. Investors are provided with arbitrage opportunities by predicting corporate recoveries – companies reporting two or more successive years of negative earnings whose earnings are about to recover.

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The Investment Analysts Journal

Forty-second issue – Summer 1995/6

Die Beleggings-ontleders Tydskrif

Twee-en-veertigste uitgawe – Somer 1995/6

Looking back over the period of the last eighteen months white South Africans have much reason to be thankful. Before the general election of April 1994 there was cause to be concerned about the future. Violence had risen to an unprecedented level, especially in Natal and on the East Rand, a massive capital outflow had occurred on the balance of payments and the real growth of GDP had declined threatening a vicious circle of deterioration. Worse still, there was every reason to fear that the election itself would not go off peacefully. Indeed, many whites sitting in their comfortable homes, still removed from the carnage happening elsewhere, had reason to wonder whether the country they had previously known had not finally come to the end of the road. The prospect of huge social upheaval loomed in a menacing way. While few doubted that the ANC would win the general election, no-one believed it possible that the ANC, on assuming office, would adopt economic policies largely consistent with the policies that had been advocated by business, the IMF and World Bank, or that it would be an ANC-led government that would, before a year was out, abolish exchange controls on non-residents. From being a protectionist party committed to policies that in all instances would defend labour interests against the interests of business, the ANC was to become not only a promoter of the market economy, but an enthusiast of freer trade and reduced tariff barriers, even if this held out the prospect of job losses in uncompetitive industries. In some respects, the ANC has come to out-business business in the boldness of its new commitment to a broadening of entrepreneurship and an open economic system.

The response of the economy to all this has been encouraging. The growth of real GDP has improved, inflation has fallen and while the balance of payments current account has deteriorated it has done so largely because there has been a surge of imports, mainly of capital goods, that has reflected an impressive revival of real gross domestic fixed investment (GDFI). Furthermore, the deterioration on the BOP current account has been more than off-set by large capital inflows with the result that the net reserves of the Reserve Bank have risen significantly. In short, the political miracle of the 1994 general election has been followed by an economic miracle no less impressive and no less important.

However, all this is now under threat by a new surge of violence both political and criminal. In KwaZulu-Natal scores of people are being killed daily, and in the big cities, but particularly in the greater Johannesburg area, armed robbery has become a mundane, even banal, phenomenon. Car hijackings have skyrocketed and the gratuitous murder of the victims of such theft has become an all too frequent occurrence. Those left unharmed after being dispossessed of their vehicles count themselves lucky. The recent shooting of a much respected young doctor outside the Johannesburg General Hospital is but one event which has sent shockwaves through the white community. Yet it is not the white community alone which is being targeted. Such violence is the everyday experience of the residents of Soweto and the other mainly black townships of Gauteng. The only escape from such threats to life is emigration, but this is not an option for the vast majority of the country's people. Even the relatively well-off are trapped because emigration cannot be contemplated without regard to housing requirements and the need for sustainable income at the other end in a world where exchange control continues

'n Terugblik op die afgelope agtien maande gee blanke Suid-Afrikaners baie stof tot dankbaarheid. Voor die algemene verkiesing van April 1994 was daar rede tot kommer oor die toekoms. Geweld het tot ongekende vlakke gestyg, veral in Natal en aan die Oos-Rand. Daar was 'n geweldige kapitaaluitvloei en die reële groei in die BBP het gedaal, wat 'n dreigende bose kringloop van agteruitgang voorspel het. Nog erger was die vrees dat die verkiesing nie vreedsaam sou verloop nie. Trouens, menige blanke wat rustig tuis gesit het, verwyderd van die slagting elders, het met rede gewonder of die land van weleer finaal tot 'n einde gekom het. Die vooruitsig van 'n groot sosiale omwenteling was immer dreigend. Terwyl daar min twyfel was dat die ANC die algemene verkiesing sou wen, het niemand geglo dat 'n ANC-bewind 'n ekonomiese beleid ooreenkomstig 'n beleid soos deur die sakewêreld, die IMF en die Wêreldbank voorgestaan, sou volg nie, of dat hulle in minder as 'n jaar valutabeheer op nie-inwoners sou ophef nie. Vanaf 'n proteksionistiese party, verbind tot 'n beleid wat arbeidsbelange deurlopend ten koste van sakebelange sou verdedig, het die ANC nie alleen 'n kampvegter van die markekonomie geword nie, maar ook 'n voorstander van vryer handel en verminderde tariewe, al sou dit verlies aan werksgeleenthede en nie-mededingende nywerhede tot gevolg hê. In sommige opsigte het die ANC sakelui getroef deur die waagmoed van sy nuwe verbintenis tot 'n verbreding van entrepreneurskap en 'n oop ekonomiese stelsel.

Die ekonomie se reaksie was bemoedigend. Die BBP-groei het verbeter, inflasie het afgeneem, en alhoewel die lopende rekening van die betalingsbalans verminder het, was dit hoofsaaklik die groot toename in invoere, veral van kapitaalgoedere, wat 'n indrukwekkende oplewing in reële bruto vaste binnelandse investering gereflekteer het. Verder het die groot kapitaalinvloei meer as kompenseer vir die verswakking van lopende rekening, met die gevolg dat die Reserwebank se netto reserwes betekenisvol gestyg het. Kortom, die politieke wonderwerk van die 1994 algemene verkiesing is gevolg deur 'n ewe indrukwekkende en belangrike ekonomiese wonderwerk.

Hierdie omstandighede word egter tans bedreig deur 'n nuwe vlaag van geweld, polities sowel as krimineel. Talle mense word daagliks in KwaZulu-Natal vermoor, en in die groot stede, veral die Johannesburg omgewing, het gewapende roof 'n alledaagse, selfs banale verskynsel geword. Motorkapings het die hoogte ingeskiet, en die sinlose moord van die slagoffers van sulke diefstalle kom te dikwels voor. Diegene wat ongedeerd afkom nadat hulle van hul voertuie beroof is, ag hulself gelukkig. Die onlangse skietvoorval voor Johannesburg se Algemene Hospitaal waartydens 'n gerespekteerde jong dokter gesterf het, is maar een van vele insidente wat skokgolwe deur die wit gemeenskap gestuur het. Dit is egter nie net die wit gemeenskap wat die teiken is nie. Hierdie soort geweld is alledaags vir die inwoners van Soweto en die ander oorwegend swart dorpsgebiede van Gauteng. Emigrasie is die enigste manier om sulke lewensbedreidings te ontsnap, maar ongelukkig is hierdie opsie vir min van Suid-Afrika se mense beskore. Selfs die relatief welvarendes is vasgevang, want emigrasie sonder die nodige behuising en 'n lewensvatbare inkomste aan die ander kant in 'n wêreld waar valutabeheer toegepas word, waar na-belasting inkomste uit spaargeld laag is, tesame met die eroderende effek van inflasie differensiale, veroorsaak dat slegs die super-rykes en jong professioneel-gekwalifiseerdes dit regtig kan bekostig om die land te ver-

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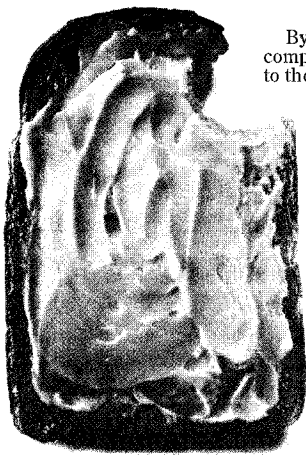
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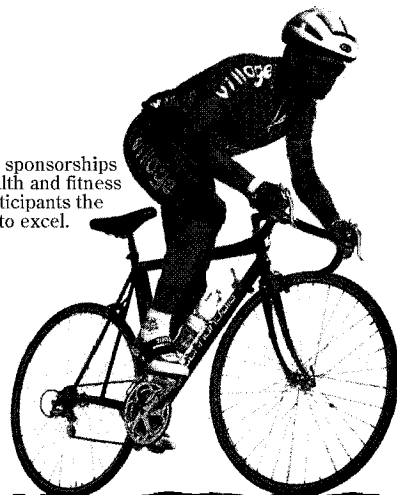
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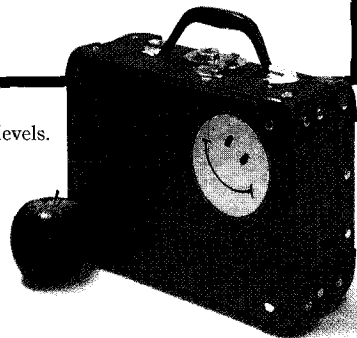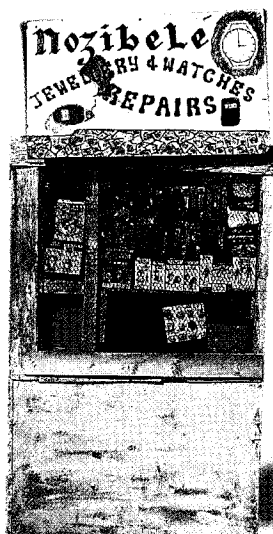to be applied to emigrants, where after tax returns on savings repositories are low and/or where such returns face the eroding effects of inflation differentials on exchange rates. Only the super rich and the young professionally qualified can really afford to go. Not surprisingly, the braindrain, which has characterised South Africa since Sharpeville, but expecially since the Soweto riots of 1976, has worsened with all its obvious implications for the economy in the long run.

But the current surge of violence does not only have long run effects on the economy. It has short run effects also and these are beginning to become troublingly visible. Most important is the impact on consumer and investor confidence. The September Quarterly Bulletin of the Reserve Bank reveals that the first half of 1995 was a good period for growth in South Africa. Private consumption expenditure (PCE) in real terms increased by 3,8 per cent per annum compared with the first six months of 1994 while the growth of real GDFI on a similar basis was 11,7 per cent (both rates of increase reflecting a substantial improvement on the year-on-year growth rates of 1994 and 1993). However, this picture is beginning to change. Although the momentum of real GDFI growth can be expected to continue during the remaining months of 1995, the position with real PCE is more problematic. Since April, with the exception of September, the volume of retail sales (which exclude motor vehicle sales) has actually declined in seasonally-adjusted terms and since September appears to be reflecting a new mood of consumer caution. A quietness has descended on the shopping centres of the land which is reminiscent of the quietness that in the past has settled like a cloud of gloom after periodic surges of socio-political turbulence. Following the Soweto riots, for example, the economy but PCE in particular (by far the largest component of total domestic spending) became so subdued that it took nearly four years to engineer a recovery, and even then monetary and fiscal policy remained ineffective until an extra boost was provided by a huge rise in the gold price in January 1980. If the consumer is to go back into his/her shell like he/she did between 1976 and 1980, much of the increase in manufacturing capacity now being put in place will come to be seen as having been misjudged. That will not be good for employment growth, still the central policy issue in South Africa. Crime may have its roots in poverty and unemployment, but it is also clear that poverty and unemployment can be perpetuated by crime if something drastic is not done to stamp it out before it spreads to engulf too large a proportion of the poor and jobless. That something drastic must include a greater quantum of law enforcement, to be sure, but it is clear as well that what is needed in addition is a more effective anti-crime strategy, and greater technical proficiency and burcaucratic competence at an operating level. Breaking the back of organised, syndicated crime (the real problem behind the car hijacking phenomenon) has become an urgent priority, almost whatever the cost. If such crime is not dealt with effectively now, its cost later, in lives lost and in the loss of property, in lost real GDP growth, lost employment growth and capital flight, will be far greater.

THE EDITOR

laat. Die breinerosie wat kenmerkend is van Suid-Afrika sedert Sharpeville, maar veral sedert die Soweto-opstande van 1976, het, nie onverwags nie, toegeneem met al die ooglopende implikasies vir die langtermyn ekonomiese ontwikkeling.

Die huidige golf van geweld hou egter nie slegs langtermyn gevolge vir die ekonomie in nie. Dit het ook korttermyn gevolge, wat algaande ontstellend duidelik word, veral die impak wat dit op verbruikers- en beleggingsvertroue het. Volgens die September-uitgawe van die Reserwebank se Kwartaallikse Bulletin, was die eerste helfte van 1995 'n periode van groei in Suid-Afrika. Privaat verbruikersbesteding het in reële terme met 3,8 persent per jaar toegeneem vergeleke met die eerste ses maande van 1994, terwyl die groei in reële bruto binnelandse vaste investering op 'n soortgelyke basis 11,7 persent was (beide koerse se toename reflekteer 'n substansiële verbetering op die jaar-op-jaar groeikoerse van 1994 en 1993). Hierdie scenario is egter besig om te verander. Alhoewel verwag kan word dat die momentum van reële investering-groei sal voortduur gedurende die res van 1995, is die reële privaat verbruiksbesteding-situasie meer problematies. Die volume van kleinhandelverkope (uitsluitende motorverkope) het sedert April in seisoensaangepaste terme in werklikheid afgeneem, met die uitsondering van September, en weerspieël 'n nuwe gees van verbruikersomsigtigheid. 'n Stilte het op die land se winkelsentrums gedaal wat herinner het aan die stilte wat in die verlede soos 'n donker wolk kom lê het na periodieke golwe van sosio-politieke turbulensie. Na die Soweto-onluste, byvoorbeeld, het die ekonomie, veral privaat verbruiksbesteding, by verre die grootste komponent van die totale binnelandse besteding, só gedemp geraak dat dit bykans vier jaar geneem het om te herstel. Selfs tóé het monetêre en fiskale beleid oneffektief gebly tot die inspuiting van die groot goudprysstyging in Januarie 1980. Sou die verbruiker weer in sy/haar dop kruip soos tussen 1976 en 1980 die geval was, sal die toename in vervaardigingskapasiteit, wat tans besig is om te vestig, gesien word as 'n verkeerde berekening. Dit voorspel niks goeds vir groei in werksgeleenthede nie, iets wat steeds 'n sentrale beleidskwessie in Suid-Afrika bly. Misdaad mag wel sy wortels in armoede en werkloosheid hê, maar dit is ook duidelik dat armoede en werkloosheid deur misdaad perpetueer kan word indien iets drasties nie gedoen word om dit uit te wis voordat dit versprei en 'n te groot verhouding van die armes en werkloses verswelg nie. Dat iets drasties 'n groter kwantum wetstoepassing moet insluit, is seker, maar dit is ook duidelik dat 'n meer effektiewe anti-misdaad strategie nodig is, asook groter tegniese bedrewenheid op operasionele vlak. Die neutralisering van georganiseerde sindikaatmisdade (die werklike probleem onderliggend aan die groot aantal motorkapings) het 'n dringende prioriteit geword, ongeag die koste daaraan verbonde. Indien sulke misdade nie nou vasgevat word nie, sal die koste later, in terme van lewensverlies, verlies aan eiendom, verlore reële BBP-groei, verlore werksgeleenthede en kapitaaluitvloei, veel groter wees.

DIE REDAKTEUR

The IASSA and its financial environment

A PRESENTATION TO THE BRAZILIAN SOCIETY ON THE 25TH ANNIVERSARY OF ITS FOUNDATION

In May 1995 the Brazilian Investment Analysts celebrated the 25th anniversary of their Society's formation. They invited five quests from other countries to attend their celebrations. Amongst them was John Rogers, one of the three founders of the IASSA in 1969 and currently its international representative.

He was asked to talk about the origans and present situation of the IASSA.

ORIGINS

The IASSA was founded in 1969 to promote and develop standards of investment analysis in Southern Africa and to provide a professional forum for matters of interest to its members.

We had in mind various objectives, some of which we realised would be unattainable for many years to come. They included the promotion of communications between companies and shareholders, educating both our members and the investing public on investment matters, co-ordinating professional standards and liaising with related bodies in our neighbouring countries and overseas.

In arranging my thoughts on this address I have found it fascinating to see how some of our concepts have developed far beyond our original expectations, how others have moved away from our initial ideas and some have lapsed or become inappropriate in today's conditions. For convenience I have placed them under six headings.

CORPORATE COMMUNICATIONS TO SHAREHOLDERS

In 1969 few companies felt a need to tell their shareholders much about the running of their affairs or their views on their prospects. It was as though shareholders were seen as asking too many inconvenient questions and competitors were too quick to take advantage of any information that was disclosed.

I well remember how we struggled, with our then tiny membership of 50, to persuade major companies that it was to their advantage to tell an audience of perhaps 30 about their operations. We shall always be grateful to companies of the like of Anglo American and S A Breweries for the help they gave us in those early years. It is surely much more than coincidence that it is these companies that have performed the best over the past quarter century.

Reporting standards in South Africa have changed greatly since then.

Various specialists in corporate presentations have brought their client companies to our platform. Sometimes they have withdrawn them again when they have developed their own list of specialist analysts whom they wish to invite to their meetings. More often, though, other companies on their list of clients have asked to be in our schedule of presentations. It is now not uncommon for us to have 4-6 presentations in a month, sometimes with 200-300 people wanting to attend a meeting in an auditorium capable of accommodating only 120 people.

Most of our meetings used to be held in the auditorium of the Johannesburg Stock Exchange (the JSE) and this is still a well favoured venue because of its display facilities, seating comfort, parking potential and post-meeting catering facilities. However, more and more companies now operate well away from the centre of Johannesburg, where the JSE is located, and both companies and audiences are increasingly reluctant to venture into the city centre after dark because of wild traffic conditions and the risk of car hijacking. The favoured auditoria are at clubs in the Northern suburbs of Johannesburg where the hazards of the city centre no longer dominate and where the surroundings consist of grass and flowers rather than concrete edifices.

The format of our meetings has become standardised, but not rigidly so, in response to the wishes put to us by our members

1. They begin at 4:30 pm – or even as late as 5:00 pm.
2. The Chief Executive and one or two of his team, assisted by a high grade slide or video presentation, talk for about an hour.
3. Questions then come from the floor for half an hour or more.
4. At about 6:00 pm or 6:30 pm we adjourn for drinks and snacks and talk to management and other analysts for about an hour.

All these components of the meetings have proved of immense value both to the companies and the analysts and I think that this format will be with us for many years to come.

As well as these "presentation" meetings we have a number of company visits.

For the more hardy, and particularly the mining analysts, there are frequent visits to gold, platinum, manganese and coal mines, whilst the less robust of us visit breweries, cement companies or packaging operations.

Each year we run an Awards Dinner, which aims to recognise excellence in corporate reporting. Prizes and certificates are awarded for the best Annual Report in various categories (for example gold mining, non-gold mining, consumer industrials and financials), for the best visits and presentations, and for the best Chairman's Statement. The brain child of Ronnie Bethlehem, one of the Society's three founders and still very much the editor of our Journal, it has become a major event in South Africa's investment calendar. It is a Black tie affair that we originally held at one of our Clubs in the Northern Suburbs of Johannesburg, but for reasons of space and prestige it now held at a major hotel in the area. Our old friends at Anglo American and S A Breweries still feature prominently in the list of awards and last year the Chief Executives of both companies, Messrs Julian Ogilvie-Thompson and Meyer Kahn, attended the dinner, along with their counter-parties in the major insurance companies, the banks and a variety of major industrial groups.

MATTERS OF GENERAL INVESTMENT INTEREST

For many years we used to run a seminar a day or two after the National Budget on its financial and investment implications. Particularly when we ran it in conjunction with the Business School of the University of the Witwatersrand it was a tremendous success and late comers had to sit in a subsidiary hall wired up for sound during the proceedings. The concept became so popular that half of South Africa now runs similar operations for its specialised audiences, whether they be accountants or business executives, and the Society has withdrawn from that market. I wonder whether the time might not have arrived for us to return to it.

Also now in abeyance, but perhaps due for a return, are one day seminars on topical matters such as monetary policy, tax reform, banking and insurance regulations and exchange con-

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trol. One major problem in organising these, I believe, is that the Society is short of Committee members able to undertake the arranging of the conferences for the Society rather than for their own companies.

This is an inevitable consequence of the fact that the Society has no paid executive, even though it has an efficient secretariat, and I speculate that in the next few years we may need to address this shortfall.

Finally, under the heading of general investment interest, there is our Journal. I have asked our Secretariat to post two dozen copies to yourselves for distribution to those who are interested and if any more are required I shall be happy to make a list and send them on to you. Basically it is designed for the academic reader but it has a number of articles aimed at practical investment management. A few years ago we ran into various problems, mainly related to the difficulty that proof-reading and editing, being unpaid activities, slid slowly down the list of priorities and the Journal began to miss its bi-annual deadlines. More recently, South Africa's two leading Business Schools, Wits and Stellenbosch, have become involved in the finance and the operations of the Journal and we are now meeting our schedules almost as well as the Swiss railway system. The finances of the Journal, now supplemented by the participation of the two universities and by the advertising contributions of various sponsors, are back at break-even point, having been an unimportant but worrying drain for several years.

EDUCATION

Our policy on education has been consistent in its broad objectives but, again because we lack full time executive staff, our achievements have been positive but sporadic. On the positive side we have run courses on investment analysis for new entrants into the industry, looking at the investment basics for both mining and industrial companies. We have also run courses on gilts and derivatives. The organising of these courses has not only met an important need but has also provided a modest profit centre for the Society. For a while we had to reduce our activities in this sector, again for reasons of lack of people, but we have been fortunate in being able to find a suitable organiser and instructor who is resuming our efforts in this field.

We have also undertaken programmes of instruction for the CFA course. These flourished for two or three years, but had to be phased down when our instructors moved into other activities.

At present we know of about 20 CFAs in South Africa (not all of them have qualified through ourselves) and we believe there are twice as many now studying to qualify. We know that a good number of our members are keen to undertake the course; recently when a member of the staff of the University of Windsor produced an address for our members at short notice on how to pass the CFA exam no fewer than 60 people attended. Clearly we should be able to develop this important sector of our activities given the necessary time and personnel.

One area we need to explore is the relationship between the CFA qualification and the British equivalent qualification (I believe there are only about 100 British CFAs). This relates to the question of whether we should advise our members to follow the British or the American course with the possible option of converting the one into the other. We would also need to look at a special South African supplement since analysts employed locally would need a knowledge of gold and other mining analysis, mining financials, exchange control (which still hampers our own investors) and local legal and tax restraints. We would greatly appreciate advice from our colleagues in other countries on their thoughts and findings on the adaptability of the CFA qualifications to local conditions.

ETHICS

Moving on to our next topic, that of ethics, the IASSA has not turned its thoughts to this to the same extent as have its sister societies in other countries. It is tempting to wonder whether I am suggesting either that our moral standards are infinitely better than those of other countries or, alternatively, that we are so far behind that we have not yet recognised the need for explicit ethical standards! My perception, though, is that virtually all our members, in terms of our original constitution, must either be university graduates or else qualified accountants. We have relaxed this a little to bring in people with several years of experience in the industry, but by and large our insistance on a professional background has meant that the code of standards of our members has fallen under the mantle of other regulatory bodies. Notably, these would include the Johannesburg Stock Exchange, the Financial Services Board, the Unit Trust or Mutual Fund Industry, the Law Society and the Institute of Chartered Accountants of South Africa.

South Africa does have its share of smart operators who offer high performance portfolio management in exchange for a share of the portfolio's profits. They telephone little old ladies and pensioners who register as shareholders. However, this type of operator falls outside the scope of the Society's activities and, thankfully, we have been able to leave their regulation and control to other bodies.

I am open to correction, but I think I can claim that of all South Africa's financial swindles and defaults over the past decade, and I can think of about ten that have been publicised, not one has involved a single member of the IASSA.

A side-step from the question of broad ethics is that of the standards of financial reporting. Many of our members are financial reporters and it is my personal belief that they observe a high ethical standard in their reporting. Regrettably, however, we have had four cases over the past two years where companies have complained that part of the coverage of their financial presentation has been inaccurate. This has created various spectres in our minds and we are still unsure of the path we should tread between upsetting corporate management, on the one hand, and imposing an unhappy degree of restriction on the freedom of the Press, on the other. Our attitude at present is that Freedom of the Press depends ultimately on all members of the Press being seen as setting responsible standards. If companies, analysts and investors develop confidence in the Press then the compulsion to develop controls over what is said will fall away. I believe that the problem of monitoring the Press arose in Europe a decade ago. The Press became free to say what it would because its standards of accuracy and integrity came to be regarded as highly acceptable.

ACCOUNTING STANDARDS

The Society plays an active role in the development of the country's accounting standards. Four of our past Chairmen have been on the Accounting Standards sub-committee of the Johannesburg Stock Exchange, which in turn has two members on the Accounting Standards Board. In addition, the Society itself is represented independently on the Board. One of our ex Chairmen, Doug Brooking, is not only on the International Accounting Standards Board but has even served as its Chairman. We look forward to continuing our participation in this vital and increasingly global activity.

INTERNATIONAL RELATIONS

Although I still participate in many of the Society's core activities, my own special interest is that of its relations with other societies.

Any period of transformation is also one of vulnerability, the new state faced with enormous challenges. Challenges, however, create opportunities for the bold, and boldness is an attribute the new South African order needs. It must take a firm grip on the complex problems with which it is faced, particularly those retarding the generation of wealth in our country.

Our Group's strong gold base places us in an ideal position, as part of the engine of South Africa, to help generate wealth both at home and further into Africa. An ability shown by our results and the recent successes in Ghana, but limited by considerations relating to statutory controls.

The economy needs to be nurtured. We have the people and the expertise to spread our skills far and wide, but we need the freedom to do so. To stimulate new cycles of growth. To enrich man through minerals.

GOLD FIELDS

The IASSA and its financial environment

This has not always been an easy task. As the Society's name indicates (The Investment Analysts' Society of Southern Africa) it was our hope, from the date we were founded, that other countries in the Southern African region would be able to join with us in the promotion of professional standards of investment analysis. Alas, this hope has never materialised. Nor has it even become a practical possibility. Mocambique, to our North East, has become an investment non-entity after years of civil war, whilst Zimbabwe (the former Rhodesia) and Zambia (formally a rich copper producing country) have waned steadily in economic power and significance. Namibia, the former South West Africa, has only one significant company that I can bring to mind that is listed on the JSE. The price of that company's shares has dropped by more than 50% since it was first listed some half a dozen years ago. Angola, to Namibia's North, has never had a company listed on our Exchange and is now an economic and political disaster. Swaziland, Lesotho and Botswana are all very much adjacent territories, being largely surrounded by South Africa. They are fairly successful but they are small economies with very little significance to South African investors. In fact, between them they have only one company listed on the JSE; it has never paid a dividend and, I believe, will never be able to afford to do so.

Even within South Africa the only significant investment centre other than Johannesburg is Cape Town. Our international relations therefore need to look beyond Africa to our friends and colleagues in other continents. And here we have much in common but we also have many difficulties to overcome. These include the legacy of Apartheid, the impact of Exchange Control and our geographic isolation at the tip of Africa.

Apartheid led to the withdrawal of many companies from the South African market. IBM, Mobil, General Motors, Kodak and Barclays Bank all come readily to mind. Exchange Control, which applied both to non-residents and residents, prevented foreign sellers both of these companies and of portfolio investments from withdrawing the proceeds of their sales freely from South Africa. The restrictions distorted the market place, led to a deterioration in financial morality and dulled the understanding of local investors of the activities of foreign markets. Since March 1995 the restrictions on foreign investors have been abandoned, apparently without material effect on the external stability of the currency, but restrictions still apply to residents. One result of Exchange Control has been a hot-house effect on local share prices. Money that might have been channelled into overseas markets has been forced to remain in our own securities. Local investors are basically unaware of the share prices and earnings performances of IBM, Coca-Cola or Imperial Chemical Industries. Shareholders have been reluctant to shed their holdings of South African equities, even when they seemed overpriced, lest it prove impossible to buy their shares back when they looked better value. The Johannesburg Stock Exchange is notorious for the illiquidity of trade in many of the companies that are listed. And inflation running at 10% to 15% per annum over the past two decades has added to the challenges facing local investors and investment analysts. Why bother to watch the results of Cadbury Schweppes PLC or Nestle when you are totally unable to trade in the shares and why go to the expense of visiting those distant brokerage houses in New York when Exchange Control makes them reluctant to invest in your shares and you are totally forbidden to trade in theirs. Inevitably, therefore, my own special interest of maintaining contacts with foreign markets and societies has been pushed into the background. Hopefully, however, conditions are on the verge of a dramatic improvement.

THE CONDITIONS OF TODAY

So much, then, for the conditions of the past and how they have led the IASSA to where it is in corporate communications, edu-

cation, ethics, accounting standards and international relations. But what of today's conditions and problems? What is its membership now, who runs the society, how is it financed, what language does it speak, what is its role in post-apartheid South Africa (the New South Africa) and what is the standing of the Johannesburg Stock Exchange, on which it depends, in this New South Africa?

MEMBERSHIP, FINANCING & RUNNING OF THE SOCIETY

Membership of the Society totals over 1 000. New applicants for membership are considered every month and last month we admitted 20. If this rate is annualised our growth rate is nearer 25% than 20%.

The occupational composition of our membership is not easy to define since our members join as individuals rather than as employees of a particular corporate body. They might, for instance, join as a member of a university teaching staff and next year, without its being reflected in our records, they could be full time members of a brokerage house's research team. My guess would be that we are 30% in stockbroking research, 30% in merchant banks, 30% in insurance companies and the remaining 10% in mining houses, industrial companies, private advisory services and so forth.

Last year I was asked in Edinburgh how many Black members we had. The answer was only one. It has now increased to eleven – still a very small figure. We are anxious to increase the numbers, but for various reasons the numbers of Black commercial graduates, from whom we would draw our membership, is still very small. I was told the other day that there are only 100 Black Accountants in the entire country and I think that the Stock Exchange itself has less than a handful of Black Authorised Clerks – none of whom may necessarily wish to become analysts.

The Society is run by a Committee of up to 15 members, of whom we try to ensure that at least one is resident in Cape Town. We have only one paid employee, our Secretariat. One, two or even three members serve on one or two sub-committees with the long term objectives I mentioned earlier. So we have Accounting Practices, Membership, Company Presentations, Education, Award Dinners and the judging of the winners, the Journal and International relations. The system works well, and would work even better if we each had more hours to the day.

Our income comes from membership fees and fees for organising courses and conferences. The Society receives little direct sponsorship from the banks and financial institutions to which our members belong. Thanks to corporate advertising in our Journal and to the contributions of our two academic backers, however, the Journal is self financing. So are our corporate presentations, for the most part, since both they and we have long felt that the costs should be borne by the companies. Our major expense is the very welcome one of our guests at the Annual Awards Dinner. The result of these financial policies is that the Society runs at a modest profit, is seen to be independent and has been able to put aside sufficient reserves to cater for a setback if we are unlucky enough to incur one.

South Africa's language policy has always been a political football. Until a year ago we had two official languages: English, which is the home language of about 3 million out of our total population of 43 million, and Afrikaans, which is the mother tongue of perhaps 5-6 million. One result of our political changes last year is that we now have another 9 official languages that include Zulu (spoken by 6-7 million of our population), Southern Sotho, Northern Sotho, Xhosa, Pedi and Shangaan.

Perfectly engineered for growth

Anglo American, South Africa's premier mining finance house, together with its major associates, De Beers and Minorco, constitute the world's foremost mining grouping.

Anglo American is best known for its substantial gold and diamond interests. Companies in which the Corporation is invested produce more gold than any other enterprise in the world, while major diamond producer, De Beers, has been synonymous with the world diamond industry for over a century. Anglo American also has significant interests in companies which cover a wide range of metals and minerals, including coal, chrome, copper, ferro-alloys, manganese, nickel, platinum and vanadium, as well as important industrial and financial services areas.

It is this diversity which continues to underscore Anglo American's inherent financial strength, enhancing the quality of its earnings and cushioning against the vagaries of the commodities cycle. Exciting new projects covered by companies in which the Corporation is invested span the spectrum from copper mining 5 000 metres above sea level in the Andes to recovering diamonds from the Atlantic sea floor.

In South Africa alone, the capital programme of Anglo American Corporation and its associated companies from 1994/95 to completion amounts to some R20 billion in constant money terms, demonstrating a firm commitment to fixed investment in the country.

When investors think South Africa, they think Anglo American.

aac - Leader in mining finance

However, English is the second language of much of our population and is certainly the language of our international business and financial community. The Society's affairs are almost totally conducted in English – and as you may guess from my own accent it is in English English rather than American English.

BANKING AND INSURANCE

The South African banking and insurance system, to which so much of the Society's activities is related, is based on the British model. We have a Reserve Bank at the top and it has been able to defend its independence, often with difficulty, from Government interference. It is our lender of last resort, our instrument for determining and applying monetary policy, our monitor of banking ratios and solvency margins and our guardian of foreign reserves and exchange control regulations.

Below it are four main commercial banking groups. These are Standard Bank, which has historical links with Standard Chartered Bank (in the U.K.), the First National Bank – which used to be part of Barclays Bank but is now South African owned, Nedcor – of Netherlands antecedents but now locally owned; and the ABSA Group, whose origins are totally local. They are strongly solvent, are well backed by major insurance and mining house groups (of which more later), and are not only subject to the scrutiny of the S.A. Reserve Bank but can also look to its help and support in emergency.

Below them, in turn, and often very closely allied to them, are the general banks and the building societies. A decade ago there were a dozen or so of these, some of them fiercely independent of the commercial banks, and South Africa took pride in the fact that its independent Building Society movement was the largest in the world relative to the size of its economy. Pride, however, has succumbed to economic necessities and nowadays the building societies have been absorbed by and become divisions of the commercial banks.

As well as being strongly financed and strongly backed, South Africa's commercial banks have a great many branches (they have country wide representation in almost every town and suburb) and they are supported by first class computer systems. We are a third world country in many respects but certainly not in banking and finance.

As an aside, and to give you an idea of the size of this sector, I remember that about 20 years ago, when it was part of Barclays, our First National Bank accounted for a major proportion of Barclays' worldwide income. It has since grown to many times its size in those days.

As an ancillary to our commercial banks we have various merchant banks which undertake activities in portfolio administration, mutual funds, pension funds, dealing in foreign exchange, derivatives markets, corporate financial structures, Stock Exchange listings and so forth.

Our insurance companies are a dominant force in our investment industry. The Big Three are the Old Mutual and Sanlam (both based in Cape Town) and Liberty Life, which is based in Johannesburg and listed on the Johannesburg Stock Exchange. Sanlam is linked to one of our major mining houses, Gencor, and has interests in property and business all over the country. But it has a limited interest in extending its activities outside South Africa.

The Old Mutual is the country's largest life insurance company and has material stakes in banks (notably Nedcor), diversified industrial groups (such as Barlows) and Property. It has moved into overseas activities and has been one of the UK's top performers in Mutual Fund Management over the past five years.

Liberty is closely allied to the Standard Bank and has strong interests in property, mutual fund management and various industrial activities. It has been active for many years in building up interests in the property and insurance industries in the UK.

There are several lesser but nevertheless strong members of the insurance industry and, like the banking industry to which it is closely linked, it is highly regulated, financially strong, computer literate and definitely first world.

MINING HOUSES

In my everday career, one of my major activities has been the monitoring of South Africa's Mining Finance Houses – though I have to admit I have not had as much time to follow them recently as I would have liked.

There are six of them of significance plus a few minor players. The majors are Anglo American (which is closely associated with De Beers), JCI (which is about to split into three separate components), Gencor (which has already split itself into a variety of components), Gold Fields of South Africa, Anglo Vaal and Barlow Rand's mining off-shoot.

Their origins lie largely in the gold mining industry and their original function was to explore mining projects, to finance the drilling and exploration of promising ore bodies, to look after the flotation of promising prospects and to provide the mining and geological expertise from the resources of the mining house itself to look after the needs of individual mines. During the life of a mine, the controlling house would, firstly, pour money into its establishment. Then it would be helped by outside backers. After that it would receive dividends from its successful projects and then sell its share holdings as the mine peaked and slowly ran into decline as its orebody was exhausted. The proceeds of the sales were used to start up a new cycle of exploration and development. Profits earned by the mines were placed in the money market by the mining house pending the payment of taxes or of dividends or outlay on capital expenditure. This activity led at an early stage to the participation of the mining houses in banking, insurance and, more particularly, in the money market. Much of the cycle of developing and managing the gold mines has remained the same, but as the most obvious and lucrative orebodies have been developed and exhausted, the houses have needed to turn their attention first to other metals and minerals and then to their benefication and, finally, on to general non mining industrial and financial operations. South Africa is still the major supplier of the World's gold, but it also has similar roles in diamonds, manganese, platinum and other platinoids, chrome and vanadium. Many of these, obviously, have been developed by our mining houses and it is for this reason that mining analysis and the analysis of mining houses have become an important area of specialisation in South Africa's market for investment analysts.

THE JOHANNESBURG STOCK EXCHANGE

My final section concerns the JSE.

When I received a communique from Ronaldo de Frota Nogueira that I was expected to speak to you for 45 minutes I was concerned as to how I would fill the time and whether I would bore you with what I had to say. I hope I haven't bored you, but certainly I have found so much I would like to tell you that I have only a limited amount of time to talk to you about the source of my livelihood (I have been a member of the Johannesburg Stock Exchange for 25 years) and the main institution with which the IASSA is associated.

For all my career as a stockbroker I have had to obey half a dozen precepts that I learned with great diligence from a thick book of Rules on which I became a Member. Many of these rules are about to be altered and although I have no doubt
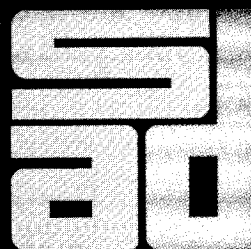
that they will bring us into line with the practice of other important international stock exchanges, many of us are unsure of where the changes will lead us personally.

The half dozen precepts (with many embellishments) were the following:

(i) We have an open outcry market. We stand on a Stock Exchange Floor and we receive orders to trade via telephones that are located to the side of the Floor. When members – or their Authorised Clerks – wish to trade in a stock (and there are about 750 equities listed on our market) we stand in front of the Board on which the shares are listed and we recite the name of the stock and our prospective trading price which is also recorded on the Board as a buyer's or a seller's price. When a counterparty to the order wishes to trade, we haggle about the price and, if we agree to one, a trade is effected.

(ii) We have an open market. When a trade is effected the price is recorded on the Board for all to see and a computer slip is completed. The computer slip records the names of the two brokers, the name, number & price of the shares we have traded and any special settlement terms on which the trade was effected. The slips are sent to the computer independently by both parties and are matched by the computer. If the computer cannot match the deals the two parties appear, at Query Time, after trading has ceased, on the Floor and have to resolve the mismatch.

(iii) A broker cannot sell from his own account direct to a client. And conversely we are not permitted to buy from a client for our own account. To put it another way, you cannot act in a dual capacity, as a jobber and a broker, in the same transaction. This has always been seen as important in avoiding abuse. It eliminates, for example, the temptation to buy shares for your own account and then sell them at an inflated price to clients who have placed their trust in you.

(iv) As an extension, a broker cannot sell from one of his clients to another (known as a book-over or a put-through) unless he goes through the intermediary of another broker to warranty that the price is equitable.

(v) Brokerage is on a fixed scale. The terms are laid down by the Committee in conjunction with the Registrar of Financial Institutions. They may have been fair or unfair but they were immutable and they were known. This rule has already been heavily modified and larger deals are subject to negotiated commissions.

(vi) Brokers are subject to unlimited liability. Members of a broking firm are individuals and if the firm goes bankrupt the individuals are liable to the full extent of their fortunes for all the amounts owed to clients and banks. The Clearing House System limits the extent of the losses and there is compulsory insurance to limit losses arising from fraud plus a Stock Exchange Guarantee Fund to protect clients. Three minor firms have defaulted in recent years but the losses to the public, whilst highly publicised, have been relatively minimal. As an adjunct to this, the Stock Exchange runs a sophisticated computer surveillance system, and if your firm fails to confirm to regulations regarding risk ratios or collecting funds timeously from clients you are visited in very short order by the Stock Exchange, which will have spotted your misdemeanour on its computer print outs.

These half dozen precepts were applicable to the JSE's Equity Floor, but were already being relaxed, out of obvious necessity, on the Gilt Floor (an entirely separate one from the Equity Floor) and in derivatives trading (housed in a different buil-

ding). In a few months' time our Equity Floor will also change to:

(i) Dual Capacity Trading, Brokers will be able to open trading positions in various securities and sell shares from their own books to their clients. They will become market makers.

(ii) Corporate Membership. Limited liability companies will be able to buy stakes in brokers.

(iii) Fully negotiated commissions.

(iv) Eventually we may move to a computer driven Equity Floor – as well as to a computer driven scrip bank.

As an investment analyst I welcome this move to a freeing up of the market, but as a stockbroker who has received his income from generating brokerage in an orderly, well regulated market I reserve judgement on what the next year or so will bring about for the traditional brokers. Many of us find it hard to judge how we will manage to compete with banks in making markets, how local banks will compete with overseas banks and how much disruption will occur to the market that we have long nurtured. I am hopeful that our fears will prove unfounded.

SUMMARY

So now I am near my end. I have told you about the origins and objectives of our Society, what it does, who our members are, who runs it, what its finances look like and where we may move.

I have also told you about South Africa's banks and insurance companies, its mining houses and why we specialise in mining analysis and I have also told you about our Stock Exchange and where I see it as moving.

I hope I have interested you and given you some ideas and I look forward to hearing from my counter parties in other societies about the problems they face and the opportunities they foresee in their own environment.

Haute Cuisine
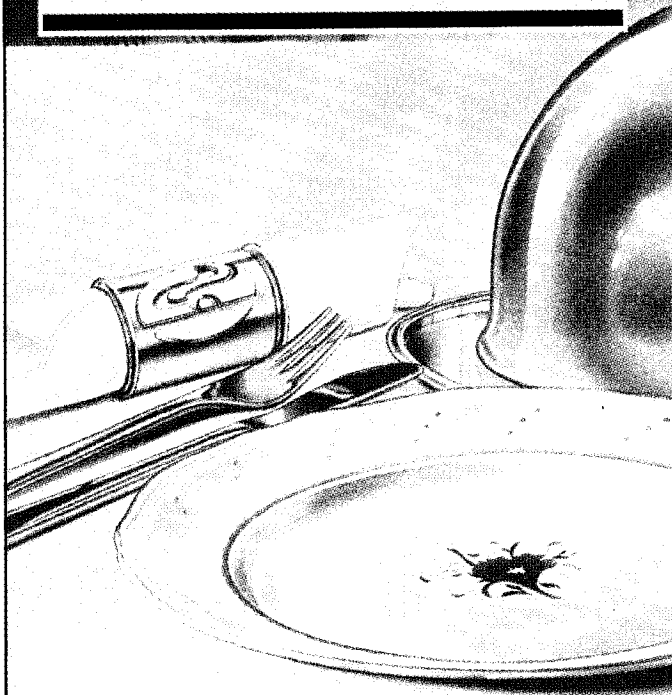
In a world of change, some things are so superlative that they transcend the rise and fall of trends to set enduring standards of their own. The Foodcorp group is steadily being developed into one of these.

Foodcorp owes its growing stature to:

The finely judged composition of its range, characterised by a prudent balance between staples and prepared foods.

The exceptional calibre of its products, reflected in the consumer support commanded by their brands.

The substantial manufacturing resources which equip it to be a high-quality, low-cost producer.

And, perhaps above all, the human effort which has sustained a consistently superior performance by the group.

FOODCORP

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

INTRODUCTION

The arguments in favour of capital regulation of commercial banks have been well documented in finance literature. For example, Koehn and Santomero (1980), Crouchy and Galai (1986), and Kim and Santomero (1988) recognize that regulators are concerned about the safety and soundness of individual banks as well as the banking systems as a whole. Since regulators are responsible for ensuring public confidence in the banking system, they want to ensure that managers are given incentives to maintain the institution's financial soundness. Capital standards are one way of providing these incentives. Also, as pointed out in an investigation by Dietrich and James (1983), equity capital reduces the risk to the insurers (government) that occurs when bank deposits are virtually fully insured by government agencies. From a bank's point of view, equity capital represents funds available for investment purposes, and also acts as a buffer against unanticipated earnings losses.

In July 1988, representatives from the central banks of twelve leading Western industrial countries approved a risk-based capital requirement for banks in their respective countries. This convergence of the regulations governing capital adequacy of banks represents a consensus among the industrial nations that the safety of the banking industry can be enhanced through control of a refined capital adequacy requirement. The Basle accord was intended to raise the capital bases of banks actively operating across national borders while levelling a significant dimension of the competitive arena by requiring uniformity in the new risk-adjusted capital requirements.

The capital adequacy requirements proposed by the Basle accord were incorporated in the banking legislation of South Africa. The regulations relating to minimum capital adequacy ratios for banks were gazetted on 30 November 1990 and became effective when the Deposit-taking Institutions Act of 1990 came into force on 1 February 1991. This Act prescribed the gradual phasing-in of the capital adequacy requirements, rising from 4,5% in January 1991 to 8% from January 1995.

Despite the importance of the Basle agreement, there is little empirical evidence with regard to its implications for the banking sector. Eyssell and Arshadi (1990) examined the wealth effects of the risk-based capital announcements on the share prices of 27 large United States banks. Based on market model analysis of residual returns, a negative stock market reaction was found to be associated with the initial announcement by the Federal Reserve proposing risk-based capital requirements for domestic banks on 24 January, 1986. Further, those banks with capital levels which were deficient relative to the mandated levels suffered the largest relative losses.

Cooper, Kolari and Wagster (1991) provided empirical evidence on the share market reaction of the perceived effects of risk-based capital requirements proposed by Basle accord on large international banks in the United States, Canada, United Kingdom, and Japan. They found significant declines in equity prices for United States, Canadian, and United Kingdom banks in response to the news announcement, with United States bank shares exhibiting the largest negative reaction. For Japanese banks, the share market reaction results were mixed, which may be due to uncertainty among investors regarding the handling of their sizeable hidden reserves under the new risk-adjusted capital rules.

Equally convincing arguments exist for and against higher capital requirements for the banking industry, but accurately assessing the true preference of the market can only be determined empirically. The objective of this study is to determine the share market's reaction to the 30 November 1990 announcement which mandated higher capital standards for the banking industry in South Africa. The results of this study may, by implication, indicate investors' preference or dislike of regulatory influence.

ARGUMENTS FOR HIGHER CAPITAL REQUIREMENTS

A higher proportion of capital results in less financial leverage and, therefore, more stable earnings, less risk of insolvency, and a greater ability to withstand the effects of rising interest rates. Thus, banks are perceived to be less risky from both the depositors' and investors' perspective. Wall (1989) states that the probability of failure is significantly affected by the level of capital. For banking institutions, capital regulations are imposed to ensure that they can weather unexpected losses (Haberman, 1987).

Whether stricter capital requirements should be applied across the board or be based on an individual bank's risk level is a debatable issue. Kim and Santomero (1988) suggest that the recent move to the risk-based capital regulation is potentially more effective. Some argue that more risky institutions should be required to maintain higher levels of capital than less risky ones (George, 1988). One proposal suggests that minimum capital requirements be established on a case-by-case basis according to the risk exposure of the banking institution (Santomero and Watson, 1977). "No life insurance company charges the same rates to a chain-smoking, alcoholic lion tamer as to a staid, churchgoing banker" (Jacobe and Smith, 1984).

Higher capital requirements would force banking institutions to slow their growth and, therefore, build capital by retaining internally generated funds (Allen, 1985). Some institutions may choose a multipurpose approach by reducing deposit interest rates, which would cause some depositors to take their funds elsewhere. This would result in a reduction of total liabilities, and, assuming that the equity capital level remained the same, the percentage of equity capital would increase (Kulczycky, 1986). Parliament (1985) reports that reducing size may be an overlooked solution to the new capital requirements for many banking institutions.

Jacobe (1988) argues that commercial banks in all major countries fit the role of poorly capitalized, overly leveraged financial institutions. Greater percentages of capital would tend to encourage a stabilization in the net worth positions of banking institutions and prevent unwanted take-overs (Sellers, 1985). The implication here is that greater industry stability would result. Increased capital requirements are necessary to bring stability to the banking industry that has been exposed to unacceptably high bad debt levels. Allen (1985) suggests that higher capital requirements will enable the banking industry to project an image of stability, profitability, astute management, and progessiveness with control.

ARGUMENTS AGAINST HIGHER CAPITAL REQUIREMENTS

Higher equity capital requirements translate into a higher cost

of capital for the banking industry as equity is more costly than debt. Furthermore, a higher capital ratio reduces anticipated returns on equity. Thus, equity investment in banking institutions may become less attractive to investors. This may precipitate a mass capital exodus from the banking industry and perhaps lead to its eventual stagnation (Allen, 1985). Jacobe and Smith (1984) state that most bank managers and their shareholders probably prefer relatively low net worth requirements. They argue that the lower such levels are, the easier it is for banking institutions to expand rapidly using debt financing, thus, increasing their financial leverage and their return on equity. According to Osterberg and Thomson (1989) imposing higher capital requirements may limit growth due to the cost of issuing additional capital. They provide evidence showing that leading banks in the United States, United Kingdom, Canada, and Japan were able to use their low ratios of capital to assets to maintain relatively high levels of return on equity.

Jacobe and Smith (1984) suggest that if banks reduced their risk, they could operate quite profitably with lower levels of capital. Under these circumstances, additional capital would hurt the industry by inhibiting the full benefits of leverage. According to Heggestad and King (1982), increased capital adequacy requirements will have an adverse effect on profit margins. Major commercial banks in the United States have operated for many years with little capital, arguing that their international competitors have been permitted to operate on a highly leveraged basis (Jacobe, 1988).

Requiring more capital may be less effective than increasing accountability as a means of reducing the banking industries' implicit risk. Generally accepted accounting principles routinely distort public perceptions of banking industry earnings and capital (Kane, 1985). Improved reporting would give depositors and investors a better chance to assess the risk themselves. According to Sanford (1985), regulations that increase market information may be the most useful. After all, economists have long acknowledged that the market is a far more efficient regulator than any bureaucratic agency could ever hope to be. Banks have found that "an alternative to growing assets on the books is to grow off the balance sheet. Mortgage banking, an activity in which large volumes of business can be generated without corresponding growth in assets, is one route banks are taking" (Kulczycky, 1986). The notion of improving reporting requirements is reinforced by increasing concern with off-balance-sheet risks that cannot be detected easily (Cooper, 1985). Cates and Davis (1987) suggest that bank managers and analysts may benefit from more widespread disclosure of off-balance-sheet activities as this would facilitate comparative analysis.

Couchy and Galai (1986) developed a model to evaluate the capital adequacy requirements that included three types of risks: business risk, financial risk, and default risk. Their analysis suggests that although capital adequacy requirements are imposed to ensure solvency, illiquidity, rather than lack of capital, is a primary cause of insolvency. Such results imply that increased capital requirements will not necessarily enhance the values of companies in the banking industry.

Santomero and Watson (1977) have investigated the concept of an optimal capital structure for the banking industry. They argue that the optimal degree of leverage for the banking system should be determined by the point at which the marginal public returns on bank capital precisely equal the marginal public costs of bank capital. Furthermore, Morgan (1984) argues that social costs may not be considered under some legal and political structures that may cause regulators to require more capital in the system than society may require. The underlying implication is that, through empirical evidence bank managers may have discovered that this marginal-

cost/marginal-return occurs at capital levels substantially less than imposed by regulatory authorities. If this is true, mandated higher capital requirements would have a negative impact on the market values of companies in the banking industry.

Modigliani and Miller (1958) argue that, in the absence of distorting factors such as asymmetric information, agency costs, bankruptcy costs, and taxes, a firm's capital structure is irrelevant in competitive markets. However, because distortions do exist, we perhaps could infer that capital structure is relevant. Smith (1986) cites empirical studies to support this notion by finding statistically significant negative share price reactions (approximately -3,14%) when industrial firms issue equity capital. Keeley (1989) found that the issuance of equity capital in order to satisfy capital adequacy requirements in the banking industry elicits a negative abnormal return. Furthermore, Keeley (1989, p 16) argues that this negative reaction probably results from signalling effects rather than from capital structure considerations.

Cornett and Tehranian (1994) have examined differences in share price reactions following voluntary capital issues (i.e., those not needed to achieve capital standards) and involuntary capital issues required to meet regulatory capital requirements. They provide evidence showing that share price declines associated with voluntary capital issues are significantly greater than those associated with involuntary capital issues. Whatever the underlying cause, empirical evidence overwhelmingly suggests that negative share price reactions ensue when the market anticipates the issuance of equity capital. This implies that the share prices of the banking industry may decline in value should they be compelled to issue equity capital in order to comply with mandated higher capital requirements.

DATA AND METHODOLOGY

In order to determine the market's reaction to an anticipated increase in capital requirements, the changes in share prices around the announcement date were assessed. All registered banks in the Bank and Financial Services sector of the Johannesburg Stock Exchange (JSE) at the time of the promulgation of the regulations (30 November 1990) were included in the sample for the investigation. The fourteen banks investigated are listed in Appendix A.

The standard event methodology was applied to the sample so that abnormal returns could be estimated for each bank around the announcement date. An estimation period ranging from 90 days to 6 days before the announcement was used to estimate parameters from the following market model:

$$R_{j,t} = b_0 + b_1 R_{m,t} + U_{j,t}$$

where :
$R_{j,t}$ = daily return of the j_{th} bank

$R_{m,t}$ = daily return of the market

$U_{j,t}$ = error term

b_0 = intercept

b_1 = COV $(R_{j,t}, R_{m,t})$ /VAR $(R_{m,t})$

The JSE Overall Actuaries Index was used as a proxy for the market. Daily share prices used to estimate returns were compiled from the data base of the JSE. The estimated parameters were applied along with actual market returns to derive expected returns for each bank over the examination period ranging from 5 days before the announcement to 10 days after the announcement:

$$\overline{R}_{j,t} = b_0 + b_1 R_{m,t}$$

Abnormal returns were then estimated over the examination period as:

$$AR_{j,t} = R_{j,t} - \overline{R}_{j,t}$$
$$= R_{j,t} - (b_0 + b_1 R_{m,t})$$

The abnormal returns for all banks were consolidated into an equal-weighted portfolio on each day over the estimation period:

$$AR_{p,t} = AR_{j,t} / 14$$

Each $AR_{p,t}$ was tested for significance with the following t-statistic:

$$t = AR_{p,t} / S(AR_{p,t})$$

where $S(AR_{p,t})$ represents the standard deviation of the portfolio of abnormal returns.

In addition to daily abnormal returns, selected intervals of abnormal returns for the portfolio were assessed to determine how the market reacted. The portfolio's cumulative abnormal returns for any interval are estimated as:

$$CAR_{f,l} = \sum_{t=f}^{1} AR_p$$

where f represents the first day of the interval and l represents the last day. To test each CAR for significance, the following t-statistic is used:

$$t = \frac{CAR}{S(CAR)}$$

where tne standard deviation of the portfolio's cumulative abnormal returns S(CAR) is estimated as:

$$S(CAR) = (T.VAR (AR_{p,t}) + 2(T-1)COV (AR_{p,t}, AR_{p,t+1}))^{\frac{1}{2}}$$

where T represents the number of days within the interval. The covariance term in the above expression accounts for first-order serial correlation of residuals within equations (Ruback, 1982). In addition, the residuals across equations may exhibit contemporaneous correlation. This cross-sectional dependence among the equations of the system (one equation for each bank) is likely to occur when firms in the sample belong to the same industry and the study has a common event date. Others have suggested forming a "portfolio" with the firms in the sample. The total returns on this portfolio could then be analyzed for abnormal performance relative to a certain event. The argument is that by examining the returns on a "single" portfolio, the contemporaneous correlation problem is no longer a relevant concern. For the present study, the estimated returns of banks were obtained using the portfolio approach. The results were virtually identical to the ones obtained using standard event study methodology. This study reports only the results using the portfolio approach.

The following hypotheses are tested:

H_1 : Higher capital requirements translate into higher cost of capital which may limit growth due to the additional cost of issuing equity capital to satisfy increased capital adequacy ratios. The additional capital requirements will erode the profitability of banks by inhibiting the full benefits of leverage. Therefore, the announcement of more stringent capital requirements is likely to lead to an adverse market reaction for shares of the banking sector on the JSE.

H_2 : The market values of the equities of the banking sector will be influenced by their respective capital positions i.e., the more deficient the capital level at the time of the announced regulatory change, the more adverse the expected market reaction.

EMPIRICAL RESULTS

The results of the event study methodology are presented in Table 1. The abnormal returns (AR_p) become negative five days before the official announcement of the increased capital requirements for banks. This may be attributed to the actions of company insiders who would have had advanced knowledge of the announcement related to capital requirements. The results confirm the findings of Bhana (1987, 1991) that company insiders who have access to privileged information related to shares listed on the JSE derive large benefits from trading in these securities.

TABLE 1
Abnormal returns surrounding the 30 November 1990 announcement mandating increased capital requirements for banks

Day relative to announcement date	Abnormal returns (AR_p)	t-value
t-5	-0,245	-0,436
t-4	-0,461	-0,742
t-3	-0,534	-0,863
t-2	-0,854	-1,437
t-1	-1,423	-2,625[a]
t = 0 (30 November 1990)	-1,647	-2,814[a]
t+1	0,314	0,578
t+2	-0,278	-0,449
t+3	-1,536	-2,615[a]
t+4	-1,712	-2,923[a]
t+5	-0,435	-0,714
t+6	0,342	0,613
t+7	0,539	0,931
t+8	0,217	0,514
t+9	0,443	0,887
t+10	0,668	1,102

Interval relative to announcement date	CAR	t-value
Days t-1 to t+1	-2,756	-3,015[a]
Days t-1 to t+2	-3,034	-3,246[a]
Days t-1 to t+3	-4,570	-3,783[a]
Days t-1 to t+4	-6,282	-4,921[a]

[a] significant at the 0,05 level

The abnormal returns were significant and negative on days t-1, t, t+3, and t+4. The reaction on day t-1 can be attributed to the anticipation of the announcement. On 29 November 1990, the Reuters news agency reported that a proposal for more stringent capital requirements would be announced the following day. In addition, the report correctly predicted the minimum level to be proposed. The strong market reaction on day t-1 suggests that the market did not wait for the news to become official.

On days t+1 and t+2, there was no significant market reaction. However, a significant negative reaction occurred again on days t+3 and t+4. The abnormal returns reported in Table 1 provides clear evidence of a negative market reaction to the expectation of more stringest capital requirements. This conclusion is further reinforced by the cumulative abnormal returns (CAR) reported at the bottom of Table 1.

Previous research by Fraser, Richards and Fosberg (1985) suggests that capital market participants may be able to distinguish between banking firms that are affected by a regulatory or economic change, and those that are not. This implies that the capital market participants are likely to react in a manner whereby the group of banks most likely to be affected by the

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In order to determine whether the market reaction per banking institution was influenced by respective capital positions, a cross-sectional analysis was performed. Capital ratios for all 14 banks investigated were obtained from their financial statements, and the following regression model was applied:

$$CAR_j = a_0 + a_1 CAP_j + U_j$$

where : CAR_j = cumulative abnormal return of the jth bank

a_0 = constant

CAP_j = capital ratio of the jth bank

a_1 = slope coefficient

U_j = error term

TABLE 2
Cross-sectional relationship between the capital ratio and cumulative abnormal returns of banking companies

$CAR_j = a_0 + a_1 CAP_j + U_j$					
Interval for CAR_j	a_0	a_1	Standard error of a_1	t-value	R^2
Days t-1 to t+1	-0,07	1,15	0,51	2,25[a]	0,23
Days t-1 to t+3	-0,17	2,51	1,23	2,04[a]	0,20
Days t-1 to t+4	-0,15	2,34	0,89	2,62[a]	0,28

[a] significant at the 0,05 level

APPENDIX A
Banks listed in the "Banks and financial services" sector on the JSE which are included in the sample

Allied Group Ltd.
Bankorp Holdings Ltd.
Boland Bank Ltd.
Cape Investment Bank Ltd.
Fidelity Bank Ltd.
First National Bank Holdings Ltd.
Investec Bank Ltd.
Investec Holdings Ltd.
NBS Holdings Ltd.
Nedcor Ltd.
Saambou Holdings
Standard Bank Investment Corporation Ltd.
UBS Holdings Ltd.
Volkskas Group Ltd.

The results of the cross-sectional analysis are disclosed in Table 2. Three different definitions (intervals) of CAR_j were used, and a separate regression model was run using each interval as the dependent variable. A significant cumulative abnormal return existed for each of the three intervals chosen (see Table 1). As shown in Table 2, there is a significant positive relationship between the cumulative abnormal return and the capital ratio. Since the CAR_s were negative, the results imply that the market reaction was more unfavourable for share prices of banks with less capital. It appears that the steps needed to achieve the new capital requirements are anticipated to have more adverse effects on banks with less capital. The market reaction reveals that investors prefer capital decisions by banks not to be constrained by regulations. That is, the optimal level of capital adequacy is less than the minimum level imposed by regulators of the banking industry. These banks may need to issue more equity capital or restrict growth to a greater degree in order to satisfy the new guidelines. The stock market has penalized banks because of these ramifications.

Overall, the results imply that any anticipated favourable effects of increased capital standards are more than offset by potential disadvantages. The most likely concern of investors is anticipation of additional share issues by the banks to meet the capital standards, which has consistently been found to result in lower share prices for firms in a variety of industries, including the banking industry. Investors appear to believe that the regulatory constraints on the capital structure may not only restrict growth but also prohibit banks from maximizing firm value.

The results of this investigation support both the hypotheses propounded to explain the share market response to exogenously influenced capital requirements. In sum, the empirical evidence is consistent with the following: first, the large negative residuals observed around the announcement date suggests that market participants generally viewed the imposition of risk-based capital requirements with disfavour. Second, the market reacted speedily to the regulatory announcement. Third, those banks with capital levels which are deficient relative to the mandated levels suffer the largest relative losses.

DISCUSSION

The results of this investigation confirm the widely held belief that the market is a far more efficient regulator than any regulatory agency. Measuring the economic effects of regulation is of interest to the investment community and to regulatory authorities. The empirical evidence suggests that unanticipated changes in regulation usually cause concurrent negative changes in share prices. Jarrell and Peltzman (1985) provide evidence showing that the capital market penalizes companies subjected to regulation far in excess of direct costs of meeting regulatory requirements. The excessive costs are indirect costs which have a greater effect on firm value than implied by immediate, unexpected outflows (reduced inflows) of funds.

Fields, Ghosh, Kidwell and Klein (1990) showed that the announcement regulating insurance companies in California resulted in a 6,9% decline in share prices. Evidently, investors perceived the change from a market to a regulatory pricing system as reducing the value of insurance companies' shares. Dowdell, Govindraj, and Jain (1992) investigated the impact of stringent packaging regulations on the share prices of the pharmaceutical industry. Companies in this industry experienced large statistically significant negative abnormal returns which were far in excess of the anticipated costs related to the packaging regulations alone.

The results of this investigation indicate investors' dislike of regulatory influence on the banking industry. Therefore, a strong case can be made for the further deregulation of the banking industry in South Africa. Pringle (1974) has shown that where shareholder interests are controlling, the key determinants of optimal capital policies for banks are future oriented, i.e., expectations regarding future loan demand, deposit levels and financing costs. Capital adequacy guidelines based on static balance sheet ratios, the usual regulatory approach, thus have little relevance to shareholder interest. Pringle (1974, p. 793) concludes that since risk is a function of factors peculiar to individual banks, no single set of quantitative capital adequacy guidelines can be valid for all banks.

Crouchy and Galai (1986) evaluated the empirical evidence to determine whether the substantial effort devoted to "capital adequacy" by regulators is worthwhile. They show that ratio tests for capital adequacy have not been useful in predicting bank failure, that other means of protecting depositors and promoting confidence are more effective than regulating capital, that market-determined capital positions are preferable from the standpoint of the functioning of banks as financial

intermediaries, and that regulatory guidelines regarding capital adequacy are largely ignored by banks anyway. Considering all the evidence, they argue that a case exists for de-emphasizing the regulation of bank capital and placing more emphasis on the use of increased financial disclosure and market data in the regulatory process.

Mehta, Eisemann, Moses and Deschamps (1979) have shown that the probability of failure and the impact of leverage on the unsystematic risk of banks is reflected in share prices. This implies that bank regulators can obtain valuable information from bank share prices. They also show that banks with actively traded shares produce two-tiered betas: one tier for "problem" banks and another tier for "normal" banks. Regulators who have detailed knowledge of the firm-specific risks of individual banks are able to concentrate their efforts towards banks which are in the "problem" tier.

Market-based measurement of the adequacy of bank capital regulation could be a highly useful tool in the regulator's arsenal. It is not suggested that policy could be determined solely on such measures; however, a greater reliance on bank share prices and betas could produce benefits. One advantage for a regulator employing these techniques is the rapidity with which feedback on the optimality of regulation is received. Although the requirement of actively traded shares limits the number of banks to which the theory can be applied in practice, it is also with these large banks (that accepts large amounts of deposits) that the greatest benefits to efficient allocation can be realized. A second advantage is that the use of market measures allows regulators to appeal to bank management on a much less subjective basis. The judgement on capital adequacy is no longer a regulator's subjective one but that of bank shareholders and bank management. This may be the most convincing argument for the use of market data in the regulatory process, especially to a regulator who is frequently confronted by bankers' accusations of arbitrariness and pleas to "let the market regulate us".

SUMMARY AND CONCLUSION

The imposition of risk-based capital requirements has been advocated by the regulatory authorities as a means of controlling bank risk-taking. This paper has examined the degree to which banks of various sizes may be affected, and the valuation effects on a sample of banks which differed in their degree of compliance. The main finding is that, as hypothesized, announcement of the regulatory change was viewed by capital market participants as generally unfavourable. Further, those banks most likely to be affected, i.e., those whose capital ratios were deficient at the time of the announcement, suffered the greatest value losses.

The results of this investigation confirms the observation that the capital market penalizes those companies that are subjected to regulation. Capital adequacy ratios tend to be subjective and may be less effective than improved financial reporting which would provide depositors and shareholders with a better method of assessing the risk themselves. Banking literature provides substantial evidence that supports the case of de-emphasizing the imposition of capital requirements and placing more emphasis on the use of increased financial disclosure and firm-specific market data as a means of regulating the banking industry.

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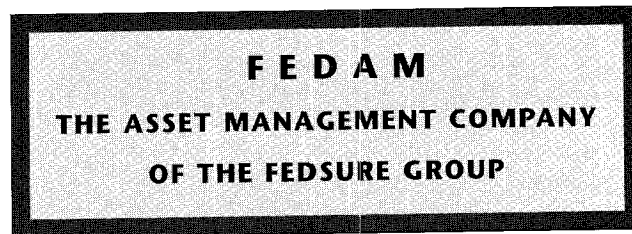
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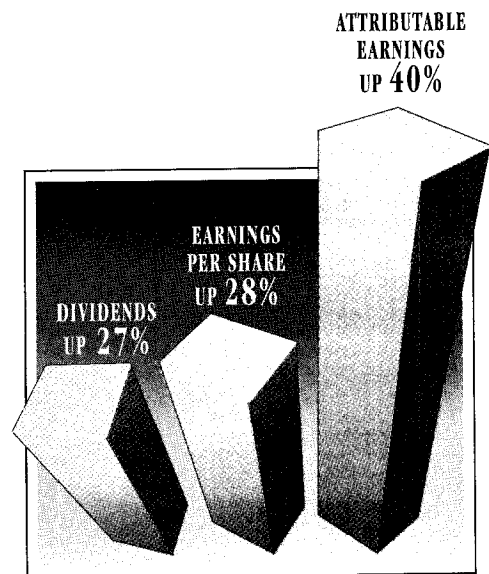
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Equity Instruments

1. INTRODUCTION

Corporate financial managers requiring external funds have essentially two sources – debt and equity. The fundamental principles underlying the choice between the two are well defined and generally well understood. However, having selected the route of equity funding the issues surrounding the selection of a particular equity instrument are less clear.

Most rights issues in South Africa have been issues of ordinary shares. However, as a result of the taxation differentials which exist between issuers and institutions there are often economic advantages to an issue of convertible debentures instead of ordinary shares. This paper shows that there is little economic advantage to the issue of preference shares over ordinary shares.

The paper discusses the merits of these different equity instruments, using worked examples. A number of other issues are also considered, including the taxation effects, pricing, tradeability, timing and underwriting. Finally, the advantages and disadvantages of a scrip dividend issue are examined.

2. EQUITY INSTRUMENTS

There is a growing trend for companies to raise equity capital on the Johannesburg Stock Exchange ("JSE") by means other than a conventional rights issue of ordinary shares. Although a variety of equity type instruments exist, the three most common are:
- ordinary shares;
- preference shares/convertible preference shares; and
- convertible debentures.

2.1 Ordinary shares

An offer of new ordinary shares is the most straight forward means of raising equity capital and is readily understood and accepted by the market.

A rights issue is usually priced at a 10 to 15% discount to the current share price. The discount is offered to provide an incentive to shareholders to take up the new issue and to allow for possible fluctuations in the share price between the announcement of the rights issue and the listing of the new shares. Although the discount will result in a dilution of future earnings, shareholders are not disadvantaged in any way since they themselves can either take up the new shares at the discounted value, or sell their shares and entitlement to the new issue on the market at fair value. In any rights issue, the rights are listed and traded separately in the form of a nil paid letter ("NPL"). The value of the NPL will reflect the value of the discount on the new shares to the underlying existing shares and NPLs can be sold by existing shareholders without the shareholders selling their original shares.

Ordinary shares are a relatively expensive means of funding a business as dividends are paid out of after tax income and,

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1. This is only true if the funds raised are employed in the production of income. The use of debentures to acquire another company may result in the non-deductibility of the interest charge.
2. There are several variations with regard to the structure and method of conversion for convertible debentures. For the purposes of this paper it will be assumed that the convertible debenture has a fixed coupon and is converted in the year following the financial year in which the dividend on ordinary shares equates or exceeds the coupon.

furhtermore, subject the issuer to additional taxation in the form of secondary tax on companies (STC). Recipients of dividends such as life funds and pension funds cannot utilise advantageous tax positions.

2.2 Preferred ordinary shares and convertible preference shares

Preferred ordinary shares and convertible preference shares are identical to ordinary shares except that they carry a fixed dividend payment which is usually higher than the dividend on ordinary shares. In the case of convertible preference shares the preference dividend lasts for a limited period of time.

Preferred ordinary/convertible preference shares can be issued at a premium to the current price of the ordinary shares as they carry a higher dividend. The premium over the ordinary shares can be calculated as the present value of the expected difference in dividend between the two up until conversion. Preference shares are less risky than ordinary shares because the dividend stream is more certain and less volatile. Furthermore, preference shareholders have prior claim over ordinary shareholders on the assets of the company in the event of bankruptcy. For these reasons the cost of capital with regard to preference shares is slightly lower than the cost of ordinary share capital. The lower cost of capital serves to increase the value of the premium at which they can be issued.

Although more cash (per share) is paid out in terms of the higher dividend, the issue of convertible preference shares typically results in fewer shares being in issue on conversion than would have been the case had ordinary shares been issued. (Refer to paragraph 3.1.1 for a more accurate discussion on the dilution effects).

In South Africa the conversion of convertible preference shares into ordinary shares is often linked to the year following the financial year in which the dividend on ordinary shares equates or exceeds the preference dividend.

Based on the following illustrative example using data relating to Sun International (Bophuthatswana) Limited ("Sunbop"):
- Sunbop's recent share price of approximately 3 000 cents per share;
- Sunbop's dividend per ordinary share for the period ending 30 June, 1994 of 132 cents;
- an anticipated ordinary dividend growth rate of 15% p.a.; and
- a fixed dividend on the convertible preference share of 250 cents per share (i.e. an initial dividend yield of 8,3% – being approximately twice Sunbop's current dividend yield of 4,4%),

the Sunbop convertible preference share could be issued at a price of 3 139 cents per share (refer **Table 1**). Conversion would take place at the start of year five.

If the preference share were actually issued at a 10% discount, say an issue price of 2 825 cents per share, 3,54 m preferred ordinary shares would have to be issued to raise R100 m as opposed to 3,70 m ordinary shares issued at 2 700 cents per share (a 10% discount to the current share price of 3 000 cents).

Should the anticipated growth of Sunbop's dividend be greater than 15%, the preference shares will convert earlier and the premium over the ordinary share price would be lower.

It should also be remembered that dividends paid to non-residents will attract 15% non-resident shareholder tax ("NRST") and as with ordinary shares, life funds and pension funds cannot utilise advantageous tax positions on dividend receipts.

TABLE 1
Valuation of Sunbop's preference shares

Year	1995	1996	1997	1998	1999	2000
Preference Dividend (c) (after STC)	250,0	250,0	250,0	250,0	250,0	319,2
Ordinary Dividend (c) (after STC)	158,7	182,5	209,9	241,4	277,6	319,2
Difference	91,3	67,5	40,1	8,6	-27,6	0,0
Present value of the difference @ 20%*	**139**					
Share price (Cents)	3000					
Price of preference shares (Cents)	3139					

* The cost of equity capital (the discount rate) is assumed to be 20% for simplicity.

2.3 Convertible debentures

In essence, a convertible debenture is a debt instrument paying a fixed coupon for a determinable period before converting to an ordinary share.

Debentures have a major tax advantage[1] over the equity instruments mentioned above because the coupon is treated as interest and is tax deductible to the issuer. Certain holders of the debentures have a different tax rate to the issuer on interest received, ranging from 43% for individuals to zero in the case of life assurers and pension funds. Furthermore, no NRST is payable on the interest (coupon) received by non-resident debenture holders.

As with convertible preference shares, conversion is often (in South Africa) linked to the dividend payment on ordinary shares.[2] This creates some uncertainty as to the time period to conversion. As with a convertible preference share, should the company grow faster (slower) than anticipated a convertible debenture is relatively inexpensive (expensive) because the net amount of interest paid will be somewhat less (more) than expected. This is not an important issue, particularly in an efficient market where the time period to conversion cannot be accurately forecasted.

The principles involved in the pricing of a convertible debenture are similar to those in pricing convertible preference shares. The major differences relate to the tax deductibility of the interest payments versus the after tax dividend payment and the tax status of the recipient shareholders. It can be argued (since convertible debenture holders (usually) have prior claim over preference share holders on the company's assets in the event of bankruptcy) that convertible debentures are less risky and should be discounted at a lower rate than preference shares. Furthermore, the dividend stream on a debenture is fixed and known and therefore less risky than that from an ordinary share. The discount rate used to value the convertible debenture should therefore be lower than the cost of ordinary share capital and the cost of preference share capital.

The pricing of a convertible debenture issue is dependent upon the following information:
- coupon rate (typically set such that the issuer is cash flow neutral)
- coupon frequency (typically half yearly in arrears);
- conversion ratio;
- dividend policy on ordinary shares;
- ordinary share price;
- risk free rate; and
- conversion date.

Were Sunbop (for example) to issue convertible debentures paying an annual coupon of 300 cents and convertible on a one for one basis in the year following that in which the dividend on ordinary shares equalled or exceeded 300 cents per share then the issue price for different categories of shareholder would be as shown in table 2.

As can be seen from table 2 there is considerable variation in the value of the convertible debentures for each type of shareholder as a result of their different marginal tax rates on interest income. Convertible debentures are issued via a rights issue and must be offered to existing shareholders. The actual issue price will therefore depend (to some extent) on the mix of shareholders, although it can be argued that the market price will be determined by the Life and Pension funds, because of their advantageous tax position. Table 2 also shows that there is considerable value to the issuer (Sunbop), being an after tax cost of only 195 cents per convertible debenture versus a preference share dividend of 250 cents per share as illustrated above. Futhermore, only 3,3 m convertible debentures need be issued at 3000c each to raise R10um.

Whilst ordinary debentures are essentially debt instruments, convertible debentures which are likely to convert within a 5 year period (say) are considered to be equity from an accounting perspective. Consequently, a convertible debenture issue will be treated as new equity from a Debt/Equity perspective and at the same time provide debenture issuers with the tax benefits of a debt instrument. Convertible debentures have two other important advantages over ordinary shares:
- no marketable securities tax ("MST") is payable on the transfer of listed debentures; and
- a company can re-purchase its own listed debentures.

3. EVALUATION OF ALTERNATIVE EQUITY INSTRUMENTS

There are a number of other considerations with regard to the choice of an equity instrument and the three types of equity instruments discussed above are evaluated on the basis of:
- cost to the issuer and return to the holder;
- voting rights;
- complexity; and
- tradeability.

3.1 Cost to the issuer and return to the holder

It is important to understand that there is an inherent trade-off between the returns received by the shareholder and the Receiver of Revenue and the costs borne by the issuer. It is in fact a "zero sum game".

In the discussion that follows the various types of instruments are compared to the returns and cost associated with ordinary shares.

3.1.1 Preference shares

The dividend receipts from preference shares over ordinary shares are tax neutral. (Non-resident shareholders not withstanding, pay 15% NRST on preference dividends *and* on or-

TABLE 2
Valuation of a convertible debenture under various taxation scenarios

Holder of debenture is a SA Company – marginal tax rate 35%

Year		1995	1996	1997	1998	1999	2000	2001
Coupon on debenture (Cents)		300,0	300,0	300,0	300,0	300,0	300,0	351,1
After tax (35%) cost of coupon to Sunbop		195,0	195,0	195,0	195,0	195,0	195,0	
After tax receipt by lender @:	35%	195,0	195,0	195,0	195,0	195,0	195,0	351,1
Ordinary Dividend (Cents) growing @	15%	151,8	174,6	200,8	230,9	265,5	305,3	351,1
Cost of dividend to Sunbop after STC @	25%	189,8	218,2	250,9	288,6	331,9	381,7	438,9
Difference		43,2	20,4	-5,8	-35,9	-70,5	-110,3	0,0
Present value @ 20%	**-36**							
Share price (Cents)		3000						
Price of convertible debenture to SA Company		2964						

Holder is a SA Individual – marginal tax rate 43%

Year		1995	1996	1997	1998	1999	2000	2001
Coupon on debenture (Cents)		300,0	300,0	300,0	300,0	300,0	300,0	351,1
After tax (35%) cost of coupon to Sunbop		195,0	195,0	195,0	195,0	195,0	195,0	
After tax receipt by lender @:	43%	171,0	171,0	171,0	171,0	171,0	171,0	351,1
Ordinary Dividend (Cents) growing @	15%	151,8	174,6	200,8	230,9	265,5	305,3	351,1
Cost of dividend to Sunbop after STC @	25%	189,8	218,2	250,9	288,6	331,9	381,7	438,9
Difference		19,2	-3,6	-29,8	-59,9	-94,5	-134,3	0,0
Present value @ 20%	**-116**							
Share price (Cents)		3000						
Price of convertible debenture to SA Individuals		2884						

Holder is a SA Life and Pension Fund – marginal tax rate 0%

Year		1995	1996	1997	1998	1999	2000	2001
Coupon on debenture (Cents)		300,0	300,0	300,0	300,0	300,0	300,0	351,1
After tax (35%) cost of coupon to Sunbop		195,0	195,0	195,0	195,0	195,0	195,0	
After tax receipt by lender @:	0%	300,0	300,0	300,0	300,0	300,0	300,0	351,1
Ordinary Dividend (Cents) growing @	15%	151,8	174,6	200,8	230,9	265,5	305,3	351,1
Cost of dividend to Sunbop after STC @	25%	189,8	218,2	250,9	288,6	331,9	381,7	438,9
Difference		148,2	125,4	99,2	69,1	34,5	-5,3	0,0
Present value @ 20%	**313**							
Share price (Cents)		3000						
Price of convertible debenture to SA life and pension funds		3313						

dinary dividends and are thus equally tax neutral). Because the Receiver of Revenue neither gains nor loses with the issue of preference shares over ordinary shares any gains or losses must be between the issuer and the holder. Convertible preference shares are perceived to be attractive to shareholders due to the higher dividend received up until conversion. However, the advantage of the higher dividend is offset by the purchase premium upon issue. Preference shares will only offer superior returns if the growth in the dividend on ordinary shares is slower than expected and conversion is delayed. In this instance shareholders will receive a higher dividend for longer than originally anticipated. In an efficient market one cannot predict this.

From the issuer's perspective it is often assumed that fewer preference shares need to be issued to raise the required capital than would be the case with ordinary shares, as shown earlier. However, it can be shown that if the same number of preference shares are issued as ordinary shares, then the premium raised on issue of the preference shares is equivalent to the present value of the excess dividend to be paid on the preference shares. So, for a valid comparison in terms of

funds raised for operations, the company needs to issue as many preference shares as ordinary shares. There is in fact no real dilution advantage to issuing preference shares in terms of earnings or dividends per share and hence no real advantage to the issuer.

If the issuing company is for one reason or another not paying tax then the cost of debt financing (including debentures) increases and an equity issue of ordinary or preferred shares may be particularly attractive.

3.1.2 Convertible debentures

Convertible debentures hold major advantages over ordinary shares (provided the holder's marginal tax rate is lower than the issuer's) because the Receiver of Revenue is prepared to forego a portion of his income.

The after tax cost to the issuer of a convertible debenture is $(1-T_c)^*$ coupon (where T_c is the corporate tax rate). This is likely to be nearly half the cost of the dividend and STC on an equivalent ordinary share.

Interest receipts are taxable in the hands of the holder at the holder's marginal tax rate. If the issuer and the holder have the same marginal tax rate then there is no net gain from the Receiver of Revenue through the issue of convertibles – what the issuer gains the holder loses. However, to the extent that the holder's marginal tax rate is lower than the issuer's there will be a net gain ("sweetener") calculated as shown in table 3:

TABLE 3
Value of the sweetener

Year		1995	1996	1997	1998	1999	2000
Coupon on convertible debenture (Cents)		100,0	100,0	100,0	100,0	100,0	115,0
After tax (35%) cost of coupon to issuer	35%	65,0	65,0	65,0	65,0	65,0	143,8
After tax receipt by coupon holder*	10%	90,0	90,0	90,0	90,0	90,0	115,0
Ordinary dividend (cents) growing @	15%	57,2	65,8	75,6	87,0	100,0	115,0
Cost to issuer after STC @	25%	71,5	82,2	94,5	108,7	125,0	143,8
Total value of the sweetener		39,3	41,4	43,9	46,7	50,0	0,0
Present value @ 20%	**130**						
Value of initial coupon	**100**						
Percentage of initial coupon:	130%						
Difference in marginal tax rates:	25%	*Assume, for example, the holders marginal tax rate is 10%					
No of Years to Conversion:	4						

Table showing the value of the sweetener as a percentage of the initial coupon

		Years to Conversion						
	130%	2	3	4	5	6	7	8
	-10%	24%	26%	25%	23%	20%	16%	12%
Marginal tax rate of	-5%	35%	39%	40%	39%	38%	35%	32%
the issuer	0%	45%	51%	55%	56%	56%	54%	52%
–	5%	56%	64%	70%	73%	74%	73%	72%
marginal tax rate of	10%	66%	77%	85%	89%	92%	93%	92%
the holder	15%	77%	90%	100%	106%	110%	112%	112%
	20%	87%	103%	115%	123%	128%	131%	133%
	25%	98%	116%	130%	139%	146%	150%	153%
	30%	109%	129%	145%	156%	164%	169%	173%
	35%	119%	142%	159%	172%	182%	189%	193%

If follows that convertible debentures are particularly attractive to Pension and Life funds because these funds are not taxed on interest receipts and can hence take full advantage of the tax differential. Conversely, convertible debentures are less attractive when the difference between the marginal tax rates of issuer and holder are low or even negative.

Convertible debentures are typically (although not necessarily) issued such that they are cash-flow neutral to the issuer, ie: whether the issuer pays dividends or interest he pays the same *cash* amount. Furthermore, the issue of convertible debentures has the effect of lowering the company's cost of capital since it is reasonable to assume that shareholders will require an equivalent return from convertible debentures to their return from ordinary shares. However, because the coupon is tax deductible to the issuer the cost of issuing convertible debentures (which will ultimately convert to ordinary shares) is less and hence the weighted average cost of capital is lower.

3.3 Voting rights

Convertible debentures and convertible preference shares carry no voting rights up until conversion whereas ordinary shares typically carry full voting rights.

3.4 Complexity

Ordinary shares are readily accepted and understood by all categories of shareholders. Preferred ordinary shares, convertible preference shares and convertible debentures, on the other hand, may be more complex due to the issues of pricing and conversion.

3.5 Tradeability

Ordinary shares are readily tradeable for most listed compa-

nies on the JSE, although there are some notable exceptions. There are approximately 20 companies with convertible instruments listed on the JSE. The tradeability varies considerably amongst these, but in general, convertibles are poorly traded. An issue of a convertible instrument needs to be large enough to permit a reasonable level of tradeability to ensure the issue is correctly priced and traded.

3.6 Timing

In an effort to minimise the dilution effects of a rights issue companies often attempt to time the market. If the issue can be brought to the market when the underlying share price is highest then fewer shares need be issued to raise the required capital and hence there is less dilution of earnings. In an efficient market however, the share is equally likely to go up as it is to go down and it can be shown that there are no timing advantages to issuing convertible debentures because the share price is perceived to be low. If company insiders have negative information which is not yet publically available they could time the market to effect, but at the cost of future credibility.

3.7 Underwriting

It is a requirement of the JSE that new issues be underwritten. The standard underwriting fee is 1,5% of the amount underwritten – unless there exist circumstances to increase or decrease the "risk premium".

4. SCRIP DIVIDEND

Scrip dividend issues or capitalisation issues have been popular methods of retaining equity for some time now. A scrip dividend offers shareholders shares in lieu of a cash dividend and

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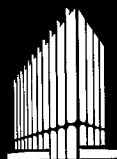
can be viewed as mini rights issue of ordinary shares.

4.1 Introduction

A scrip dividend is an alternative to the above mentioned equity fund raising options. It amounts to an offer to shareholders to receive, at their election, ordinary shares in lieu of a cash dividend and although akin to a rights issue, a scrip dividend has a number of advantages:
- underwriting is not required;
- the market risk period is shorter because scrip dividend issues can be implemented more quickly;
- it is less expensive from an administrative perspective; and
- it satisfies the requirements of shareholders who require cash and those who do not, the so called "clientele" problem.

4.2 Pricing mechanism

A currently acceptable method to determine the offer price of the new scrip is to take the current market price of the ordinary share less the amount of the dividend and a discount of 5-10%. Appendix 1 presents an analysis of recent scrip dividends and the discount/premium to the market on the announcement date.

APPENDIX 1
RECENT SCRIP DIVIDENDS

NAME	ANNOUNCEMENT DATE	PREMIUM (DISCOUNT) TO MARKET ON ANNOUNCEMENT DATE	ACCEPTANCE LEVEL
PRE STC			
AMIC	05/03/93	(3%)	96,8%
African Life Assoc.	24/04/92	43%	93,5%
Autopage Holdings	07/05/90	6%	69,0%
Bankorp (90)	05/10/90	(0,8%)	81,1%
(91)	28/02/91	(12%)	90,8%
(92)	20/03/92	5%	87,0%
Barlow Rand	11/11/92	(8%)	83,7%
Boumat	04/06/91	(12%)	43,0%
Common Fund	10/08/92	(5%)	89,1%
Crusader Life	21/10/91	(22%)	84,0%
DPF Inv	09/11/90	(10%)	58,0%
Focus	30/10/90	4%	57,0%
Genrec	11/08/90	30%	83,0%
Kersaf	24/02/92	(13%)	98,0%
Musica	29/06/90	(17%)	90,9%
Natal Ocean Trawling	31/03/92	0%	90,4%
Nedcor (90)	12/11/91	(1%)	92,3%
(92)	08/05/92	(6%)	81,0%
SAB	08/05/92	(6%)	90,9%
Safren	01/03/92	(13%)	94,6%
	09/09/92	(9%)	74,6%
SBIC	04/08/92	(2%)	96,8%
Smart Ctr Hld	02/05/92	0%	92,8%
Sunbop (91)	08/08/91	(12%)	72,1%
(92)	09/01/92	(15%)	98,7%
Tiger Wheels	24/09/90	7,1%	72,1%
Time Holdings	20/03/91	(23%)	66,0%
Trabild Group	18/03/91	32%	78,4%
Yabeng	18/06/92	(11%)	88,1%
York Timber (90)	02/08/90	37%	91,0%
(91)	07/02/91	(13%)	77,0%
POST STC			
African Life Assoc.	06/05/93	(12%)	96,9%
Imperial Hld.	26/08/93	(17%)	93,8%
Liberty Investors	18/09/93	4%	29,3%
Liberty Life Assoc.	18/09/93	21%	94,7%
Liberty Life Hld.	18/09/93	(2%)	28,6%
Nedcor	01/05/93	(12%)	95,7%
Smart Centre	02/04/93	1%	64,3%
Southern Life Assoc.	10/05/93	4%	85,7%

4.3 Basis for determining the ratio of shares to be offered

On the basis that the company has decided to undertake a scrip dividend offer, the overriding objective should be to retain the maximum amount of cash. Shareholders should be given the fullest possible information by way of a personalised computer printed form which indicates the shareholder's maximum entitlement and cash resulting from fractional entitlements. The scrip entitlement is calculated as follows:

$$\text{Scrip dividend entitlement} = \frac{\text{Dividend per share} \times \text{No. of shares held}}{\text{New share issue price}}$$

4.4 Comment

Most of the advantages listed in 4.1 are only advantages if one compares a scrip dividend with a rights issue of ordinary shares. However, dividend theory suggests that companies which require additional equity funding for superior investment opportunities should not pay a dividend at all. Furthermore, the introduction of STC at 25% makes the payment of dividends unattractive to almost all shareholders. Because of the high issue and administrative costs a scrip dividend is an expensive way of allowing the market to confirm the theory. Appendix 1 shows that the acceptance levels for most of the recent scrip dividends were in excess of 90%. From an economic perspective it is arguable that companies contemplating a rights issue should already be simply foregoing the dividend.

5. SUMMARY

This paper presents an analysis of four different equity-type instruments used in South Africa.

A rights issue of ordinary shares is a readily understood and accepted method of raising equity capital.

Preferred ordinary shares and convertible preference shares are less risky than ordinary shares but have no other significant advantages over ordinary shares.

Convertible debentures can have a major tax advantage over ordinary shares. The accounting treatment of convertible debentures is essentially to treat them as equity. The major disadvantage of convertible debentures is that they are relatively more complex and poorly traded. This could result in a discount to the theoretical premium on the instrument.

A scrip dividend provides an attractive mechanism to retain share capital. It may however, not be a viable means of raising a significant amount of equity capital.

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The efficiency of the South African Capital Market

I INTRODUCTION

There is, of course, a huge international literature regarding the Efficiency of asset markets, generally, and on share market efficiency, particularly.[2] This literature is not confined to 'large' markets, but includes a number of examinations of 'small and/or 'thinly capitalized' markets.[3] In addition to this international literature, there are a significant number of studies of the efficiency of the S.A. share market.[4] It is not too much to suggest that this literature, taken as a whole, indicates that a large number of share markets, including those in 'small' markets, are at least weak-form efficient. Or, as Jensen has said, "there is no other proposition in economics which has more empirical evidence supporting it than the efficient markets hypotheses."[5]

In sharp contrast, there is a paucity of literature regarding the efficiency of the bond, or gilt, market. Internationally, the major such studies are those of Keim and Stanbaugh (1986), Campbell (1987), Fama and French (1987), Harvey (1991), and Ferson and Harvey (1991). These studies all concluded that the capital markets in the large markets studied were, indeed, at least weak-form efficient.[6]

For 'small' markets, there are but two extant such undertakings which we have been able to discover: one by Souter[7] using New Zealand data and, in South Africa, a 1988 study by Moore.[8] Souter's study employed 'standard' methodology in finding weak-form efficiency in the N.Z. capital market. In contrast, Moore's study was exceptionally limited in that Moore eschewed any tests of serial correlation and concluded there existed 'weak form' efficiency of the S.A. capital market based solely on his use of Runs tests. Thus, it is not too much to suggest that knowledge of the efficiency of the S.A. capital markets is limited in the extreme. We certainly do not suggest the present work is definitive; rather, we claim only that it adds to the stock of knowledge on the efficiency of the S.A. capital market, and, we would hope, will thus encourage further research into this all-too-understudied component of our financial markets.

II THE SOUTH AFRICAN GILTS MARKET

While, on average, the annual trading volume on the JSE equity market is only about 4% of its total market capitalisation, the S.A. Gilt market turned over fully 373%, or R746 370 million, of its total nominal value of bonds outstanding of approximately R200 000 million in 1993.[9] Put differently, the average daily turnover in 1993 was approximately R3 billion per working day on the JSE alone; and as "it is estimated that JSE turnover is equal to approximately 50% of total turnover, the turnover for the entire market is thus close to R6 billion per day on average."[10]

Despite the fact that the gilts market is considerably larger than the equities market, it has not been the subject of extensive research. Moore's 1988 study, mentioned above, employed data[11] for closing daily yields for ten of the larger and more heavily traded gilts (including the E 168, which is employed in this paper) for, what appears to be, an 18 month period from Jan. 1987 to June 1988.[12] Relying on Fama's seminal study,[13] Moore tested gilt market efficiency via the use of Runs tests. Following convention, Moore counted the actual of number of Runs of a given sign (positive or negative), and calculated the expected number of runs, for one, four, and nine-day differencing intervals. This enabled him to determine whether the expected number of runs differed significantly from the

actual number. He found that in only one case was the expected number of runs less than the actual number. Additionally, he calculated the expected number of runs of each sign, and compared these with the actual observed number in the data set. With the exception of one gilt, the S.A. Post Office 2008, this comparison suggested the existence of independence in prices. Finally, Moore compared the expected length of each run, by sign, with the actual run lengths in the data set. His results indicated that the actual distribution of run lengths was not markedly different than would have been expected under the assumption of independence. These tests, then, led Moore to the conclusion that "there is insufficient evidence to reject the hypothesis that the bond market (is) weak form efficient . . ."[14]

While not *directly* testing for market efficiency, the work of Hattingh and Smit[15] bears mention. This recent work was an attempt to discover the existence/non-existence of market anomalies in the market for the E 168 and R150 and, particularly, whether there were 'day-of-the-week' effects in these markets. They found such anomalies did, in fact, exist, suggesting, then, some level of market inefficiency.

III THE PRESENT STUDY

(a) The Underlying Data

In our study, we have employed daily data on Yields to Maturity (YTM) for the E 168 and R150, for the year 30/03/92 to 29/03/93; this data provide 261 data points for the daily series (or, 260 observations on *returns.*) The 51 weekly observations were derived by calculating the arithmetic mean of the 5-day daily observations.

Our decision to investigate these two gilts was neither arbitrary nor coincidental for these two gilts are, traditionally, among the most heavily traded in the gilts market. Indeed, of the 108 different bonds traded on the JSE in Nov. 1993, fully 11 291 trades, or 40% of all trades, were in the R150 or the E 168. Put somewhat differently, while the nominal value of all trades on the JSE in Nov. 1993 was R93,255 billion, fully R25,84 billion of these trades, or 27,7%, was in the R150 while R7,71 billion, or 8,26%, was in the E 168. Together, then, these two bonds/gilts constituted 35,98 percent of the value of all trades consumated.[16] Moreover, the liquidity of these two stocks is enhanced by both the market-making activities of the Reserve Bank and Eskom in trading in their own stock, and by the fact that these stocks are those seemingly most widely traded by international investors. Given the relatively high levels of liquidity of these gilts, which – of course – implies a rapid, if not instantaneous, response to new information, if tests on these stocks lead to the rejection of the null hypothesis of independence, it would not be too much to infer that the less liquid portion of the gilts market is almost certainly inefficient.

(B) Empirical Tests of Weak Form Market Efficiency

We have conducted rather conventional tests on the data. Specifically, we have tested for independence using Serial correlation tests and Runs tests, and we have employed a filter rule.[17] On the assumption that readers will be familiar with these conventional tests, we discuss our results below.

1 Serial Correlation Tests

As is well known, the serial correlation test measures the strength of the relationship between the value of a random vari-

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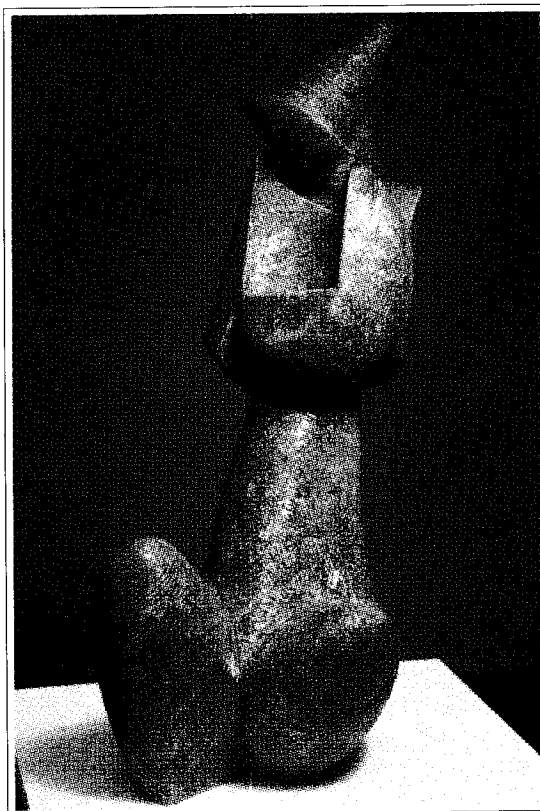
Figure: Cast Bronze Sculpture – Eduardo Villa

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able at the beginning of period t, and its value k periods earlier, i.e. the 'lagged' period(s). If the resulting correlation coefficient is not significantly different from zero[18], the variables may be presumed independent. Such a finding would, then, be evidence in support of the Random Walk hypothesis.

One difficulty, however, with the Serial correlation test is that it assumes stationarity and normality of the underlying data. In order to transform the data into a stationary distribution, we have – following convention – converted the holding period yield into natural logs and calculated the first differences thereof; this gives us a new series of the following form:

$$k_t = \log_e(YTM)_t - \log_e YTM)_{t-1}$$

The value of k_t, the holding period yield, has a constant mean and approximates normality. This transformation, then, permits us to invoke the assumptions of parametric tests.

Correlation coefficients for daily data, lagged 1 to 5 days, were then calculated. Similarly, for the weekly data, we have lagged k_t by 1 to 5 weeks. Our results are given in Tables 1A and 1B, below:

TABLE 1A
Serial Correlation Coefficients
(Daily Data, Lags = 1-5 days)
n = 260

GILT	LAG PERIOD				
	1	2	3	4	5
R 150	-0,0370	0,0722	-0,0054	-0,0563	0,0893
	(0,5528)	(0,2463)	(0,9310)	(0,3650)	(0,1512)
E 168	-0,0253	0,0754	0,0032	-0,0404	0,0075
	(0,6853)	(0,2255)	(0,9586)	(0,5164)	(0,2130)

NOTE: p-values are shown in parentheses.

TABLE 1-B
Serial Correlation Coefficients
(Weekly Data, Lags = 1-5)
n = 51

GILT	LAG PERIOD				
	1	2	3	4	5
E 150	-0,0403	-0,1086	-0,0189	-0,0710	0,0101
	(0,7789)	(0,4479)	(0,8954)	(0,6207)	(0,9440)
E 168	-0,0434	-0,1134	-0,0312	-0,0604	0,0275
	(0,7625)	(0,4282)	(0,8278)	(0,6754)	(0,8481)

NOTE: p-values are given in parentheses.

It will be noted that there are no significant correlation coefficients, indicating, of course, that changes in YTM, over time, are independent. Moreover, while the coefficients for the weekly data move from negative to positive as the lag period moves from 4 to 5 periods, for both the weekly and daily data, these movements are not significant. It bears note that, for some of the lag periods, while the calculated values approach 1, they are invariably well below the critical value of 1,96. In short, our results from Serial Correlation tests clearly supports the hypothesis of independence and thus provide some support for the Random Walk hypothesis.

2 Runs Tests

Following both Fama, and convention, we have calculated the number of runs which might have been expected with data generated from a random binomial process, and compared these with the actual number of runs.

Having done so, we can derive a test statistic to measure the significance of any relationship that might arise from this test by standardising the difference between the Actual Runs (=AR) and the Expected Runs (=ER) in the normal distribution, as follows:

$$z = \frac{(AR + 0.5) - ER}{SE_{er}}$$

The results of the Total Runs tests are given in Tables 2-A and 2-B, below:

TABLE 2-A
Daily Runs Analysis
n = 260

Gilt	AR	ER	AR-ER	z	AR-ER / ER
R 150	142	155,80	-13,80	-1,768	-0,09
E 168	146	150,21	- 4,21	-0,489	-0,03

TABLE 2-B
Weekly Runs Analysis
n = 51

Gilt	AR	ER	AR-ER	z	AR-ER / ER
R 150	20	26,02	-6,02	-1,592	-0,23
E 168	23	27,43	-4,43	-1,136	-0,16

It will be observed that, in neither the case of daily or weekly data, are the differences between the actual, and expected, number of runs statistically significant at the 0,05 level. This suggests that the YTM's are, in fact, random over time for both data sets. It bears note that the weekly data does have decidedly larger percentage differences between the actual, and expected, number of runs than does the daily data; for example, the actual runs for the R150 were about 9% less than expected with the daily data, but fully 23% less than expected using weekly data. Despite this, given that the differences are statistically insignificant, one cannot reject the null hypothesis of independence.

3 Runs by Sign

As the total runs test merely determines the overall existence of dependence in the data, and does not take into account any patterns which might be exhibited by the runs, it is necessary to test for the signs of the price changes so as to ensure that a particular pattern does not give rise to a trend which could be exploited so as to enable an investor to outperform the market. If we assume there is independence in the runs by sign, i.e. that the signs of price changes are generated by a random binomial process with probabilities of P(+),P(0), and P(-) for each change, then we can readily calculate the Expected number of runs of each sign from the entire sample of N-price changes; and, thus we can readily calculate the probability of a run of a given sign. We can then use these probabilities to determine the expected number of runs of each sign by multiplying the total actual number of runs.

This enables the use of the Chi-square to determine whether there is a statistically significant difference between runs, by sign. Our results are given in Tables 3-A and 3-B, below:

Tables 3-A and B yield X^2 values which are decidedly less than the critical value of 5,991, leading to the clear implication that investors should not be able to detect trading profits based on a preponderance of runs of a particular sign. This test, then, also lends support to – at least – a weak form efficient market in these two widely traded gilts.

TABLE 3-A
Runs by Sign
(Daily Yields; n = 260)

GILT	AR	ER	AR-ER
Positive runs:			
R 150	59	58,504	0,496
E 168	65	61,060	3,940
Negative runs:			
R 150	59	58,362	0,638
E 168	64	61,060	2,940
No Change Runs:			
R 150	30	24,140	5,86
E 168	17	19,17	-5,17

X^2 : R 150 = 1,434; E 168 = 2,188

TABLE 3-B
Runs by Sign
(Weekly Yields; n = 51)

GILT	AR	ER	AR-ER
Positive Runs:			
R 150	10	9,620	0,38
E 168	11	10,049	0,35
Negative Runs:			
R 150	10	9,620	0,380
E 168	11	10,695	0,305
No Change Runs:			
R 150	0	0	0
E 168	1	0,828	0,172

X^2 : R 150 = 0,03; E 168 = 0,056

4 Runs by Length

It is of some importance to also examine the distribution of runs of each sign by length, since it is conceivable that a run of a longer duration than expected could signify an opportunity to earn excess profits. In doing so, we compare the expected number of runs of a particular length for each sign with the number actually observed. Further, we first calculate the probability of runs of length i (i=1,2,..., n) positive, negative and no-change runs and these probabilities can then be used to derive the number of expected runs of length i for each sign by multiplying by the actual number of runs of a positive, negative, and no-change run.

The results of the distribution of runs of length i for each sign are given in Tables 4-A and B for daily data, and in Tables 4-C and D for weekly data.

TABLE 4-A
Distribution of Runs by Length: R 150
(Daily Data)

R 150	Positive Runs			Negative Runs			No-change Runs		
Length (1)	Prob. (2)	ER (3)	AR (4)	Prob. (5)	ER (6)	AR (7)	Prob. (8)	ER (9)	AR (10)
1	0,5638	32,7	27	0,5615	33,1	27	0,8846	21,2	21
2	0,2371	14,6	15	0,2462	14,5	17	0,1018	0,3	1
3	0,1102	6,5	12	0,1078	6,4	10	0,0117	0,3	1
4	0,4922	2,9	4	0,0472	2,8	4	0,00135	0,0	1
5	0,0219	1,3	0	0,0207	1,2	0	0,0002	0,0	0
6	0,0098	0,6	1	0,0091	0,5	1	0,0000	0,0	0
7	0,0044	0,3	0	0,0039	0,2	0	0,0000	0,0	0
8	0,0019	0,1	0	0,0017	0,1	0	0,0000	0,0	0
9	0,0009	0,0	0	0,0008	0,0	0	0,0000	0,0	0
10	0,0004	0,0	0	0,0003	0,0	0	0,0000	0,0	0
TOTAL		59	59		59	59		24	24

TABLE 4-B
Distribution of Runs by Length: E 168
(Daily Data)

E 168	Positive Runs			Negative Runs			No-change Runs		
Length (1)	Prob. (2)	ER (3)	AR (4)	Prob. (5)	ER (6)	AR (7)	Prob. (8)	ER (9)	AR (10)
1	0,5423	35,3	33	0,5423	34,7	30	0,9346	15,9	15
2	0,2482	16,1	17	0,2482	15,9	21	0,0608	1,0	1
3	0,1137	7,4	12	0,1137	7,3	9	0,0040	0,1	0
4	0,0521	3,4	1	0,0521	3,3	2	0,0003	0,0	0
5	0,0239	1,6	1	0,0239	1,5	1	0,0000	0,0	1
6	0,0109	0,7	1	0,0109	0,7	0	0,0000	0,0	0
7	0,0050	0,3	0	0,0050	0,3	1	0,0000	0,0	0
8	0,0023	0,1	0	0,0023	0,1	0	0,0000	0,0	0
9	0,0011	0,0	0	0,0011	0,0	0	0,0000	0,0	0
10	0,0005	0,0	0	0,0005	0,0	0	0,0000	0,0	0
TOTAL		65	65		64	64		17	17

TABLE 4-C
Distribution of Runs by Length: R 150
(Weekly Data)

R 150	Positive Runs			Negative Runs			No-change Runs		
Length (1)	Prob. (2)	ER (3)	AR (4)	Prob. (5)	ER (6)	AR (7)	Prob. (8)	ER (9)	AR (10)
1	0,5687	5,7	4	0,4314	4,3	5	0,000	0	0
2	0,2452	2,5	4	0,2452	2,5	1	0,000	0	0
3	0,1057	1,1	0	0,1395	1,4	1	0,000	0	0
4	0,0456	0,5	2	0,0794	0,8	0	0,000	0	0
5	0,0196	0,2	0	0,0452	0,5	2	0,000	0	0
6	0,0085	0,1	0	0,0149	0,2	0	0,000	0	0
7	0,0036	0,0	0	0,0146	0,2	0	0,000	0	0
8	0,0016	0,0	0	0,0083	0,1	0	0,000	0	0
9	0,0007	0,0	0	0,0047	0,1	1	0,000	0	0
10	0,0003	0,0	0	0,0027	0,0	0	0,000	0	0
TOTAL		10	10		10	10		0	0

TABLE 4-D
Distribution of Runs by Length: E 168
(Weekly Data)

R 168	Positive Runs			Negative Runs			No-change Runs		
Length (1)	Prob. (2)	ER (3)	AR (4)	Prob. (5)	ER (6)	AR (7)	Prob. (8)	ER (9)	AR (10)
1	0,5294	5,7	6	0,4902	5,4	5	0,9804	1	1
2	0,2492	2,7	3	0,2499	2,7	3	0,9961	0	0
3	0,1174	1,3	0	0,1275	1,4	1	0,0004	0	0
4	0,0553	0,6	2	0,0650	0,7	0	0,0000	0	0
5	0,0260	0,3	0	0,0332	0,4	0	0,0000	0	0
6	0,0123	0,1	0	0,0169	0,2	2	0,0000	0	0
7	0,0057	0,0	0	0,0086	0,1	0	0,0000	0	0
8	0,0027	0,0	0	0,0044	0,0	0	0,0000	0	0
9	0,0013	0,0	0	0,0033	0,0	0	0,0000	0	0
10	0,0006	0,0	0	0,0016	0,0	0	0,0000	0	0
TOTAL		11	11		11	11		1	1

In these tables, column 1 gives the length of the run, while columns 2, 5 and 8 give the binomial probabilities of a run of that sign of that length, and columns 3, 6 and 9 give the expected number of runs of that sign of that length, based on the binomial probability distribution and the actual number of runs of that sign, while columns 4, 7 and 10 give the actual number of runs of each sign of each length.

Overall, the actual number of runs of length i appears to be similar to that expected if generated from a random binomial

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process. For daily data on both gilts, runs appear to persist for slightly longer than expected; however, no such inference can be drawn for weekly data.

5 Filter Rules

In order to determine whether active trading based on price trends might yield returns superior to those obtained via a buy-and-hold strategy, we have employed two 'filter rules' to simulate such a trading technique. Fama defined such a technique as follows:

> If the daily closing price of a particular security moves up at least x percent, buy and hold the security until its price moves down at least x percent from a subsequent high, at which time simultaneously sell and go short. The short position is maintained until the daily closing prices rise at least x percent above a subsequent low, at which time one should simultaneously cover and buy.[19]

Given the low transactions costs in the S.A. gilts market, and further given the finding by Gilbertson and Roux[20], who employed four different trading rules and found that these techniques consistently underperformed a buy-and-hold strategy in the JSE Equities market, it was thought important to employ a filter test, despite the fact that institutional rules restrict short selling in S.A. In doing so, we acknowledge a difficulty in our test since we have utilised daily closing yields and thus have introduced a bias, in favour of a filter, into our results. The use of daily highs and lows would have eliminated this bias; however, that data was unavailable to us. Given that our weekly data is derived from daily data, we have not applied a filter to the weekly data.

We have run our data through a 2% filter and a 0,5% one. The filter tests yield the following results for the daily data:

TABLE 5
Returns from a 2, and a 0,5, Percent Filter, and from a Buy-and-Hold Strategy

GILT	Buy and Hold (Returns)	2% Filter		0,5% Filter	
		Return	No. of Transactions	Return	No. of Transactions
R 150	11,26 %	5,57 %	18	10,43 %	60
E 168	9,56	7,70	12	4,23	63

It is clear that a buy-and-hold strategy provides returns superior to those employing filters; and this despite the fact that in the gilts market, commissions are negotiated and presumptively low. This test, then, also suggests weak form efficiency of the gilts market.

III CONCLUSIONS

There has been only one previous direct test of the efficiency of the S.A. capital market; and this was of highly limited scope. The present Note has employed conventional tests (serial correlation, runs, runs by length, and filter rules) for the most widely traded gilts; and the results of our tests suggest that the market in these bonds is likely weak form efficient. This is in sharp contrast to the findings of Hattingh and Smit who discovered the probable existance of 'day of the week' anomalies. In making this observation, we are constrained to note that our results must be treated with caution. Our tests have not included less liquid gilts, and thus it is quite possible that information is less quickly incorporated into the prices of such instruments.

We would most assuredly not wish to 'over interpret' our findings, given that they involve only the more liquid, and reasonably heavily and internationally traded gilts. We would, however, hope that our tenetative conclusions will induce others to un-dertake further research into this highly important, and all-too-ignored segment of our securities market.

FOOTNOTES

1. The authors are especially grateful to Prof. Eon v.d. Merwe Smit, Univ. of Stellenbosch Graduate Business School, for making available the data underlying this study and for critical comments and suggestions. We also wish to axknowledge the useful comments of an anonymous referee. Neither Prof. Smit, nor the Referee, of course, bear any responsibility for errors contained in this Note.

2. See, especially, Fama, E.F., "Efficient Capital Markets: A Review of Theory and Empirical Work," J. of Finance (Vol. XXV, May 1970), pp. 383-417; and Fama, E.F., "Efficient Capital Markets: II," ibid (Vol. XLVI, No. 5, Dec. 1991), pp. 1575-1617.

3. See, for example, Barnes, P. "Thin Trading and Stock Market Efficiency: The Case of the Kuala Lumpur Stock Exchange" J. of Business Finance and Accounting (Vol. 13, No. 4, Winter 1986), pp. 609-617; Dawson, S., "A Test of Stock Recommendations and Market Efficiency for the Kuala Lumpur Exchange, "Singapore Management Review (July 1981), pp. 69-72; Dawson, "The Trend Towards Efficiency for Less Developed Stock Exchanges: Hong Kong," J. of Bus. Finance and Accounting (Vol. 11, No. 2, Summer 1984), pp. 151-161; Emanuel, D.E., "A Note on Some 'Weak Form' Tests of Capital Market Efficiency in New Zealand," Accounting and Finance (Vol. 19, No. 1, May 1979), pp. 100-110; Errunza, V.R., "Efficiency and the Programs to Develop Capital Markets, The Brazilian Experience," J. of Banking and Finance (Vol. 3, 1979), pp. 335-382; Gandhi, D.K., Saunders, A., and Woodward, R.S., "Thin Capital Markets: A Case Study of the Kuwaiti Stock Market," Applied Economics (Vol. 12, 1980), pp. 341-349; Wawaini, G.A. and Michel, P.A., "The Pricing of Risky Assets on the Belgian Stock Market," J. of Banking and Finance, (Vol. 6, 1982), pp. 161-178; and, finally, Sharma, J.L. and Kennedy, R.E., "A Comparative Analysis of Stock Price Behaviour on the Bombaya, London and New York Stock Exchanges, " J. of Financial and Quantatitive Analysis (Sept. 1977), pp. 391-413, among others.

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7. Souter, R.J.P. An Empirical Study of the Weak Form of the New Zealand Government Stock Market, (Unpublished Thesis, Massey Univ. (Palmerston North, N.Z., 1989). passim. Candor requires noting that Souter's work was performed under High's direction.

8. Moore, P.A. An Analysis of the Development and Efficiency of the South African Gilt Market (Unpublished technical report, Graduate School of Business, Univ. of Cape Town, Dec. 1988), passim.

9. Faure, A.P. An Overview of the South African Bond and Bond Options Market (Unpublish mss., 1994), pp. 6-7.

10. Ibid.

11. It is, regretably, most unclear where, precisely, Moore got his data. The raw data is not given in his technical report.

12. In his discussion, Moore refers to a "two year" period for his data. Moore, op. cit., p. 139. However, it would appear that, in fact, the data covers only 18 months; see Moore's Appendix 6, p. 152. We have been unable to ascertain the precise length of the data used by Moore.

13. See Fama, "The Behaviour of Stock Market Prices, "Journal of Business (Vol. XXXVIII, May 1965), pp. 34-105.

14. Moore, op. cit., p. 120.

15. Hattingh, F.S. and Eon v.d. M. Smit, "Seisonale Patrone in die Suid-Afrikaanse Kapitaalmark," South African J. of Business Management, (Vol. 24 (4), 1993), pp. 142-146. Also see, for a comparison as applied to the futures market, Watson, G. & Eon vd. M. Smit, "Seasonal Patterns in the South African Share Index Futures Market," South African J. Bus. Mgt. (Vol. 25 (4), 1994), pp. 155 ff.

16. Faure, op. cit., pp. 11-12.

17. See, for example, Fama ibid. Should there remain questions regarding our methodology, we shall be happy to provide equations, calculations, etc. upon request.

18. Following Fama, ibid., (1965) we may conclude that if the correlation coefficient is not more than twice its computed standard error, it may be concluded it is not significantly different from zero, and thus the values are independent.

19. Fama, p. 81

20. Gilbertson and Roux, op. cit.

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

INTRODUCTION

Rationality in financial markets implies that investors correctly use all available information in establishing security prices (Fama, 1970). In terms of this definition researchers concerned with how share returns are generated must first consider how market participants determine and assimilate the relevant data in their decision making. The efficient market hypothesis (EMH) claims that the price of a security at any point is a noisy estimate of the present value of the certainty equivalents of all risky future cash flows. Beyond this, the EMH also assumes that investors learn to make correct inferences about the impact of new information on the probability distribution of potential share returns – that is, they form rational expectations about the future.

Recently, an intriguing efficient market anomaly has emerged. De Bondt and Thaler (1985, 1987) report that equities that experience the lowest (highest) returns over a period (2-5 years in their studies), overperform (underperform) the market in the subsequent period. They call this violation of the EMH the "overreaction" phenomenon since it suggests that investors overreact in the initial period and subsequently correct themselves.

De Bondt and Thaler (1987) hypothesize that the reason for the overreaction lies in the market's inefficient response to earnings information. Research has found that the random walk model, in which all changes are permanent, provides a good description of the time-series behaviour of companys' annual earnings, on average. The primary exception to the random walk model comes from companies that have experienced extremely good or bad years, relative to their "normal" performance. The earnings changes of such "outlier" companies are temporary – earnings regress to the mean (Brooks and Buckmaster, 1980). If market participants incorrectly perceive the extreme earnings changes of such companies to be permanent, they would overreact by bidding the share prices of the good (bad) performers up (down) too high (low). When subsequent earnings realizations are not extreme, the market learns of its mistake and share prices correct.

The purpose of this paper is to determine whether or not the investors on the Johannesburg Stock Exchange (JSE) respond rationally to share prices of listed companies reporting positive and negative earnings. Based on the empirical evidence, an investment strategy which might enable investors to exploit the irrationality implied by the "overreaction to earnings" hypothesis will be recommended.

PREVIOUS STUDIES

The suggestion that investors overreact to company-specific news of dramatic financial events has recently aroused considerable interest among researchers (Howe, 1986). The term overreaction implies a comparison with some degree of reaction that is considered appropriate. In this context, we can define overreaction as the general tendency for investors to process event-related news in an excessive, and even absurb fashion. In particular, market participants can be said to overreact when unexpectedly favourable (unfavourable) announcements cause trading behaviour that results in price appreciation (depreciation) that is excessive relative to the actual value implied by the nature of the event.

The most extensive studies on market overreaction were undertaken by De Bondt and Thaler (1985, 1987). They base their overreaction hypothesis on the observation that most investors are poor decision makers in terms of appropriate probability revision to new information, and they overweight recent information and underweight prior (or base rate) data. The investigators conjectured that, as a consequence of investor overreaction to current earnings, share prices may also temporarily depart from their underlying fundamental values. With prices initially biased by either excessive optimism or pessimism, this drives the share prices of companies reporting unusually poor earnings ("losers") too low, and the prices of those companies reporting unusually good earnings ("winners") too high. The subsequent correction of the overreaction generates positive (negative) abnormal returns for investments in the loser (winner) shares. De Bondt and Thaler argue that this is an exploitable market inefficiency. Howe (1986) and Brown and Harlow (1988) report results that generally support those of De Bondt and Thaler. Jaffe, Keim, and Westerfield (1989, p 135) in studying the small-firm effect and the low P/E effect found "consistently high returns for firms of all sizes with negative earnings". Zarowin (1989) investigated whether the stock market overreacts to extreme earnings, by examining companys' share returns over the 36 months subsequent to extreme earnings years. While the poorest earners do outperform the best earners, the poorest earners are also significantly smaller than the best earners. Zarowin (1989, p 1398) reports that when poor earners are matched with good earners of equal size, there is little evidence of differential performance. This suggests that size, and not investor overreaction to earnings, is responsible for the "overreaction" phenomenon. This conclusion contradicts the finding by De Bondt and Thaler (1987, p 579) that "the winner-loser effect is not primarily a size effect".

Page and Way (1992) followed the approach used by the De Bondt and Thaler (1985, 1987) for the NYSE to investigate the overreaction hypothesis applicable to shares listed on the JSE during the period 1974 to 1989. Page and Way (1992, p 43) report that, on average, over the thirty six months after porfolio formation, portfolios of prior "losers" achieved average returns of about 10% above the market and portfolios of prior "winners" achieved average returns of about 4,5% below the market. Therefore, the loser portfolios outperformed the winner portfolios by a total of almost 15% which is significant at the 1% level. The empirical results of this study are consistent with the overreaction hypothesis.

Bhana (1989) investigated whether companies listed on the JSE overreacted to unexpected favourable and unfavourable company-specific news events during the period 1970-1984. Bhana (1989, p 127) reports that in the short-term reaction to extreme unexpected financial events, the JSE's response is determined by whether the event is positive or negative. The evidence on the short-term corrections to negative events is consistent with the Overreaction Hypothesis. However, for positive events only weak evidence of short-term overreaction was observed. A similar asymmetry was observed in the long-term market reaction to events generated by favourable and unfavourable information. It would appear that for negative events, the JSE generates economically significant corrections up to one year following the event and then adjusts prices in

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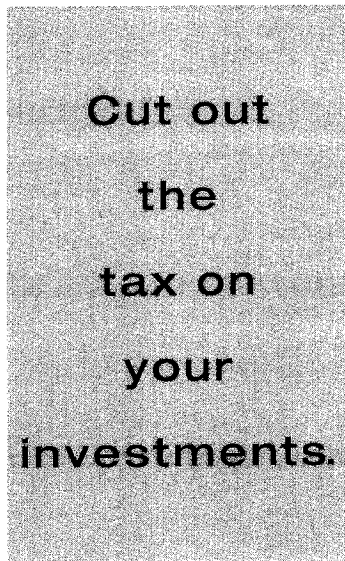
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a random manner. The JSE does not display a long-term tendency to overreact to news of a favourable nature. Therefore, the tendency for the JSE to overreact can best be regarded as a short-term phenomenon.

Bernard, Thomas and Abarbanell (1993) have provided evidence contrary to the claim that the market overreacts to short-term earnings trends. They provide empirical evidence suggesting that the market underreacts to earnings announcements and that the initial underreaction is corrected only on a delayed basis over the following six to nine months. Furthermore, this underreaction is especially pronounced in the case of small and medium-sized companies. The authors suggest that the market fails to fully reflect financial statement data that is relevant for interpreting the implications of the current earnings number. For example, investors may not completely take account of the power of certain financial ratios such as, changes in ROE or inventory turnover to predict reversals of current trends in profitability.

The earnings surprise theory has a wide following among investment analysts. The concept of standardized Unexpected Earnings (SUE) was developed by Latane, Jones and Rieke (1974). Their study of a sample of listed companies in the United States found that from 1962 to 1971, companies that reported quarterly earnings above a trendline forecast (positive SUE) provided returns greater than the market average. Conversely, those companies with negative SUEs saw their shares underperform the market average in subsequent months.

Mott and Coker (1993) tested the earnings surprise model covering the 5-year period 1988 to 1992. During the study period the earnings surprise model consistently distinguished between shares that outperformed the market and those that underperformed. Shares of companies that reported positive earnings surprises were superior performers to those shares whose earnings fell short of expectations or were in line with consensus. This investment insight is especially useful when applied to the small market capitlization segment of the stock market. They conclude that the earnings surprise factor is the most consistent predictor of performance in the multifactor valuation model they used to generate the share selection process.

The hypothesis that the market overreacts to earnings announcements is generally supported in the literature. However, the previous studies identify "winner" and "loser" portfolios and their market performance is investigated in the period after portfolio formation. These studies do not specifically examine the share market reaction to announcements of negative earnings.

This deficiency is addressed by Ettredge and Fuller (1991) who examined the abnormal share returns over twelve-month periods following announcements of negative earnings. Ettredge and Fuller (1991, p 28) show that companies reporting negative earnings generated, on average, a positive abnormal return of 11,6% during the year following the negative earnings. This negative earnings effect exists independently of any small-firm effect. Furthermore, companies reporting negative earnings in any test year experience, on average, strong earnings rebounds over the next two years.

Several investigators have attempted to explain the cause of the overreaction phenomenon that appears to be widespread in securities markets. There is a phenomenon in nature referred to as "reversion to the mean", which asserts that, over time, properties of members of groups tend to converge to the average value for the group as a whole. This concept is widely applicable in situations where economic forces tend to move things towards equilibrium. In the world of finance, researchers have shown that company earnings tend to revert to the

mean (Keim and Stambaugh, 1986). Fama and French (1986) suggested that investors habitually extrapolate recent earnings trends into the future, ignoring the many random walk elements in earnings pattern as well as ignoring the tendency of most divergences from average earnings performance to correct themselves over time by a familiar process known as reversion to the mean. It is suggested that failure by the market to recognize the tendency towards mean reversion results in overreaction to share prices.

Vermaelen and Verstringe (1986, p 13) suggested that the overreaction effect is a rational market response to risk changes associated with extreme share price movements. They further suggested that the "risk change hypothesis" offers an explanation for the existence of market overreaction. According to this hypothesis a decrease (increase) in share prices leads to an increase (decrease) in debt-equity ratios and an increase (decrease) in risk measured by beta coefficients. Vermaelen and Verstringe argued that if betas vary with changes in market value, a negative correlation between risk and market value is plausible because of changes in financial leverage that accompany extreme movements of the value of equity. The risk change hypothesis claim that losers are riskier than winners, and that this difference in risk is responsible for the apparent, abnormal returns associated with market overreaction (Chan, 1986).

Efficiency in securities markets is based on the premise that investors are able to incorporate all relevant information into security prices in a rapid and unbiased fashion. Brown, Harlow and Tinic (1988) have demonstrated that rationality does not require that the information be assimilated instantaneously. It was shown that in the presence of imperfect information, rational risk-averse investors will respond by initially setting security prices that appear, on the surface, as overreactions to bad news and underreactions to good news. Brown, Harlow and Tinic (1988, p 184) conclude that the short-run behaviour of share prices following unexpected and substantial news announcements does not reveal evidence of anything but rational judgement by investors. That is, the market reacts to uncertain information in an efficient, if not instantaneous manner.

To explain the overreaction phenomenon Brown, Harlow and Tinic (1988) developed the uncertain information hypothesis (UIH). The UIH argues that when the full implication of new information concerning a share is uncertain, investors revise their perception of the share's risk upward. This results in an increase in the expected or required rate of return for the share. Even when the event clearly conveys good or bad news about a company's prospects, the full extent of its eventual impact on share prices may be uncertain. As the uncertainty is resolved, the perceived risk decreases, and price changes subsequent to the event tend to be positive on average, even if the event was clearly bad news. Furthermore, if investors' preferences exhibit decreasing absolute risk aversion (a typical assumption in risk-return models), the UIH predicts that the average price change subsequent to the event will be larger following bad news, than following good news.

RESEARCH METHODOLOGY

The methodological approach used in this study is similar to that of Ettredge and Fuller (1991) who investigated the negative earnings effect for companies listed on the NYSE. The purpose of this investigation is to test the "overreaction to earnings hypothesis" for companies listed on the JSE during the fifteen-year period 1975-1989. Random samples of 200 companies reporting negative earnings and 200 companies reporting positive earnings during the period 1975-1989 were selected to provide the empirical evidence. For each company in the random samples monthly data on share prices were ob-

tained from the database of the JSE and "McGregor's Online Information Services".

The selection procedure of companies in the random samples had to satisfy two requirements. Firstly, the share price information had to be available for the entire five-year test period surrounding the earnings announcement. Therefore, certain companies were precluded from this investigation due to lack of data caused by events such as acquisitions and mergers, bankruptcy, or delisting. Secondly, the companies selected were those whose shares are actively traded on the JSE to ensure that a reliable measure of abnormal returns could be obtained (Roll, 1983).

The Market Model developed by Bowman (1983) is used to obtain the abnormal (risk-adjusted) returns associated with earnings announcements. Monthly abnormal returns were estimated as residuals in the standard market model regression:

$$R_{it} = A_i + B_i R_{mt} + e_{it} \qquad (1)$$

where: R_{it} = the expected return on share i for the month t;
A_i, B_i = the intercepts and slope respectively of the linear relationship between the return for share i and the return for the general market;
R_{mt} = the monthly return for the market portfolio represented by the JSE Overall Actuaries Index during month t;
e_{it} = an estimate of the residual or abnormal return for share i in month t.

The objective is to examine the deviations in monthly returns around the vicinity of the earnings announcement and to measure abnormal price changes during this period, that is, the value of e_{it} in Equation (1). These monthly abnormal returns were then added together or "cumulated" over each twelve-month test period to obtain cumulative abnormal returns, or CAR_t. If one assumes that there are no unusual share price movements associated with the earnings announcement, one can expect that both e_{it} and CAR_t would fluctuate randomly about zero. However, if material information is associated with an announced earnings change, the resulting share price change would be reflected by a deviation of the monthly average residuals from zero and a corresponding increase or decrease in CAR_t.

The hypothesis tested in this study can be stated as:

Ho : Investors have a tendency to place greater emphasis on easily understood information relating to recent earnings announcements and place lower emphasis on less reliable predictions of future earnings. This results in the systematic underestimation of subsequent earnings recoveries by companies reporting negative earnings and leads to an excessive discounting of their share prices. The negative earnings effect may be attributable to the subsequent correction of this initial overreaction.

For each earnings year of the test period (1975-1989) and for each company, the following financial year-end data were collected, or computed: price per share, earnings per share (EPS), and the market value of the company's equity capital. Price per share and EPS were all adjusted for share splits. EPS were defined as primary EPS for reported net income. Following the recommendation by Chou (1975) changes in EPS (EPSCHG) in any year t were measured as the rand amount of change in EPS divided by the price per share, as shown below:

$$EPSCHG = (EPS_t - EPS_{t-1})/P_{t-1} \qquad (2)$$

Where P_{t-1} is equal to the price per share at the end of the previous year.

In order to make EPS changes comparable for different com-

panies it is necessary to scale the rand amount of EPS change. The simple percentage change in EPS cannot be used for two reasons. Firstly, for companies with EPS close to zero in year t-1, the percentage change in EPS tends to "explode" for relatively small change in the rand amount of EPS. Secondly, if EPS are negative in year t-1, then a positive EPS reported in year t results in a negative percentage change if the usual method of computing percentage changes is followed. By scaling (dividing) by price, as in Equation (2), we reduce the first problem considerably and eliminate the second problem altogether.

The changes in EPS were also computed by scaling the absolute value of EPS in period t-1 as shown below:

$$EPSCHG = \frac{EPS_t - EPS_{t-1}}{|EPS_{t-1}|} \qquad (3)$$

This eliminates the problem associated with negative earnings in year t-1 changing the sign of the change in EPS. All the data in Tables 1, 2, and 3 were recomputed, and the results were qualitatively the same.

The test data were collected for a five-year period associated with each test year. That is, for each test year, the changes in EPS for two years prior to the test year, the test year itself, and two years after the test year were calculated. The following notation is used to represent EPS change around each test year. Let t = the test year (e.g., 1980), and let EPSCHG $(m2)_{it}$ represent the change in EPS for company i two years before the test year (that is, test year minus 2, or 1978), EPSCHG $(m1)_{it}$ represent the change in EPS one year before the test year (1979), EPSCHG $(00)_{it}$ represent the change in EPS in the test year, EPSCHG $(p1)_{it}$ represent the EPS change one year after the test year (that is, test year plus 1, or 1981) and EPSCHG $(p2)_{it}$ represent the EPS change two years after the test year (1982).

EMPIRICAL RESULTS

TABLE 1
### Market Model statistics for companies reporting positive and negative earnings during 1975-1989

Panel A: EPS(00)>0

	Median	Mean	Std. Dev.
CAR	-2,1%	-2,4%	40,6%
Market Value (R millions)	518,7	969,2	106,4
Beta	1,160	1,193	0,396
EPSCHG (m2)	9,7%	12,4%	30,9%
EPSCHG (m1)	13,2%	19,4%	34,7%
EPSCHG (00)	14,5%	23,7%	90,6%
EPSCHG (p1)	10,6%	16,4%	62,4%
EPSCHG (p2)	7,3%	12,5%	39,3%

Panel B: EPS(00)<0

	Median	Mean	Std. Dev.
CAR	12,5%	12,9%	49,3%
Market Value (R millions)	74,1	89,2	46,7
Beta	1,374	1,423	0,416
EPSCHG (m2)	0,7%	0,9%	21,4%
EPSCHG (m1)	-4,2%	-5,3%	31,5%
EPSCHG (00)	-30,7%	-38,6%	41,8%
EPSCHG (p1)	25,4%	31,8%	96,4%
EPSCHG (p2)	12,3%	18,2%	86,3%

The Market Model statistics for sample companies listed on the JSE which reported positive and negative earnings during the 1975-1989 period are presented in Table 1. The sam-

OF A W[...]
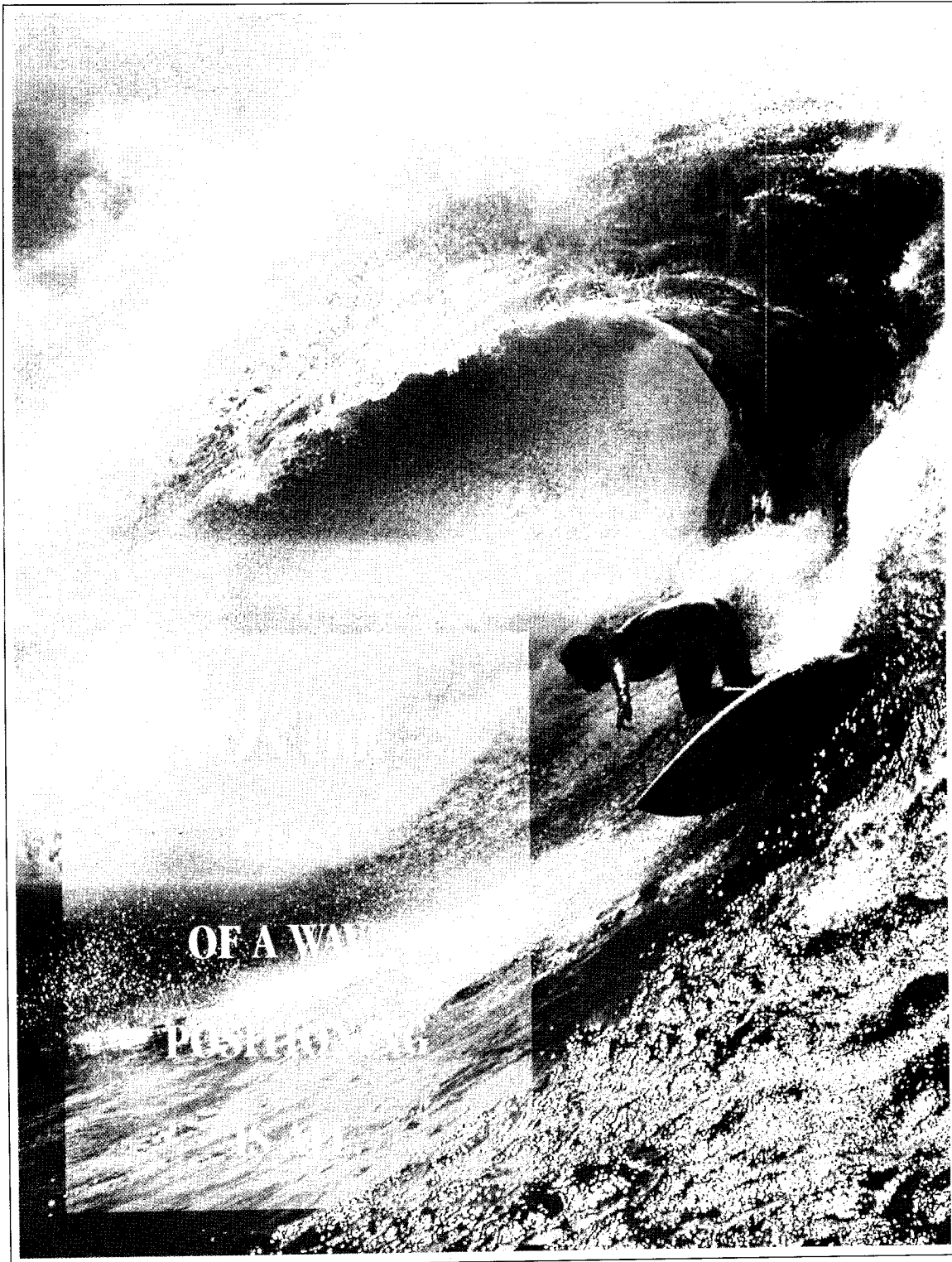
S outh Africa's pent-up development tide is finally ready to roll. Fraser Alexander's concrete products, construction, mining, materials handling and waste management operations have been carefully positioned over many years to meet the rising demand for key infrastructural products and services.

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ple companies are aggregated across all test years, with companies classified into two groups in any test year: those that report positive earnings (Panel A) and those that report negative earnings (Panel B). For companies reporting positive earnings, the average CAR in the twelve-month return period after the test year is negative – the median (mean) CAR is -2,1% (-2,4%). For the negative earnings group, however, the CAR is very large and positive – the median (mean) CAR is 12,5% (12,9%). These results are consistent with the overreaction to earnings announcements on the JSE reported by Bhana (1989), and Page and Way (1992).

A risk-adjusted positive abnormal return of more than 12% during the year following the negative earnings is highly significant in the economic sense. It is also highly significant in the statistical sense. The t-statistics (not reported in Table 1) testing whether the observed mean abnormal return of 12,9% could have occurred by chance is 4,26. The probability of observing a t – statistic as large as 4,26 under the null hypothesis, that the true abnormal return is zero, is less than 0,001. This suggests that a simple strategy of immediately buying the shares of companies reporting negative earnings for the previous financial year and holding these shares for the next twelve months would have generated positive abnormal returns in excess of 12% before transaction costs.

The EPSCHG variables reported in Table 1 provide a possible explanation for the positive abnormal return in the year subsequent to reporting negative earnings. For companies reporting positive earnings (Panel A), there is a steady increase in the median changes in EPS for the two years preceding the test year. However, there is a steady reduction in earnings in the two years following the test year. For companies reporting negative earnings (Panel B), the median change in EPS is negative in the test year and the prior year, but there is an increase of 25,4% in the year following the test year. Earnings improvement continues in the second year after the test year, with a median increase of 12,3%. The presence of positive abnormal returns together with strong earnings improvements in the year after the test year suggest that companies reporting negative earnings tend to return to profitable operations, and the market does not forsee this possibility (or discounts it excessively).

These results confirm the findings of Fama and French (1986) that investors tend to ignore the tendency of most divergences from average earnings performances to correct themselves over time. The results also support the notion that failure by the market to recognize the tendency towards mean reversion results in overreaction to share prices.

To further explore the inference that the positive CAR in year (p1) is related to the earnings recovery in that year, a linear regression was performed with the subsample of negative earnings observations. The following estimated coefficients were obtained:

$$CAR = 0,093 - 0,136 \text{ LN(MARKET)} + 0,125 \text{ EPSCHG (p1)} \qquad (4)$$
$$ (1,64) \quad (-2,17) \qquad\qquad (3,98)$$

where the first explanatory variable in Equation (4), the natural logarithm of the market value of equity, controls for differences in company size, and the t-statistics are in parentheses. The variable EPSCHG (p1) is the change in EPS in the period following the test year, as a percentage of price per share.

Equation (4) was estimated for all negative earnings observations during the study period. An interesting observation is that the coefficient of EPSCHG (p1) is positive, it also differs from zero at a high level of significance (the t-value of 3,98 is significant at the 0,0001 level for a two-tailed test). The linear regression data indicate that magnitude and direction of the market price (CAR) in the twelve months following the an-

nouncement of negative annual earnings are related to the magnitude and direction of the EPS change in the corresponding financial year.

Additional analysis is necessary to determine the sensitivity of these results to company size. It can be seen from Table 1 that companies reporting negative earnings are quite small relative to those companies reporting positive earnings – the median market values of their equity capital are R74 million and R519 million, respectively. Therefore, it is possible that what appears to be a "negative earnings effect" is really the now well documented small-firm effect (Keim, 1983).

To resolve the company size issue, all companies were first sorted into five quintiles, based on the market value of their equity capital. Each market value quintile was divided into two portfolios – companies reporting negative earnings and companies reporting positive earnings. Using this approach we can hold company size roughly constant while making comparisons of other characteristics, such as abnormal returns (CARs) and change in earnings (EPSCHG). The results are reported in Table 2.

TABLE 2:
Median statistics (sorted into size quintiles) for companies reporting positive and negative earnings during 1975-1989

	Median	Market	Value		
Market Value Quintile	1	2	3	4	5
EPS(00)<0	25,3	79,6	317,4	698,7	1914,5
EPS(00)>0	32,9	97,4	309,3	732,9	2481,2
	Median	CAR			
Market Value Quintile	1	2	3	4	5
EPS(00)<0	16,5%	9,2%	-1,4%	1,3%	19,6%
EPS(00)>0	4,3%	-0,9%	-2,1%	-2,9%	-4,2%
	Median	Beta			
Market Value Quintile	1	2	3	4	5
EPS(00)<0	1,36	1,42	1,29	1,39	1,30
EPS(00)>0	1,24	1,19	1,09	1,02	0,98
	Median	EPSCHG(00)			
Market Value Quintile	1	2	3	4	5
EPS(00)<0	-32,4%	-34,5%	-26,3%	-38,7%	-24,1%
EPS(00)>0	18,2%	16,3%	13,6%	11,7%	5,8%
	Median	EPSCHG(p1)			
Market Value Quintile	1	2	3	4	5
EPS(00)<0	31,1%	24,3%	19,7%	18,4%	21,9%
EPS(00)>0	10,3%	11,5%	8,1%	9,4%	6,7%

It can be seen from Table 2 that the market values for each of the two portfolios (EPS(00) > 0 and EPS (00) < 0) are roughly comparable across quintiles. For example, the median market value of the first quintile for the negative earnings portfolio was R25,3 million compared to R32,9 million for the positive earnings portfolio. Similarly, for quintile 2 the comparisons are R79,6 million versus R97,4 million, and so on.

From Table 2 it can also be seen that the first, second, and fifth quintile CARs are considerably higher for the negative earnings portfolios as compared to the positive earnings portfolio – the comparisons are 16,5% versus 4,3% for the first quintile, 9,2% versus -0,9% for the second quintile, and 19,6% versus -4,2% for the fifth quintile. For the third and fourth quintiles, the negative earnings portfolio CAR's are also better than the positive earnings portfolios, but the comparisons are not

cratching his head in dismay, James Hargreaves stared at the ruin of a morning's work. His daughter, Jenny had knocked her spinning wheel over, its precious yarn now strewn across the floor of their humble cottage.

In 1760 England, weaving cloth was little more than a cottage industry. The Hargreaves earned their keep spinning thread by day, weaving it into cloth by night. But as the wheel turned listlessly on its side, Hargreaves looked beyond his despair. And saw the future. He could make a machine with several horizontal spindles. A machine that could do the work of eight people.

And so was born the idea that began the Industrial Revolution. The "Spinning Jenny", named after the daughter whose mishap inspired Hargreaves to turn a morning's loss into a lifetime of profit.
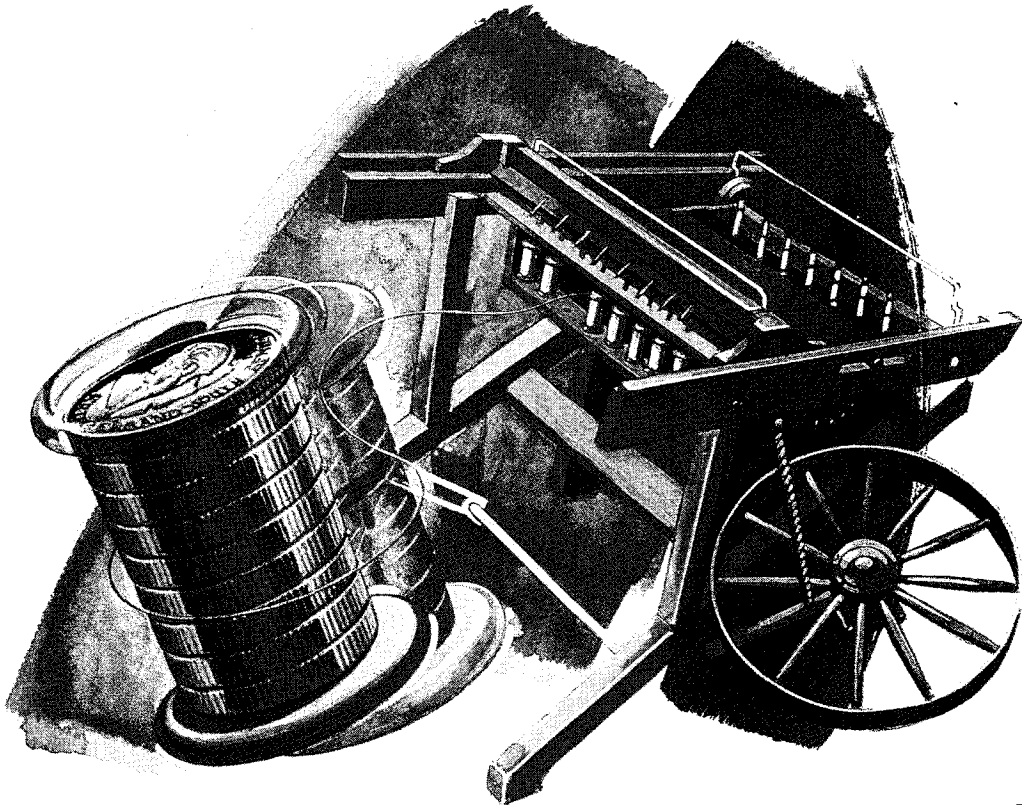
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as dramatic i.e. -1,4% versus -2,1% and 1,3% versus -2,9% respectively. These results clearly show that the negative earnings effect exists independently of any small-firm effect.

In order to control and make a more explicit evaluation for differences in company size, the following regression model was estimated:

$$CAR = 0,217 - 0,065 \text{ LN(MARKET)} + 0,082 \text{ LOSS} \qquad (5)$$
$$(7,21) \quad (-8,34) \qquad\qquad (3,36)$$

Where LN(MARKET) is the natural logarithm of market value (a measure of company size). LOSS is a dummy variable that assumes a value of one for negative earnings companies and a value of zero for positive earnings companies. The estimated coefficient for the size surrogate is negative, as expected, while the coefficient for LOSS is positive. Both are highly significant (t-values of -8,34 and 3,36, respectively). Equation (5) reveals that after controlling for differences in company size, we find a positive mean CAR difference of 8,2% for negative earnings companies versus the positive earnings companies. This confirms the earlier finding that even controlling for company size, there remains a negative earnings effect.

Table 2 reveals an interesting pattern in the differences in risk (measured by beta) for the two categories of reported earnings. For all five quintiles the median beta values are somewhat higher for the negative earnings portfolio compared to the positive earnings portfolio. Furthermore, for all five quintiles the median CAR values are generally positive and considerably higher for the negative earnings portfolio compared to the positive earnings portfolio. The initial reporting of negative earnings leads to an increase in risk and a reduction in share prices. As the negative earnings rebound in the year immediately following the test year there is a continuous reduction in risk and a corresponding increase in market value (as reflected by positive CAR values) over time. The negative correlation between risk and market value suggest that investors are compensated for the perceived higher risk associated with companies reporting negative earnings.

An analysis of the median EPSCHG(p1) variable in Table 2 reveals as interesting trend. It appears that, after controlling for company size, the negative earnings effect is still driven by the subsequent recovery in earnings. The median earnings changes for the first year after the test year, EPSCHG(p1), are consistently and substantially higher for the negative earnings portfolios compared to the positive earnings portfolios, regardless of company size. For example, for the first quintile companies the median first-year earnings change for the negative earnings companies is 30,1% versus 10,3% for the positive earnings companies, for the fifth quintile the comparisons are 21,9% versus 6,7%.

The results of this investigation are consistent with the hypothesis proposed to explain the negative earnings effect for companies listed on the JSE. Risk-averse investors, faced with the inherent uncertainty involved in estimating the future earnings stream, tend to place an undue emphasis on recent earnings announcements. Furthermore, investors habitaully extrapolate recent earnings trends into the future, ignoring the random walk elements in earnings pattern as well as ignoring the tendency of most divergences from average earnings performance to correct themselves over time (reversion to the mean). The overreaction to current earnings announcements for companies reporting negative earnings leads to an excessive discounting of their share prices. The negative earnings effect may be attributable to the subsequent correction of the initial overreaction. It appears that investors either underestimate the degree to which earnings "recover" after a negative earnings year, or the market simply overreacts to the negative announcement, or both.

There is the possibility that the frequency of unprofitable performance may influence the share prices of companies reporting negative earnings. This necessitates a comparison of "repeat offenders" versus "first-time losers". Therefore, the negative earnings companies were subdivided into two groups" 1) companies whose negative earnings years are preceded by one or more successive positive earnings years, i.e., "first-time losers"; and 2) companies whose negative earnings years are preceded by one or more additional negative earnings years, i.e., "repeat offenders".

It is suggested that the market may make a distinction between these different situations. A company reporting negative earnings which is preceded by positive earnings may well surprise the market. On the other hand, the reporting of negative earnings by a company that has already reported negative earnings in the preceding period should not surprise the market. The overreaction hypothesis would predict that the negative earnings effect would be more apparent for first-time losers than for repeat offenders. In particular, the expectation is, that any excessive discounting of share prices, if it existed, would occur during the period of reporting the first negative earnings. The Market Model data presented in Table 3 do not support this proposition.

TABLE 3
Market Mode statistics for "first-time losers" versus "repeat offenders" during 1975-1989

Panel A: Repeat Offenders
Total Observations = 52

	Median	Mean	Std. Dev.
CAR	16,7%	21,4%	49,7%
Market Value (R millions)	39,7	291,9	352,1
Beta	1,522	1,462	0,396
EPSCHG (m2)	-3,2%	-5,7%	39,5%
EPSCHG (m1)	-27,3%	-33,4%	46,2%
EPSCHG (00)	-5,7%	-15,7%	71,3%
EPSCHG (p1)	19,5%	38,6%	126,4%
EPSCHG (p2)	11,4%	41,8%	130,8%

Panel B: First Time Losers
Total Observations = 148

	Median	Mean	Std. Dev.
CAR	6,9%	9,2%	39,8%
Market Value (R millions)	80,2%	416,3	301,7
Beta	1,304	1,334	0,401
EPSCHG (m2)	1,4%	3,6%	47,4%
EPSCHG (m1)	-2,7%	7,1%	61,5%
EPSCHG (00)	-34,3%	-43,2%	50,2%
EPSCHG (p1)	23,9%	30,5%	41,6%
EPSCHG (p2)	13,5%	18,2%	34,9%

Table 3 (Panel B) shows that the median and mean CAR_s for first-time losers in the year immediately following the test year are 6,9% and 9,2%, respectively. While these results are significantly greater than zero in a statistical sense, they are considerably less than the median and mean CARs for repeat offenders (Panel A), which are 16,7% and 21,4% respectively. The t-statistic for a test of the hypothesis that the mean CAR equals zero is 2,81 for first time losers, and 3,43 for the repeat offenders. It appears therefore that, while a strategy of buying first-time losers may be profitable, even greater rewards can be attained through predicting corporate recoveries — companies with two or more successive negative earnings years, whose earnings are about to recover.

An important statistic shown in Table 3 is that repeat offenders are considerably smaller than first-time losers. Given the relatively small number of observations for the repeat offenders (fifty-two), an analysis of the size effect similar to that presented in Table 2 is not appropriate, for each repeat offender quintile would include only ten observations. Therefore, a linear regression was performed with the subsamples of first-time losers and repeat offenders, and the following estimated coefficients were obtained:

$$CAR = 0,204 - 0,054 \text{ LN(MARKET)} + 0,062 \text{ FIRST} + 0,157 \text{ REPEAT} \quad (6)$$
$$ (8,13) \quad (-9,24) \qquad\qquad (2,34) \qquad\quad (3,67)$$

Where : LN(MARKET) = natural logarithm of market value (a measure of company size);
FIRST = 1 for first-time losers, and 0 otherwise; and
REPEAT = 1 for repeat offenders, and 0 otherwise.

As expected, the coefficients of the variables FIRST and REPEAT are both positive, and the coefficient for REPEAT is greater than that for FIRST. While the coefficient of FIRST differs from zero at a marginal level of significance (0,0572 for a two-tailed test), the coefficient of REPEAT is highly significant (0,0003 for a two-tailed test). These results confirms the observation that a strategy of investing in the shares of repeat offenders is likely to be more profitable than investing in the shares of first-time losers.

DISCUSSION

The results presented in the previous section provide clear evidence of investor overreaction to earnings announcements on the JSE during the period 1975-1989. A simple strategy of buying the shares of companies reporting negative earnings would have generated, on average, a positive abnormal return of 12,5% during the year following the negative earnings. It was also observed that companies reporting negative earnings experience considerably larger earnings gains (recoveries) in the first and second year following the test year than do companies not announcing negative earnings. These results are also consistent with the negative earnings effect reported by Ettredge and Fuller (1991) for shares listed on the NYSE.

The results of this investigation, also support the hypothesis proposed to explain the negative earnings effect for companies listed on the JSE. It appears that investors either underestimate the degree to which earnings "recover" after a negative earnings year, or the market simply overreacts to the negative earnings announcement, or both. The fact that earnings reversals are accompanied by contemporaneous share price reversals suggest that the market fails to recognise the tendency towards mean reversion in extreme earnings numbers. It would appear that investors do not form rational expectations about the future profitibility of companies reporting negative earnings.

The asymmetry of response behaviour to positive and negative earnings announcements implies that unfavourable earnings announcements attracts more attention than favourable earnings announcements in the market. A possible explanation of the negative earnings effect is that several investors may be following an old investment maxim, "when in doubt, sell out". The undue influence of negative earnings announcements can be attributed to the fact that losses affect investment decisions to a greater extent than the corresponding amount of earnings gains. Risk-averse investors are unduly concerned with the preservation of their investment capital. Therefore, negative earnings may well induce investors to sell quickly in an effort to minimize their losses.

The selling pressure could depress prices well below levels justified by the negative earnings. Such a selling pressure is especially likely to occur on the JSE, which is dominated by a few large institutional investors. The absence of a large number of buyers and sellers creates a "thin" market for the securities traded. The large institutional investors prefer to invest in large listed companies having the status of "blue chip" investments. Furthermore, institutional investors have a tendency to take major market positions in an effort to exert some form of control over their investments. In the event of forced selling (in response to negative earnings) by institutional investors, a major decline in the price of the affected shares can be expected because of the high volume of shares involved.

The share price behaviour following reports of negative earnings is driven by many complex factors. A failure to identify and fully understand these factors will result in an incomplete understanding of the phenomenon. To better understand the share market pricing of companies reporting negative earnings, we need to undertake additional research. Such research will help to determine what are the economic and perhaps, behavioural factors that investors use in setting the market prices of these securities.

A limitation of this investigation is that no distinction has been made between negative earnings arising from purely operating conditions and negative earnings that are caused by extraordinary items and discontinued operations. It is suggested that the negative earnings effect be studied using two subsamples. That is, companies reporting negative earnings for net income, the "net income" portfolio, and companies reporting negative earnings excluding extraordinary items and discontinued operations, the "ordinary income" portfolio. It may well be that investors make a distinction between negative earnings caused by operating conditions and those due solely to extraordinary items or discontinued operations.

There does appear to be a positive relationship between the yearly CAR_s for companies reporting negative earnings and the earnings recovery these companies report in the following year.

It can be suggested that the factor driving the yearly CAR_s for companies reporting negative earnings is a systematic risk factor. That is, companies reporting negative earnings are perceived as risky and investors who are willing to invest in these companies require to be compensated with higher average returns over the investment period. This explanation is consistent with the "risk change" hypothesis suggested by Vermaelen and Verstringe (1986). A useful area for further study is to identify the operating and financial characteristics of companies reporting negative earnings in order to determine to what extent they are perceived as risky by the investment community.

It could well be that the perceived riskiness of companies reporting negative earnings is related to the "marginal firm" concept suggested by Chan and Chen (1991). They show that marginal firms are typically poor performers, they are inefficient producers, and they are likely to have high financial leverage and cash flow problems. They are marginal in the sense that their prices tend to be more sensitive to changes in the economy, and they are less likely to survive adverse economic conditions. In short, the marginal firms are perceived as being very risky. This further highlights the need to investigate the operating and financial characteristics of companies reporting negative earnings because they might be viewed as marginal or "distressed".

Mott and Coker (1993) have reported that for the past three decades the earnings surprise theory (which forecasts standardized unexpected earnings) has been used to consistently predict companies likely to outperform the market. Overseas evidence does suggest that there may be limits to be mar-

ket's ability to accurately process earnings information, especially in the case of smaller companies with limited analyst following. The market interprets available accounting information in a sophisticated manner, but does not completely reflect it in security prices when the information is publicly released. It is strongly recommended that the earnings surprise theory be tested under South African capital market conditions. This may enable local investors to supplement earnings announcements with additional information to assess the "quality" of company earnings by means of a trendline forecast.

CONCLUSIONS

This paper provides additional evidence consistent with the simple behavioural view that investors overreact to short-term earnings movements. Certainly within the framework of the efficient market hypothesis, it is distinctly puzzling that a dramatic fall (rise) in share prices is predictive of a subsequent rise (fall) in company-specific earnings. An analysis of the abnormal share returns cumulated over twelve-month periods following annual earnings announcements reveal that a strategy of buying shares of companies that announced negative earnings, and holding these shares over the next twelve months, would generate positive abnormal returns of about 12,5% before transaction costs. The observed negative earnings effect exists independently of any small-firm effect. It was also found that companies reporting negative earnings in any test year experienced, on average, strong earnings recovery over the next two years.

The results of this investigation are consistent with the hypothesis proposed to explain the negative earnings effect for companies listed on the JSE. The overreaction to current earnings announcements for companies reporting negative earnings leads to an excessive discounting of their share prices. The negative earnings effect may be attributable to the subsequent correction of the initial overreaction. It appears that investors either underestimate the degree to which earnings "recover" after a negative earnings year, or the market simply overreacts to the negative earnings announcement, or both.

The market inefficiency associated with overreaction to company-specific negative earnings announcements suggests that astute investors may outperform the market by following an appropriate investment strategy. In testing companies whose negative earnings were preceded by positive earnings (first-time losers) and those whose negative earnings were preceded by one or more additional negative earnings (repeat offenders), it was found that the largest abnormal returns were experienced by repeat offenders. These results suggest that additional research into predicting corporate recoveries may be particularly useful for investors seeking to outperform the market.

ACKNOWLEDGEMENTS

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Earnings growth for negative EPS – Investment Basics XXXII

INTRODUCTION

A basic mathematical principle poses a problem of extensive impact for the financial analyst. In this article an effort is made to briefly describe the problem and suggest methods to overcome it.

DESCRIPTION OF THE PROBLEM

The basic principle concerned is that of dividing a positive number by negative number resulting in a negative number (and vice versa) and likewise dividing a negative number by a negative number resulting in a positive answer.

The problem emerges especially in the case of calculating the earnings growth (percentage change of earnings per share [EPS]). As negative EPS figures are reported at times the simple and widely applied formula of $(EPS_t - EPS_{t-1})/EPS_{t-1}$ is problematic should the EPS_{t-1} be negative and the EPS_t positive since it results in a negative percentage change. Futhermore, a loss in $year_{t-1}$ followed by a bigger loss in $year_t$, will result in a positive percentage change.

In addition nil earnings reported in $year_{t-1}$ poses the problem of division by nil resulting in an infinite number. Likewise any number just a fraction bigger than nil tends to blow up the earnings percentage change considerably.

METHODS OF ADDRESSING THE PROBLEM

In confronting the problem it is important to consider whether a single company is being analyzed or whether trends and characteristics of a number of companies are being studied.

Should the financial analyst be working with a single company the best solution is to apply a formula where the absolute value of the denominator is used, i.e. $(EPS_t - EPS_{t-1})|EPS_{t-1}|$. The following simple examples in Table 1 illustrate the possible outcomes. Column c illustrates the outcome where the absolute value of the denominator is not used and column d illustrates the outcome suggested in this article (i.e. where the absolute value of the denominator is used).

TABLE 1
Earnings per share percentage change

Year$_t$	Year$_{t-1}$	Percentage change	
		No absolute value used	Absolute value used
a	b	c	d
30	20	50%	50%
30	-20	-250%	250%
-30	20	-250%	-250%
-30	-20	50%	-50%
20	30	-33%	-33%
20	-30	-167%	167%
-20	30	-167%	-167%
-20	-30	-33%	33%

The problem can also be eliminated by using a scaling factor such as the share price. The formula applied to calculate percentage change will then be the following:

$(EPS_t - EPS_{t-1})/P_{t-1}$. By using the latter the problem of a blown up percentage due to a very low denominator is reduced at the same time.

If trends or growth rates of a number of companies are being studied two more alternatives could be of use. Firstly companies reporting losses can be taken out of the sample entirely.

However, the extend to which a bias is thus incorporated and the implication thereof regarding the findings of the study concerned are points of debate.

In stead of eliminating companies reporting losses the earnings of all companies included in a particular study can be "pooled" per year. In this fashion growth rates for arbitrary periods can be calculated for the "market" as it were.

UNACCEPTABLE METHODS

After having suggested ways and means of overcoming our mathematical problems of division it should be noted that adjusting the data by interpolating to replace the loss figures results in nothing but an incorrect solution. Furthermore replacing the loss by the smallest of fractions blows up the percentage change as discussed previously.

Great care should be taken, especially when working with data of considerable magnitude and computerising calculations, that none of the above discussed aspects are unintentionally ignored.

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